

## **Injuries in Donkeys and Mules: Causes, Welfare Problems and Management Practices in Amhara Region, Northern Ethiopia**

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**Abstract:** A cross-sectional study was conducted from November 2011 to April 2012 with the objective of assessing the causes, welfare problems and management practices in 110 mules and 140 donkeys in and around Bahir Dar, Northwest of Ethiopia. In the study subjects, 140 donkeys and 110 mules that had visible external injuries were examined using detailed account of physical examination. A semi-structured questionnaire and interviews were used to gather relevant data on causations, management practices and treatment options to supplement the findings in physical examination. Out of the 140 donkeys and 110 mules examined, a significant majority of subjects in the area was found to be caused due to harness problems (31.2%) more commonly in mules than donkeys. The difference is statistically significant ( $\chi^2=47.354$ ,  $P < 0.05$ ). Overloading, (31.2%) was more frequent ( $\chi^2=11.899^2$ ,  $P = 0.001$ ) in donkeys than mules. On the other hand, only 20% (50/ 250) of respondents claimed to have taken their injured animals to veterinary clinics while 8% (20/ 250) reported to have rested them without any intervention. About twenty percent (51 / 250) did nothing to their injured animals. In over 51% (129 / 250) of the respondents that had reported to have used traditional treatment interventions, use of dry cell tar 12.8% (32), animal feces (hen, hyena donkey and mule) 11.6% (29), ash (8.8%), honey 6 % (15) and salt water 6% (15), branding (4.8%), engine oil (3%) and plant root (2.4%) were the ones that embarrassingly constituted practices of traditional treatments. In conclusion, community education should be instituted on injury mitigation schemes, replacement of poorly designed harnessing materials, improvement of modern health-seeking behavior of owners and critical scientific evaluation of indigenous knowledge on traditional treatments should be made.

**Key words:** Wound injury • Causes • Donkeys • Mules • Bahir Dar

### **INTRODUCTION**

There are an estimated 1.8 million horses, 377,000 mules and 4.3 million donkeys working in Ethiopia, harboring the largest population of donkeys in Africa and the second largest donkey population in the world after china [1]. Due to poor infrastructure, transportation by vehicle is virtually inaccessible and hence the role of equines in the socio-economics of the country is substantial, [2]. Farmers use alternative means like draught animals especially donkeys and mules to transport crops, fuel wood, water, building materials and people by carts or on their back from farms and markets to home [3].

Despite the valuable services in livelihood in rural and peri-urban Ethiopians, much of healthcare services are directed towards cattle than equines. This resulted in multiple welfare problems associated with

inaccessible water, feed and shelter at the working sites and suffering several lesions [4]. Some methods of hobbling to restrain equines cause discomfort and inflict wounds [3, 5]. Loading without proper padding and overloading for fairly long distances causes external injury to donkeys and mules. The misuse, mistreatment, mismanagement of wound and lack of proper healthcare have enormously contributed to early death. Majority of donkeys and mules currently have working life expectancy of 4 to 6 years. [6]. Research conducted in Ethiopia demonstrated that improvements in the welfare of donkeys had significantly improved their work output which in turn improved livelihood situations of the poorest communities in the peri-urban areas [7].

Wounds are amongst one of the commonest health concerns to afflict working donkeys in many countries [8-12]. In addition, the study on donkey in Ethiopia has

demonstrated that back sores and wounds are the most commonly observed health problem. Unfortunately, carts, wounds, punctures and lacerations are a fact of life when you have a mules and donkeys. The potential cause of equine wounds are almost endless: punctures from sharp object like metal and glass; shear wounds from barbed wire sticks; collision injuries from falling or running in to the object and entrapment, such as getting a leg hung up in a rope or in a cattle are major cause of injury [9, 13].

Wounds in working donkeys are seen on the leg, girth, tail, saddle and wither regions [9, 12]. These wounds are often caused by a combination of poorly fitting and designed tack or harnesses, beating with sticks and improper management practices. One approach to decrease the prevalence of wounds is through educations of donkey users. Ethiopian farmers have themselves identified a need for greater knowledge through training [13-15].

There is almost no published work available on causes of wounds and their management practice by local communities in equines in the study area, Amhara Regional State of Ethiopia. Our personal observation and understanding of the study area tells us the serious misunderstandings on use of traditional wound treatment: ranging from herbal materials to various unverified chemicals and even animal faeces.

The objective of this paper was, therefore, to assess the causes of wound injuries and their management practices and the scope of use of traditional treatment of injured donkeys and mules in and around Bahir Dar, Ethiopia.

## **MATERIALS AND METHODS**

**Study Area:** The study was conducted from November 10, 2011 to April 10, 2012 in and around Bahir Dar, seat of Amhara Regional State which is 570 km from the capital Addis Ababa. It is located at 11°29'N latitude, 37°29'E longitude with altitudinal range of 1500-2300 meters +above sea levels. The mean annual temperature and rainfall is 23° C. and 1200-1600 mm respectively. Topography of the area is characterized as plain with slight slopping covering about 70% a total land of the area and marked by Lake Tana and Abay River which drain the area. There are about 16.8 million inhabitant in the region of which 89% are living in the rural area. The region has 2.1million equine species of which Bahir Dar city and its surroundings harbor 2199 mules and 2368 donkeys [16].

**Study Animals:** The study animals were the indigenous breeds of donkeys and mules including both sexes at all age which were affected by external injury and mostly the owner treated their wounds using traditional treatment such as animal's feces (hyena, hen and the+ir feces) and ash in and around Bahir Dar, Ethiopia.

**Study Design:** Cross-sectional study was conducted on 110 mule and 140 donkeys with external injury were sampled from the market, working place, mail house and veterinary clinics in and around Bahir Dar, Ethiopia, using systematic sampling method.

### **Study Protocol**

**Physical Examination:** Injured donkeys and mules were grossly examined for cause, location of wounds and use of traditional treatment after basic information on relevant animal identifications were recorded. Body condition scoring was made based on literature [17]. Age was also determined as young and adult based on the guideline. [12].

**Questionnaire Survey:** A semi- structured and comprehensive questionnaire format that addresses a number of issues related to wounds was prepared and administered to owners of injured donkeys and mules at their consent. They were briefed about the objective and the benefit of the study. The interview was conducted at veterinary clinic, working place, mail house and market. It was aimed to know what the major causes of wounds were and to gain information from the owner what they did to treat wounds traditionally.

**Data Analysis:** Proportions of injured animals were related with the major cause of wounds and different traditional treatment of the injured animals with specific cause of wounds to the total examined animals. The analysis of the result was made using manual calculators for descriptive data. We have used SPSS version 15 where appropriate.  $\chi^2$  values were determined to look in to associations in categorical variables and 95% confidence level was used to test significances.

## **RESULTS**

The proportion of mules to donkeys on age, sex and body condition: Out of the total animals (250) examined, 56% (140 / 250) were donkeys and the remaining parts (44%) were mules. Close to forty nine percent of the mules were male and the remaining of about 51% were female,

Table 1: The proportion of mules to donkeys on age, sex and body condition

Species	Age		Sex		Body condition				
	Young	Adult	Female	Male	Poor	Moderate	Ideal	Fat	Obese
Mule	38	72	54	56	37	45	7	15	6
Donkey	46	94	70	70	56	51	13	14	6
Proportion of mules to donkeys	45.2	43.4	43.5	44.4	39.8	46.9	35	51.7	50

Table 2: The proportion of purpose associated with species

	Species	Frequency	Proportion (%)
Stone	Mule	6	37.5
	Donkey	10	62.5
Grain	Mule	4	11.76
	Donkey	30	88.23
Cart	Mule	60	100
	Donkey	–	0
Water	Mule	10	18.2
	Donkey	45	81.2
Flour	Mule	2	9
	Donkey	20	90.9
Farming	Mule	7	100
	Donkey	–	0
Multipurpose	Mule	23	39.6
	Donkey	35	60.3

Table 3: Distribution of causes of injury in the study area

Causes	Total number injured by leading causes	Prevalence(%)
Bites (dog, donkey and hyena)	10	4
Peaker bird	17	6.8
Infectious	21	10.5
Collusion	2	0.8
Traditional treatment practice (branding, bloodletting and injection)	16	6.4
Sarcoids	13	5.2
Foreign bodies (nails and glass)	5	2
Improper loading	12	4.8
Over loading	31	12.4
Long distance travel	5	2
Harness (no padding, improper padding, girth rope and tail rope)	78	31.2
Falling down	1	0.4
Beating	5	2
Hobbling	9	3.6
Multifactorial causes	15	6

while for donkeys the male to female ratio is 1:1 (50/50). On the other hand, the vast majority (67.1%) of both the donkeys and mules were adults while the remaining proportions were young. The details of the frequency and proportions of variables are given by the following table (Table 1).

**Purpose of Donkeys and Mules:** In this study, the major activities owners utilized with donkeys and mules are summarized in (Table 2). From the summary, it can be seen that injured donkey and mule owners used donkeys for water and grain transportation which accounted for 32.1% (45 / 140) and 21.4% (30 / 140) respectively; but none of the injured donkeys are used for cart and farming

purposes though. On the other hand, cart pulling was the major activity [54.54% (60 / 110)] of the injured mules used by owners (Table 2).

**Major Causes of Injury:** The result showed that there was significant difference in prevalence of external injury in the two species considered in the study area. The injury in mule that resulted from girth rope was highly significant at 95% CI ( $\chi^2= 47.354^2$ ,  $p = .000$ ) associated with species. On the other hand, out of the total 110 mules, 37 (33.6%) were injured by girth rope. The injury caused by tail rope associated with species was not statistically significant ( $\chi^2 = 0.075$ ,  $p > 0.05$ ) though. It can also be observed that 15 mule and 5 donkeys were injured by friction of tail rope.



Fig. 1: Wound caused by tying materials



Fig. 2: Wound caused by over loading



Fig. 3: Wound caused by loading of hot flour

Generally the result revealed that the injury was mainly caused by harnessing at a frequency of 78 (31.2%) and overloading was the next commonly encountered with 31 (12.4%) causes of injury in the study area. Moreover, infectious (lympangitis), which account 10.5% of the cases, were found to be the 3<sup>rd</sup> common causes of external injury by comparing with the other causes. The result also showed less frequently occurring causes - collusion 2(0.8%), falling down 1 (0.4%) and beating 5 (2%). Also, 15 (6%) of the study animals were injured by multiple factors (Table 3).

**Traditional Treatment of Wounds of Donkeys and Mules:**

The result indicated that the externally injured donkey and mules owners used different traditional treatment to treat

Table 4: The distribution of traditional treatments that used to treat wounds

Traditional treatment	Type of treatment recorded to treat the wounds	Percent of treated animals out of the totals %
Animal feces	29	11.6
Salt water	15	6.0
Fresh water	16	6.4
Branding	12	4.8
Honey	15	6.0
Enjoin oil	8	3.2
Petroleum	17	6.8
Plant root	6	2.4
Battery tar	32	12.8
Ash	22	8.8
Total	129	51.6

Table 5: Severity of wound associated with age and body condition score

BCS	Age	Severely affected species	Percent (%)
Poor	Adult	41	16.4
	Young	27	10.8
Moderate	Adult	15	6
	Young	10	4.6
Ideal	Adult	9	3.6
	Young	6	2.4
Fat	Adult	4	1.6
	Young	3	1.2
Obesity	Adult	9	3.6
	Young	1	0.4
Total	Adult	78	31.2
	Young	47	18.8

$\chi^2 = 12.155 P - value = .000$

Table 6: Response of injured animal's owner to treat wounds

Owner response	Frequency	Percent (%)
Take to veterinary clinic	50	20
Traditional treatment	129	51.6
Rest	20	8
Nothing	51	20.4

Table 7: Use of tying materials in the area

Materials	Frequency	Percent (%)
Thin nylon	83	33.2
Thick nylon	37	14.8
Other synthetics	95	38
Sisal	35	14

the wounds of their animals. The common treatments in the study area were animals' feces (hen, hyena and themselves) at a rate of (11.6%), honey (6%) and salt water (6%), enjoin oil (3%), branding (4.8%), ash (8.8%) and plant root (2.4%). The detailed result is listed in (Table 4) [18].

**Grade of Wounds:** The result revealed that animals with poor body condition score were severely affected at rate of 27% (68), moderate 10.6% (25). Therefore this result showed that severity of injury was significant at 95%CI ( $\chi^2 = 12.155^2$ ,  $p = .000$ ) associated with body condition score. The result also showed that injury in adult with poor body condition was 16.4% (41) and 10.8% (27) in young. The details are given in (Table 5).

**Response of Owner for Wound Management:** The study revealed that the injured donkeys and mules owners' used different methods to manage wounds. The 20% take to clinic, 51.6% used traditional treatment which was the highest percent that the owner takes as wound treatment measure. 20.4% of the owner did nothing on management of injury. The detailed is given (Table 6).

**Tying Materials:** The result showed that 33.8% owner used thin nylon to control their animals and 38% other synthetics. The detail is given (Table 7).

## DISCUSSION

A detail assessment of the causes of external injury of donkeys and mules has evidenced that this external injuries were caused by 4% (10) bites, 31.2% (78) harness materials (tail ropes and girth ropes), improper padding, over loading, nails, stones, infectious and collision in and around Bahir Dar. Almost comparable finding were documented by [13] in Hwassa who reported that 28.7% of injuries were caused by overloading in southern Ethiopia.

The result of this investigation demonstrated that injuries caused by girth rope in mules were the most commonly encountered with a magnitude of 33.6% (37 / 110) among the recorded causes during this study period; this may be due to improper use of girth ropes, the thickness of ropes and purpose of mules that were mainly used to pull carts. In other possible reason could be that the wound may have resulted from the rope that was made: like synthetic materials, thin nylon and chain. The same finding was reported by [17] that the rope must be made from cloth, sacking tubes and leather rather than nylon to reduce injury. Serious welfare and handling state was also reported by [4].

Regarding purposes that the injured animals served, this study showed that the donkeys in the study area were mainly used for transport of water at rate of 32% (45 / 140) and grain 21.4% (30 / 140) but mules used for mainly for cart pulling in the study area at a rate of 60 (84.5%).

The previous reports done by [17] indicated that donkeys were used in rural in urban communities for transportation of goods and people. On top of that, the report indicated that donkeys were used for cart pulling in contrast to the present study, in which none of the donkeys included in this study were used for pulling cart. This finding seems to be contrary to what one observes in many Ethiopian towns, where donkeys are seen to be used for the purpose mentioned- cart-pulling. This may be due to a small size of donkey and less work out put potential.

Considering the causes of injuries, a few numbers of donkey and mule injuries were recorded due to (dog, donkey and hyena) bite in the present study 4% (10) among the rest causes. In contrast to our finding [13] had recorded as much as 19.6% of donkeys in Hwassa were injured by bites with serious laceration. This difference may be due to the owners' responses to give care for their animals and that they had apparently did not expose donkey bites by separating them and did not leave them outside at night to prevent hyena bite. Unlike the finding by [10] in southern Ethiopia that reported trauma as a sequele of fighting among donkeys and hyena bites, the present study indicated that bite was not necessarily the major cause of injury in the study area; rather, harnessing 31.2%(78) and overloading 12.4% (31) had taken the lion's share as causation of trauma.

When it comes to treatment interventions by the owners, the present study indicated that the injured donkey and mule owners treat animals with traditional medications before taking them to veterinary clinics. We found that owners had used animal feces at a rate of 11.6% (29) and battery tar 12.8% (32) in attempt for remedy to combat injuries which is remarkably embarrassing scientifically. On the other hand, salt water 15.6% (15), ash (8.8%) (22) and plant root 2.4% (6). In agreement with this report, a study elsewhere in Ethiopia reported that owners would take their donkeys and mules to veterinary clinic after having treated injured subjects using traditional practices [13]. This also coincided with the report of [17], that owners have cleaned the wound with plenty of water to remove dirt and dusts. [17] had also recommended that the best way to do was run water from a hose pipe over the wound for 5 minute; use high amount of water. This showed that owners treated their animals with cold water to reduce the swelling. In the present study though, we found that the owners predominantly 11.6% (29) used animals' feces (hen, hyena and donkey and mule faeces, to mention a few). This may be due to culture or indigenous knowledge practices. In the focus-group discussions we held with the local communities, they

claimed that animal feces, particularly of hen and hyena feces, were of considerable degree in their healing capabilities. Respondents disclosed there may be important wound healing element that need further study in the feces of preferred animals. Moreover, respondents had used ash for protection of fly. Similar to our study, traditional treatment of wound using honey was reported by [18]. It is reported that honey has an inhibitory effect on different species of aerobic and anaerobic bacteria as well as antifungal activity. As the researcher report, the inhibitory of honey was due to osmotic effect of its high sugar content to inhibited microbial growth. In contrast the researcher reported that the inhibitory effect of honey has been reduced due to dilution of honey with exudates of wound. Therefore, the present study showed that 15 (6%) of honey treated animals reported.

### CONCLUSION

This study revealed that despite the pivotal role played by donkeys and mules in sustaining livelihoods in the study area, owners give little care and attention as compared to other farm animals. We also found that the difference in severity of wounds was associated with the types of services animals offer. Plus, external injuries in mules caused by harness problem were higher than donkeys. A significant majority of owners treat wounds using traditional treatments (some of which in comprehensible) than seeking professional services. To our knowledge, this work is probably the first one to attempt in identification of major causes of injury and traditional treatments in the study area. We recommend that community education should be instituted on injury mitigation schemes, replacement of *poorly designed harnessing materials* by better ones, improvement of modern health-seeking behavior of owners and critical scientific evaluation of indigenous knowledge on traditional treatments to be initiated. Effective and integrated attempts by all stakeholders should be made to improve fragile and poor welfare and health of mules and donkeys in the study area.

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