

## Investigation on Factors Associated with Back Sore in Working Donkeys in Ada'a District, Central Oromia, Ethiopia

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Rec date: Aug 03, 2015; Acc date: Sep 07, 2015; Pub date: Sep 09, 2015

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### Abstract

The cross-sectional study was carried out from November 2009 to April 2010 to investigate factors associated with back sore in working donkeys in Ada'a district, central Oromia, Ethiopia. A total of three hundred eighty five (385) working donkeys with back sore were randomly selected and examined for risk factors back sore. The study revealed that the degree of sore was statistically associated ( $P < 0.05$ ) with sex, cause and age but insignificantly associated ( $P > 0.05$ ) with body condition score. Old age donkeys were extremely vulnerable 256 (66.5%) to the back sore, the highest frequency of mild degree of back sore 215 (55.8%) and medium body condition score donkeys 218 (56.6%) was observed. The location of the back sore was significantly associated ( $P < 0.05$ ) with body conditions but not associated ( $P > 0.05$ ) with sex, age and cause of the back sore. In the study improper harnessing and padding 198 (51.4%) followed by overloading and overworking 184 (47.8%) were the most cause of donkeys back sore. Type of back sore showed a significant ( $P < 0.05$ ) variation in donkeys with different risk factors sex, age, body condition score and cause of sore and erosion 169 (43.9%) was the most frequent followed by laceration 110 (28.6%) in the study area. The current study revealed that there is no variation ( $P > 0.05$ ) in the treatment offered to donkeys with different risk factors sex, age, cause of sore and body condition score. Majority of donkeys with back sore 339(88%) were not gained any treatment. This infers that back sore is the major health and welfare problems of donkeys that compromise performances of working donkeys of the study area.

**Keywords:** Back sore; Risk factors; Donkeys; Ada'a district

### Introduction

The world and Africa's donkey population is about 44 million and 13.7 million respectively. In developing countries 95% of donkeys are found and the rest in developed countries [1]. In the developing world the highest donkey population is found in central Asia, North and East Africa [2]. Donkeys in developing countries are kept mainly for work [3]. Donkeys play an important role in rural communities by providing power and transport at a low cost. They are also used for various agricultural operations such as ploughing, planting, and weeding and provide the much needed transport in rural areas for activities such as carrying building materials, agricultural products, people and fetching water [4].

Ethiopia possess about 5.2 million of donkeys which is the second largest donkey population in the world next to China and stands first in Africa with over forty percent of Africa's donkey population [5]. In Ethiopia there is one equine for every four people in agricultural sector. Donkeys have been a part of farming system as animal power in areas with scarcity of oxen supply for ploughing in the highland part of the country road [6]. The low level of development of the transport system and the rough terrain of the country make donkeys the vulnerable, appropriate and affordable pack animal under the small holder farming system [7]. Donkeys are the most suitable means of transportation in Ethiopia due to the mountainous and rugged terrain landscape [8]. Despite their great importance donkeys have been suffering from overwork and malnutrition as most of their owners are poor and resource limited and depend on these animals for their livelihood [9]. In household without donkeys the women take the

responsibilities of doing heavy work [10]. Donkeys are often described as sturdy animals, hence are exposed to a variety of diseases and many other adverse conditions [11].

A poorly designed or ill-fitted harness can cause inefficient transfer of power from the donkeys to the implement and cause fatigue, discomfort or injury the donkey [4]. Donkeys are usually much more affected than horses and mules because of widely prevailing opinion that they are tolerant to harsh condition, and carry heavy load over long distances for long period of time and travel as far as 70 km/day while carrying an average weight load of 150 kg. These are the major cause of injuries on the back of donkeys due to overloading and overweight. Traditionally constructed wooden or iron-made saddles are constantly put on the back and strongly tied to the body by plastic rope which causes persistent irritation and injuries [12]. Back sore is a common and widely distributed problem of health and welfare of working donkeys in all parts of Ethiopia and there is scarcity of information on the economic importance, proportion and potential risk factors in Ethiopia.

Therefore, the main objective of this paper is to investigate the factors associated with back sore in working donkeys in Ada'a district, central Oromia, Ethiopia.

### Materials and Methods

#### Study area

The study was conducted from November, 2009 to April, 2010 in Ada'a district, central Oromia. Bishoftu is the main town of Ada'a district which is 47 km South East of Addis Ababa capital city of

Ethiopia. Bishoftu is geographically located at 90 N and 400 E and an altitude of 1900 m above sea level. The rainfall is bimodal. The area receives an annual rainfall of 850 mm with a maximum and minimum range of temperature 30.70°C and 8.50°C, respectively. The average relative humidity is 61.3% [13]. The donkey population of the district is 46,222 [14]. Donkeys are primarily used for carrying water, materials for sale to the market, fire wood, farm products, construction materials as well as straw in the study area.

### Sample determination

As there is no previous studies on the back sore of working donkeys in the Ada'a district the sample size for this study was calculated by using 95% confidence level, 5% precision and 50% expected prevalence according to Thrusfield [15] and 385 of working donkeys with back sore was studied.

### Study animals and design

The study animals were specifically working donkeys with back sore in Ada'a district. The cross sectional study on a total of 385 donkeys with back sore was randomly selected from donkeys with back sore visited the stationary and mobile clinic of the Donkey Health and Welfare Clinic Project for the deworming programme. Each randomly selected donkey with back sore was examined for only one location of back sore on donkey. Clinical examination of donkeys with the back sore was performed regarding to sex, age and body condition. Information about back sore on each affected donkey that include cause, location, type, degree of sore and treatment were collected. The age of the selected donkeys having back sore was determined by dentition according to Crane [16] and body condition was scored poor, medium and good as described by Svendsen [11]. Donkeys with back sore were grouped into three age categories. Donkeys with back sore

under two years of age were classed as young (n=2), those in range of two to ten years were classed as adult (n=127) and those beyond ten years were classed as old (n=256). These age classes were based on age of first work, productive age and the life span of Ethiopian donkeys [17,18].

### Data analysis

Data collected was entered into computer using excel spread sheet. It was analyzed using statistical software SPSS for windows version 15.0. Descriptive statistics and Chi-square were used. The confidence level was set at 95% and P<0.05 was set for level of significance.

### Results

Study on donkeys with back sore visited stationary and mobile clinic of Donkey Health and Welfare Project was revealed that the mild degree of back sore was the higher in all risk factors except in unknown cause and degree of back sore was statistically significant (P<0.05) with cause, sex and age. It was insignificantly associated (P>0.05) with the body condition score. The major cause of donkey's back sore was improper harnessing and padding 198(51.4%) followed by overloading and working 184(47.8%) (Table 1). The study showed that back sore on the thoracic 211(54.8%) was higher in all risk factors than other location of sore on back of donkeys and differently associated (P<0.05) with the risk factors (Table 2). The study revealed that erosion 169(43.9%) was the most common type of wound observed on the back of donkey and significantly associated (P<0.05) with risk factors (Table 3). The study clearly showed that majority of the owners at the study area rarely treated their donkeys for back sore. Among types of treatment given traditional treatment 30(7.8%) was redundantly rendered than modern treatment 16(4.2%) offered and insignificantly associated (P<0.05) (Table 4).

Risk factors		Degree of back sore				X <sup>2</sup> value	Df	P- value
Sex	Jenny	131(34%)	14(3.6%)	58(15.1%)	203(52.7%)	13.531	2	0.001
	Jack	84(21.8%)	23(6%)	75(19.5%)	182(47.3%)			
Total		215(55.8%)	37(9.6%)	133(43.6%)	385(100%)			
Age	Young	2(0.5%)	0	0	2(0.5%)	10.626	4	0.031
	Adult	81(21%)	15(3.9%)	31(8.1%)	127(33%)			
	Old	132(34.3%)	22(5.7%)	102(26.5%)	256(66.5%)			
Total		215(55.8%)	37(9.6%)	133(34.6%)	386(100%)			
BCS	Poor	57(14.8%)	15(3.9%)	48(12.5%)	120(31.2%)	9.061	4	0.060
	Medium	129(33.5%)	15(3.9%)	74(19.2%)	218(56.6%)			
	Good	29(7.5%)	7(1.8%)	11(2.9%)	47(12.2%)			
Total		215(55.8%)	37(9.6%)	133(34.6%)	385(100%)			
Cause	Improper harnessing and padding	124 (32.2%)	20(5.2%)	54(14%)	198(51.4%)	41.734	14	0.000
	padding	90(23.4%)	17(4.4%)	77(20%)	184(47.8%)			
	Overloading and working	1(0.3%)	0	2(0.5%)	3(0.8%)			

	Unknown							
Total			22(5.7%)	133(34.5%)	385(100%)			
		215(55.9%)						

**Table 1:** Risk factors for degree of back sore in donkeys. Jenny=Female Donkey, Jack=Male Donkey.

Risk factors		Location of sore on back					X <sup>2</sup> value	df	P-value
		Wither	Thoracic	Lumbar	Sacral	Total			
Sex	Jenny	29(7.5%)	104(27%)	62(16.1%)	8(2.1%)	203(52.7%)	4.125	8	0.846
	Jack	23(6%)	107(27.8%)	47(12.2%)	5(1.3%)	182(47.3%)			
	Total	52(13.5%)	211(54.8%)	109(28.3%)	13(3.4%)	385(100)			
Age	Young	0	1(0.3%)	1(0.3%)	0	2(0.6%)	17.339	16	0.364
	Adult	17(4.4%)	63(16.4%)	38(9.9%)	9(2.3%)	127(33%)			
	Old	35(9.1%)	147(38.1%)	70(18.2%)	4(1%)	256(66.4%)			
	Total	52(13.5%)	211(54.8%)	109(28.4%)	13(3.3%)	385(100%)			
BCS	Poor	8(2.1%)	69(17.9%)	41(10.6%)	2(0.5%)	120(31.1%)	26.345	16	0.049
	Medium	32(8.3%)	121(31.4%)	57(14.8%)	8(2.1%)	218(56.6%)			
	Good	12(3.1%)	21(5.5%)	11(2.9%)	3(0.8%)	47(12.3%)			
	Total	52(13.5%)	211(54.8%)	109(28.3%)	13(3.4%)	385(100%)			
Cause	Improper and padding	28(7.3%)	102(26.5%)	59(15.3%)	9(2.3%)	198(51.4%)	72.585	56	0.067
	Overloading and working	24(6.2%)	107(27.8%)	49(12.7%)	4(1%)	184(47.8%)			
	Unknown	0	2(0.5%)	1(0.3%)	0	3(0.8%)			
	Total	52(13.5%)	211(54.8%)	109(28.3%)	13(3.3%)	385(100%)			

**Table 2:** Risk factors with location of sore on donkeys back.

Risk Factors		Type of sore								X <sup>2</sup>	df	P-value
		Laceration	Puncture	Erosion	Hematoma	Swelling and Erosion	Incision	Burns	Total			
Sex	Jenny	49(12.7%)	0	106(27.5%)	5(1.3%)	9(2.3%)	1(0.3%)	33(8.6%)	203(52.7%)	15.424	6	0.017
	Jack	61(15.8%)	3(0.8%)	63(16.4%)	9(2.3%)	9(2.3%)	1(0.3%)	36(9.4%)	182(47.3%)			
	Total	110(28.6%)	3(0.8%)	169(43.9%)	14(3.6%)	18(4.7%)	2(0.5%)	69(17.9%)	385(100%)			
Age	Young	0	0	2(0.5%)	0	0	0	0	2(0.5%)	11.060	12	0.524
	Adult	26(6.8%)	1(0.3%)	62(16.1%)	4(1%)	9(2.3%)	1(0.3%)	24(6.2%)	127(33%)			
	Old	84(21.8%)	2(0.5%)	105(27.3%)	10(2.6%)	9(2.3%)	1(0.3%)	45(11.7%)	256(66.5%)			
	Total	110(28.6%)	3(0.8%)	169(43.9%)	14(3.6%)	18(4.7%)	2(0.5%)	69(17.9%)	385(100%)			

BCS	Poor	43(11.2%)	2(0.5%)	51(13.2%)	4(1%)	9(2.3%)	0	11(2.9%)	120(31.2%)			
	Medium	58(15.1%)	1(0.3%)	99(25.7%)	6(1.6%)	8(2.1%)	1(0.3%)	45(11.7%)	218(56.6%)	24.373	12	0.018
	Good	9(2.3%)	0	19(4.9%)	4(1%)	1(0.3%)	1(0.3%)	13(3.4%)	47(12.2%)			
	Total	110(28.6%)	3(0.8%)	169(43.9%)	14(3.6%)	18(4.7%)	2(0.5%)	69(17.9%)	385(100%)			
Cause	Improper harnessing and padding	40(10.4%)	0	77(20%)	5(1.3%)	6(1.6%)	1(0.3%)	68(17.7%)	198(51.4%)	388.278	42	0.000
	Overload and working	69(17.9%)	2(0.5%)	91(23.6%)	9(2.3%)	11(2.9%)	1(0.3%)	1(0.3%)	184(47.8%)			
	Unknown	1(0.3%)	1(0.3%)	1(0.3%)	0	0	0	0	4(0.8%)			
	Total	110(28.6%)	3(0.8%)	169(43.9%)	14(3.6%)	17(4.5%)	2(0.5%)	69(17.9%)	385(100%)			

Table 3: Type of sore by risk factors.

Risk Factors		Nontreated	Treatment given before survey		X <sup>2</sup>	df	P-value
			Traditional	Modern			
Sex	Jenny	180(46.8%)	17(4.4%)	6(1.6%)	1.694	2	0.429
	Jack	159(41.3%)	13(3.4%)	10(2.6%)			
	Total	339(88%)	30(7.8%)	16(4.2%)			
Age	Young	2(0.5%)	0	0	6.184	4	0.186
	Adult	119(30.9%)	5(1.3%)	3(0.8%)			
	Old	218(56.6%)	25(6.5%)	13(3.4%)			
	Total	339(88%)	30(7.8%)	16(4.2%)			
BCS	Poor	101(26.2%)	14(3.6%)	5(1.3%)	3.910	4	0.418
	Medium	195(50.6%)	14(3.6%)	9(2.3%)			
	Good	43(11.2%)	2(0.5%)	2(0.5%)			
	Total	339(88%)	30(7.8%)	16(4.2%)			
Cause	Improper harnessing and padding	174(45.2%)	14(3.6%)	10(2.6%)	10.240	14	0.74
	Overloading and working	162(42%)	16(4.2%)	6(1.6%)			
	Unknown	3(0.8%)	0	0			
	Total	339(88%)	30(7.8%)	16(4.2%)			

Table 4: Treatment given before survey of back sore by risk factors.

## Discussion

Degree of back sore was significantly ( $P < 0.05$ ) varied in donkeys of different sex, cause and age but insignificantly associated ( $P > 0.05$ ) with body condition score. This is most probably attributed to the fact that the jack usually pass time on work, physically strong and was vulnerable to the heavy loads that result in the sever degree of sore 75(19.5%) on the back of working jack than Jenny. In this study the mild degree of back sore 215(55.8%) was higher than the other degree

of sore. However, in contrary to this finding Demelash and Moges [12] reported from Hawassa area that 41 (16.1%) of mild degree of injuries.

Old age donkeys were extremely vulnerable 256 (66.5%) to the back sore than the rest. Similar findings were reported by Birhan et al. [19] and Demelash and Moges [13]. As age increases the working time and overloading was increasing and donkeys were easily predisposed to back sore.

The medium body condition score donkeys 218 (56.6%) were frequently exposed to back sore. This study contradicts the findings

reported by Mekuria et al. [20]; Birhan et al. [17] and Pearson et al. [17] which states that the sore was dominant on poor body condition score donkeys in the study area.

The location of the back sore was significantly associated ( $P < 0.05$ ) with body conditions but not associated ( $P > 0.05$ ) with sex, age and cause of the back sore. Frequency of back sore on thoracic 211 (54.8%) was the higher than others and similar study reported proportion of 58 (22.8) was frequently observed on thoracic area than others by Demelash and Moges [13]. It indicates that the thoracic area is mainly susceptible to back sore.

The study indicated that improper harnessing and padding 198 (51.4%) followed by overloading and overworking 184 (47.8%) were the most cause of back sore of donkeys in the study area. Lower proportions were reported by Fentie et al. [21] from Bahir Dar states that harnessing 78 (31.2%) and overloading 31 (12.4%) and Demelash and Moges [13] from Hawassa area reported that improper harness 66 (26%) was identified as the major cause of injury in donkeys. This is most probably due to carried materials on the back lower heat exchange and physiologically to overcome the heat donkeys excrete sweat. The excreted sweat moist the hair and skin and carried materials polish with the wetted skin result in damage of the skin as well as underlining muscles based on the type of carried materials and how long donkeys under work.

Type of back sore showed a significant ( $P < 0.05$ ) variation in donkeys of different sex, age, body condition score and cause of sore. In the study area erosion 169 (43.9%) was more frequent followed by laceration 110 (28.6%). Erosion was principally caused by overloading and overworking 91 (23.6%) followed by improper harnessing and padding 77 (20%). Hence, during this study in the Ada'a district there was huge harvesting of crops and owners sold cattle dung to Bishoftu town by traveling long distance which increased probability of occurrence of back sore of the study donkeys.

Study presented that there is no variation ( $P > 0.05$ ) in the treatment offered to donkey of different sex, age, body condition score and cause of sore. Majority of donkeys with back sore 339 (88%) were not presented purposively for treatment of back sore by their owners. This finding is greater than the previous work of Demelash and Moges [13] who reported from Hawassa area that higher number of owners did not provide any treatment (38.6%) to their equines.

## Conclusion and Recommendations

This study investigated that back sore is the problem of health and welfare of working donkeys in the area. In addition, the study clearly showed that donkeys of all age, sex and body condition score affected by back sore and several causes are responsible for back sore on working donkeys of the study area. Majority of the working donkeys with back sore were untreated for both traditional and modern treatment.

Therefore, Regular and continuous community education about the proper use of harness on their donkeys should be given. Donkeys with the back sore should get sufficient rest. Owners should avoid the overload and overwork of their equine. Finally, further studies should be conducted on the prevalence, economic significance and health and welfare importance of back sore in equine in vast areas of Ethiopia.

## Acknowledgment

I am thankful for financial support from Donkey Health and Welfare Project.

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