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Occurrence of Wound in Working Equids and Associated Risk Factors in and around Bishoftu Oromia Region, Ethiopia

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Abstract

This study was undertaken to investigate the occurrence of wound and determine its risk factors in working Equines in and around Bishoftu, Oromia region Ethiopia. Purposive sampling method was performed to screen clinically affected Equids. Accordingly, 1017 working Equines that had comprised of (N=485) horses, (N=513) donkeys and (N=19) mules were examined to determine the cause, anatomical site affected, degree and type of the wound on different body parts. Results of the present investigation showed that the overall prevalence of wound in the study area was 28.5%. The species prevalence was 37.5%, 31.6% and 19.9% in horses, mules and donkeys respectively. In this study, the prevalence of wound between sex categories was 19.4% in females and 31.4% in males as well as 24.3% in young and 29.3% in adult and 31.6% in old age groups. The prevalence of wound in body condition was 30.8% in moderate and 26% in good body condition. Species and Sex category were significantly influence the prevalence of external injuries in Equids ($P < 5\%$). There was higher Proportion of severely injured donkeys (60.8%) than horses (35.7%) and Mules (16.7%). Moderate wound was the most cases in all Equids which was 46% of the cases. Girth had the highest overall proportion of wound (27%) and the least one was happened on fetlock region (14.1%). Girth sore (27%), Chest sore (23.2%), back sore (17.3%), fetlock sore (14.1%) were the types of wound ranked based on their proportion. The current study indicated that over loading and improper harness or saddle design were the major causes of injuries in donkeys (35.3%) and horses (36.2%). In this study, the highest anatomical sites of sore was on wither and back (27.5%) and the lowest was on the tail base (6.9%). The findings of the present study lead to the conclusion that wounds are one of the major health and welfare problems of Equines in and around Bishoftu. Therefore, innovative techniques that can minimize the incidence of wound and welfare practices need to be introduced and adopted under the condition of animal owners.

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Bishoftu, Equids, Wound, Prevalence, Sore.

Introduction

Equines are the most important working animals to the resource-poor communities in both rural and urban areas of Ethiopia, providing traction power and transport services (Ameni, 2006). Poor transport networks, rugged topography as well as low economic status of the

community necessitate the use of equines as alternatives means for transportation (Mengistu, 2003). In rural and peri -urban areas, people rely on equines to transport agricultural products and other supplies to villages (Yoseph *et al.*, 2005). Horses are particularly important in pulling carts, transport goods to and away from markets, farms and also provide long distance transport

services for the communities (Biffa and Woldemeskel, 2006). Despite their invaluable contributions, Equines in Ethiopia are neglected and little attention is given to study their health status and welfare aspects. Due to poor attention given to working Equines, they are prone to various health disorders such as malnutrition, early death due to parasitic burden and acute sores (Svendesen, 1997). The welfare of working equids is crucially important not only for the health and survival of those animals, but also for the livelihoods of poor society that depends on them (Pearson and Krecek, 2006).

Studies to elucidate the magnitude of this problem are lacking in the present study area, and such information would be useful for designing strategies that will help to improve the health and welfare of equids. Wounds are of great concern in animals as they affect animal productivity and their treatment response as an economic burden to the owners mostly in developing country. There are limited studies on the causes of external injuries or accidents in working Equines during transport (Demelash and Moges, 2006). Equine wound is inflicted by poor restraining practices, poor harness, severe biting, trauma or physical injuries. Donkeys in Ethiopia in the donkey health and welfare project operation sites are subjected to a variety of health disorder including multi-parasitism, back sore and other wounds, hoof problems, colic, various infectious disease such as strangle, tetanus (Tesfaye M., 2005) and wounds have been considered as the most important health problem.

One of the problems which are a potential threat to the lives of working donkeys in central Ethiopia is hyena bite (The Donkey Sanctuary (2006). Over working, over riding, overloading, and friction are also responsible for the occurrence of wound on different body parts. Wound is a break in the skin tissue of working Equines. Unfitted and poorly prepared harness, traditionally constructed wooden or iron made saddles which is fixed on the back of equines lead to persistent irritation and injuries on various body parts (Bedaso, 2010). Limited studies and little attempt have been made to determine the health disorders and welfare of working Equines. Scientific studies that can help to elucidate the magnitude of this problem are lacking.

Such information would be useful for designing strategies that would help improve equine health and welfare (Demelash and Moges, 2006). Experiences while working in different site of SPANA and DHWP have indicated that wounds are a frequent occurrence in working Equids. However, the degree of occurrence and

cause of wound is not known objectively. Information and knowledge on the distribution and predisposing factors of such wound is also scarce in the study site. This study was conducted to fill this gap and explore intervention mechanisms that can improve the health and welfares of Equines. Therefore, the objectives of this study was to determine the occurrence of Equine wound and investigate associated risk factors in and around Bishoftu town of Oromiya Region Ethiopia

Materials and Methods

Description of study area

The present study was undertaken on working Equids in and around in Bishoftu, which is one of the towns located in central Oromia Regional State at a distance of 47 kilometer southeast of Addis Ababa, the capital city of Ethiopia. Bishoftu is the main city of Ada'aba District, situated on two international trade routes, which are connected by Franco-Djibouti railway and Addis Moyale Nairobi, intercontinental-asphalted road transport route. This is the gate for import-export of livestock and agricultural commodities besides other commercial goods or to international market. It is geographically located at 8°7' N latitude and 39°E longitude and an altitude of 1860 m.a.s.l. It receives an annual rainfall of 871 mm in which 80% is received during long rainy season occurring from June to September while the short rainy season extends from March to April and the dry season from October to February. The mean annual maximum and minimum temperature are 26°C and 14°C, respectively, with relative humidity of 63.8%

Study Equines

Working Equines (horses, donkeys and mules) presented to SPANA and DHWP stationary clinics for deworming, hoof trimming, management of wounds and treatment of various clinical cases were included in the study. Equines were examined clinically for any visible gross injuries and the presence of wound cases on different sites of bodies were identified Equines in different age, sex and body condition were considered for this work.

Study design

Cross sectional study design was undertaken on Equines admitted to SPANA and DHWP clinics for either deworming or other abnormalities or disorders. The presence of wound cases and its cause, site, type,

intensity or degree of lesion and size of injuries were clinically diagnosed and identified.

Sampling method

Purposive sampling method was done on clinically injured Equids. Equines were examined clinically and any grossly visible injuries were identified. Injuries were defined as any grossly visible skin/tissue damages with size measuring ≥ 5 cm and located on which part of the body, active with ongoing tissue damage, with or without blood/exudates/ pus, abscess formation, or any secondary bacterial complication. Bites (lacerated wounds) were identified by irregular edges with underlying tissues removed as well as presence of hemorrhages.

Injuries were categorized as severe when there was ulceration involving a pronounced contusion in wider areas, tissue hypertrophy and severe complication. Moderate injuries involved coalition of small wounds with tissue sloughing and involving no complication and hypertrophy and some with chronic courses. Injuries were categorized as mild when they involve only loss of epidermis and the superficial layer with no further trauma (Biffa and Woldemeskel. 2006). Age of the animals was determined by dentition characteristics and categorized as ≤ 5 years, 6-10 years, 11-15years and 15 years of age.

Sample Size Determination

The total number of Equines required for the study was calculated based on the formula given by Thrusfield (2005).

$$N = \frac{1.962(P_{exp}) (1-P_{exp})}{d^2}$$

Where n=the required sample size, 1.96 the value of 95% CI, P_{exp} =expected prevalence of wounds, d=desired absolute precision level at 95% confidence level. Thus, A total of 1017 working Equines were examined which includes 487 horses, 513 Donkeys and 17 mules.

For the sake of simplicity, the size of wounds located on any parts of the body was categorized as small if it is measuring 1-10 cm, medium if between 10-25cm and large sized if above 25cm (From personal experience) and wound severity was categorized as severe when there was ulceration involving a pronounced contusion in wider areas, tissue hypertrophy and moderate wound, when small wound with tissue sloughing involving or

subcutaneous tissue is visible as well as mild when they involve only loss of the epidermis.

Data collection and analysis

Data collected was entered into the computer using excel spreadsheet and analyzed using statistical software Stata software. The association between dependent and independent variables such as age, sex, species, body condition, and degree of injuries, anatomical sites affected, type of wounds, cause and sex were determined by Pearson's chi-square. Prevalence of wound was determined as the proportion of injured animals out of the total examined. The significance level was set at 95% confidence interval.

Results and Discussion

Out of the total Equines examined during the study period (N=1017), 290 Equines were injured and the overall prevalence of wounds in this study area was 28.5%. The species prevalence were 37.5%, 31.6% and 19.9% in horses, mules and donkeys respectively. In this study, the prevalence of wound between sex category was 19.4% (N=48 affected) in females and 31.4% (n=242 affected) in males as well as among age group was 24.3% (N=56 affected) in young and 29.3% (N=175 affected) in adult and 31.6 % (N=59 affected) in old age groups. In addition, the prevalence of wound among body condition was 30.8% (N=164 affected) in moderate and 26% (N=126 affected) in good body condition (Table 1). There were a higher proportion of injured horses (37.5%) than donkeys (19.9%) and mules (31.6%) in this investigation. Species and Sex category were found to significantly influence the prevalence of external injuries in Equids ($P < 5\%$) (Table 1).

The study revealed that the occurrence of wound was highly associated with species and sex category, hence there was statistically significant difference between these categories ($p < 0.05$). The study also showed that the presence of wound was related to different age category and body condition. However, statistically insignificant difference ($p > 0.05$) was observed between these risk factors (Table 2).

Moderate wound was the most cases in all Equids which was 46% of the cases. Intensity of injury was reported to be highly associated with species. There were a higher Proportion of severely injured donkeys (60.8%) than horses (35.7%) and Mules (16.7%) (Table 3). Ill fitted harnesses and inappropriate material (36.5%) were one

of the contributory factors of wounds in horses while accidental injuries (22.7%) followed by unknown causes (14.6%) ranked second and third in that order. Girth had the highest overall proportion of wound (27%) than other anatomical area while fetlock region with the percentage of (14.1%) ranked third. Medium and small sized wound (64.9%) and (20.5%) were happened in order. Girth sore (27%), Chest sore (23.2%), Back sore (17.3%), fetlock sore (14.1%) were ranked first, second, third and fourth respectively (Table 4).

Injuries on the back and wither parts of horses were observed more commonly due to poor designed harness and saddle (41.2%) and accidental injuries (27.5%) on fetlock and unknown cause (12.6%) on the girth region were the next leading causes of wound. bad bit was the least cause of wound on the oral commissure. Statistically significant ($p < 0.05$) difference was observed between the causes of wound and anatomical sites of the body (Table 5).

The optimum utilization of working donkey is hindered by multiple health problems such as wounds. The major causes were overload (35.3%), bite related (31.4%) and accidental injuries (14.7%) were the major causes of wound in donkeys. The distribution of wound on body parts with the highest percentage was on wither and back (27.5%) and the lowest was on the tail base regions (6.9%). The incidence of back sore (35.3%) followed by bite wounds (31.4 %) and other sores were described in (Table 6).

Back region of the donkeys was mostly affected due to Heavy load and over work (37.3%).The main prominent cause of wound on the thigh and perineal part was bite related (34.3%) and falling related cause was responsible for the occurrence of wound on the limb (4.9%).There was statistically significant ($p < 0.05$) difference among causes of wound and anatomical sites of the bodies (Table 7).

Heavy load and overwork were responsible for the presence of injuries on the back region of mules (16.7%). Thigh and perineal part as well as base of tail were the most commonly affected sites due to bite related causes (33.3%) and unknown causes (33.3%) respectively (Table 8).

Results of the present investigation showed that the overall prevalence of wound in working equines at the study area was 28.5%. The finding was lower than 44% prevalence reported from central Ethiopia (Pearson, *et*

al., 2000). In addition, Demelash and Moges (2006) reported that the prevalence of injuries in working Equines was 72.1% in Hawasa town. This variation in the occurrence of wound is related to the presence of DHWP and SPANA in the Bishotu town that have been delivering trainings on the knowledge and attitude of Equine owners. In this study, the main causes of injuries on various body parts of horses were harness related problems (36.2%), Accidental injuries (22.7%) and unknown causes (4.6%). In agreement with the present concept (Pearson, *et al.*, 2000) and (Helen, 2001) reported that improper harness and saddle were the major causes of injuries in equines in the central and northern Ethiopia. The current study also showed that over loading and absence of padding on the back (35.3%) in donkeys, improper harness and saddle (36.2%) in horses were the major causes of injuries on different body parts. This finding in donkey was relatively similar with the report of by Bedaso (2010) who reported that more injuries in donkeys were due to over loading and over working (33%) in Bishoftu areas. In contrary to this findings, Demelash and Moges (2000) reported that the type of load and over weight (28.7%) in donkeys and improper harness and saddles (27.9%) in horses were identified as the major causes of injuries in Hawasa town. This variation could be related with the crop harvesting season of the area when Equines were involved in crop gathering from the field by farmers. Accordingly, the anatomical sites of injuries in horses were more frequently observed on girth (27%), on fetlock region (14.1%) and back region (9.7%) than other body parts. Similarly, back and wither (27.5%), thigh and perineal region (10.8%) were common sites of injuries in donkeys. In relation to the present finding (Yielma *et al.*, 991) reported that 33.7% of donkeys were suffered from back sore as well as Pritchard (2005) reported that wounds of the withers were found only in (1.8%) pack donkeys. In addition to this, Asnakech from Addis Ababa reported that back sore (62.6%) was due to absence of padding. This difference in the incidence of wound was due to variability of saddle types which causes persistent irritation and injuries.

The anatomical sites of the sore was associated with different factors and statistically significant ($p < 0.05$) variation was observed between species and sex of equines. In both sex, as the age of equines increase the duration of working and heavy work load increase and they are predisposed to sores. In contrary to the present study report, Demelash and Moges from Hawasa town reported that injuries in horses were more frequently observed on front leg (17%) and wither (16.2%)

compared to other body parts as well as back region(22.8%) and wither (20.9%) injuries in donkeys. This is probably related to poorly developed harness and

variation in the type of materials carried by donkeys, length of working time and other risk factors contributed to the occurrence of wounds in these species.

Table.1 Clinical Prevalence of wound in working Equines at the study site

Risk factors		Examined (n)	Injured (n)	Prevalence (%)	chi square	P value
Species	horses	485	182	37.5	38.2	0.001
	donkeys	513	102	19.9		
	mules	19	6	31.6		
Sex	Females	247	48	19.4	13.2	0.002
	males	770	242	31.4		
Age	adult	230	56	24.3	2.91	0.23
	old	600	175	29.2		
	poor	187	59	31.6		
Body condition	moderate	532	164	30.8	5.89	0.207
	good	485	126	26		
Total		1017	290	28.5	25.7-31.3	

Table.2 Risk factors for the occurrence of wounds in working Equine species (Univariate analysis) in the study area

Risk factors	Chi square (x ²)	df	P-value
Species (horse, donkey, mules)	38.2	2	0.001
Sex (male, female)	13.20	1	0.002
Age (young, adult, old)	2.93	2	0.231
Body condition (poor, moderate, good)	2.93	1	0.027

Table.3 Intensity status of wound among species of Equids

Equine species	Degree of wound			Total (%)	Fisheries exact test	P value
	Mild (%)	Moderate (%)	Severe (%)			
Donkeys	5(4.9)	35(34.3)	62(60.8)	102(35.2)	21.97	0.001
Horses	19(10.4)	98(53.8)	65(35.7)	182(62.8)		
Mules	2(33.3)	3(50)	1(16.7)	6(2.1)		
Total	26(9)	136(46.9)	128 (44.1)	290 (100)		

Table.4 Description of wound characteristics ranked According to importance in horses

Wound characteristics		Percentage (%)	Rank description
Causes	inappropriate harness and saddle	36.2	first cause of injury
	Accidental injury	22.7	second cause injury
	Unknown	4.6	third cause of injury
	Poor farrier	5.4	fourth cause of injury
	Bad bit	3.2	least cause
Anatomical site	Girth	27	primary affected secondary
	Chest	24.3	affected
	Fetlock	14.1	third affected site
	Back	9.7	least affected site
Size	Medium sized	64.9	first
	Small sized	20.5	second
	Large sized	14.6	third
Types	Girth sore	27	first
	Chest sore	23.4	second
	Saddle sore	17.3	third
	Fetlock sore	14.3	fourth

Table.5 Causes of wounds related to different anatomical sites in horses

Causes of the wound	Anatomical sites affected	N	wound cases (%)
Improper harness and saddle	Back and wither	75	41.2
Accidental Injuries	Fetlock	50	27.5
Unknown causes	Girth region	23	12.6
Poor farrier (poor shoeing)	Forelimb	20	10.98
Bad bit	Oral commissure	14	7.7
Total		182	

Chis square -14.9, P value-0.001

Table.6 Wound characteristic ranked according to their importance in donkeys

Wound characteristics		Percentage	Rank description
Causes	Over load and insufficient padding	35.3	first
	bite related	31.4	Second
	accidental injury	14.7	Third
	unknown	5.9	least
Anatomical site	back and wither	27.5	first
	lumbo sacral	16.7	Second
	thigh and perianal muscle	10.8	third
	base of tail	6.9	least
Intensity of the wound	severe	60.8	first
	moderate	34.3	second
Size of the wound	mild	4.9	third
	medium sized	45	first
	small sized	4.9	second
Types of wound	large sized	50	third
	back sore	35.3	first
	bite wound	31.4	second
	lumbo sacral sore	12.7	third
	tail sore	9.8	fourth

Table.7 Causes of wounds related to different anatomical sites in donkeys

Causes of wounds	Anatomical sites	No	wound cases (%)
Heavy load and over work	back region	38	37.3
Bite related	Thigh and perianal	35	34.3
Accidental injury	lumbo sacral	16	15.7
Unknown cause	Base of tail	8	7.8
Fall	limbs	5	4.9
Total		102	
Chi square: 16.5, P value: 0.002			

Table.8 Causes of wounds related to different anatomical sites in mules

Causes of wounds	Anatomical sites	wound cases (%)
Heavy load and over work	back region	1(16.7)
Bite related	Thigh and perianal	2(33.3)
Accidental injury	lumbo sacral	1(16.7)
Unknown cause	Base of tail	2(33.3)

The present result showed that accidental injury in horses (22.7%), donkeys (15.7%) and in Mule (16.7%) was treatable injuries. However, according to the clinician observation, majority of accidental injuries resulted in death and incurable structural damage, study made by Getachew, *et al.*, (2008) reported that accidental injury as one of the major problems in working donkeys living in the urban set ups and by the road sides. This is because donkeys that carry heavy loads and share the same road in the urban set up with vehicle predispose them to accident. The presence of variation in the proportion of wound prevalence on Equines of Good body condition might suggest that animals with good body condition were used for work at higher frequency and used for longer distance than those with other body condition.

Recommendations

The current study showed that wound is a major health and welfare problem of working equines in the study site. In addition, the study clearly indicated that various types of wounds affected Equines of all age, sex and BCS and several causes are responsible for its occurrence. Based on the current result, it is important to apply that animal owner should avoid over loading and over working of equines and improvement of the current harnessing technologies to minimize incidence of sores so as to improve the health and welfare of working Equines

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