

# Prevalence of Wound and Associated Risk Factors in Working Donkeys in and around Wolaita Sodo Town, Southern Ethiopia

Wale Tesfaye\* Kero Mekuria

School of Veterinary Medicine, Wolaita Sodo University, Wolaita Sodo, Ethiopia

## Abstract

A cross-sectional study was conducted from October 2015-September 2016 to determine the prevalence of wound and associated risk factors in donkeys in and around Wolaita Sodo town, Southern Ethiopia. A total of 400 working donkeys were examined, of which 172 (43%) were affected by wound. The prevalence of wound vary significantly among sex, age categories and body condition score of animals. Higher prevalence (101/214;47.2%)of wound was recorded in male animals than female ones (71/186; 38.2%). This difference between both sexes was statistically significant ( $p = 0.013$ ). The study also showed that a significantly higher prevalence ( $p = 0.001$ )of wound in old donkeys (75/161; 46.6%) followed by adults (89/202; 44.1%) and young (8/37; 21.6%). The highest rate of prevalence ( $p = 0.000$ ) was recorded in donkeys with poor body condition (149/325; 45.8%) than those with good body conditions(23/75;31.1%). The highest distributions of wound was found in prescapular region (8.2%) followed by mixed (6.7%), back (5.5%), hind limb (5%), neck (3.8%), chest (3%), fore limb (2.8%), shoulder (2.3%) and head (2.2%). Donkey wounds were commonly distributed on the prescapular and back region. A significant number of abrasion wounds (24.5%), lacerative wounds (8.7%), punctured wounds (6.8%) and incised wounds (3%) in donkeys were reported in this study. The highest prevalence of wound was caused by improper harnessing (6.9%) followed by biting (12%), injury by horn (5%), infectious diseases (4.7%), over load (3.7%), unknown (2.3%), and falling (1.8%).Generally, this study has figured out wound as a major health problem of working donkeys in and around Wolaita Sodo town and hence, a comprehensive working donkeys health programs should be implemented in order to alleviate the prevailing problem.

**Keywords:** Donkeys, Prevalence, Risk Factors, Wolaita Sodo, Wound

## 1. INTRODUCTION

Ethiopia has the largest population of equines in Africa and the second largest equine population in the world after China (Anon, 2007). In Ethiopia, there are an estimated 5.2 million donkeys, 2.5 million horses and 0.5 million mules. Ethiopia possesses approximately half of Africa's equine population with 37%, 58%, and 46% of all African donkeys, horses, and mules, respectively (CSA, 2005). Donkeys are also important animals to the resource-poor communities in both rural and urban areas, providing traction power and transport services at low cost and in the remote areas of Ethiopia, pack animals offer the only realistic way of obtaining returns from agriculture above mere existence. Moreover, the increasing human population in Ethiopia has resulted in an increase in demands of donkeys for transport of goods to and from far, remote areas and construction activities (Biffa and Woldemeskel, 2006). Donkeys appear to be an affective in assisting women both in domestic responsibilities and income generation activities, which otherwise they may not have had access. It was also mentioned that in Ethiopia, the low level development of the road transports and the rough terrain of the country make the equines to be the most valuable, appropriate and affordable pack animals under the small holder farming system (Gebrewold *et al.*, 2004).

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 (Ameni, 2006). Some methods of hobbling to restrain equines cause discomfort and inflict wounds (Dinka *et al.*, 2006). Loading without proper padding and overloading for fairly long distances causes external injury to donkeys. The misuse, mismanagement of wound and lack of proper healthcare have enormously contributed to early death. Majority of donkeys currently have working life expectancy of 4 to 6 years (Howe and Garba, 1997).

Wounds are amongst one of the commonest health concerns to afflict working donkeys in many countries (Behnke and Metaferia, 2011; Getachew *et al.*, 2010). In addition, the study on donkey in Ethiopia has demonstrated that back sores and wounds are the most commonly observed health problem. The potential cause of equine wounds is almost endless: punctures from sharp object like metal and glass; shear wounds from barbed wire sticks; collusion injuries from falling or running in to the object and entrapment, such as getting a leg hung up in a rope or in cattle are major cause of injury (Getachew *et al.*, 2010; Asfaw *et al.*, 2012).

Wounds in working donkeys are seen on the leg, girth, tail, saddle and wither regions (Getachew *et al.*, 2010; Gizachew *et al.*, 2013). 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 education of donkey users (Getachew *et al.*, 2010; Asfaw *et al.*, 2012).

To date, there is no work done on the prevalence of wound, the types of wound, the causes of wound and its associated risk factors in working donkeys in and around Wolaita Sodo. Such information would be useful for designing strategies that would help to improve donkeys health and welfare. Thus, the objectives of the study were to determine the prevalence of wounds, to study the causes of wounds, to assess the types of wounds and to identify influencing factors associated with the occurrence of wounds in donkeys in and around Wolaita Sodo.

## 2. MATERIALS AND METHODS

### 2.1. Study Area

This study was conducted in and around Wolaita Zone, which is located 390 km southwest of Addis Ababa following the tarmac road that passes through Shashamane to Arbaminch. Alternatively, it is located 330km southwest of Addis Ababa following the tarmac road that passes through Hosanna to Arbaminch. Wolaita Sodo is a town of the Wolaita zone. It has a total area of 4,541km<sup>2</sup> and is composed of 12 weredas and 3 registered towns. Livestock production in Wolaita zone includes cattle (oxen, milking cows and young stock), goats and sheep, equines (horses and donkeys) and poultry (CSA, 2008).

### 2.2. Study Animals

A total of 400 donkeys with different sex, age and body conditions were included in this study. The working donkeys which were kept under different management systems was the study animals.

### 2.3. Sample Size Determination

The sample size was determine using 95% confidence interval. To a date, there was no earlier work done on wound problems in working donkeys at the study area. Therefore, the sample size was determined by taking the prevalence of 50% using the formula given by Thrusfield (2005), the minimum of 384 donkeys are intended to be sampled. However, in this study, to maximize the precision 400 donkeys were examined.

$$N = \frac{1.96^2 (P_{exp}) (1 - P_{exp})}{d^2}$$
$$N = \frac{1.96^2 (0.5) (1 - 0.5)}{(0.05)^2} = 384 \text{ donkeys}$$

Where N = sample size, P = expected prevalence, d = desired level of precision.

### 2.4. Study Design and Sampling

A cross-sectional study was conducted on randomly selected 400 donkeys from October 2015 to September 2016 in Wolaita Sodo town and its surroundings, Southern Ethiopia. Each randomly selected donkey has been physically examined for any external body injury and findings including site, severity and class of wound have been recorded on physical examination sheet. Moderate injuries were involving coalition of small wound with tissue sloughing involving no complication and hypertrophy and some with chronic courses. Wounds were categorized as mild when they involve only loss of epidermis and superficial layers with no further trauma. Wounds (injuries) were also classified as abrasion, lacerative, incision and puncture (Feseha, 1997).

Age and body condition score (BCS) estimations have been made according to the method described by Sevendsen (2008). Wound severity and classification estimation were made as indicated by Biffa and Woldemeskel (2006) and Knottenbelt (2003) respectively.

### 2.5. Data Management and Analysis

The data were entered and managed in Microsoft Excel. SPSS version 20 software was used for the data analysis. The differences in parameters like age, sex, body condition and other factors on wounds in working donkeys were analyzed by using  $\chi^2$  (Chi-square) technique and the level of significance was set at  $p < 0.05$ .

## 3. RESULT

This study revealed an overall prevalence of wounds in working donkeys were 172(43.0%). Higher prevalence of wound was recorded in male animals 101(47.2%) than female ones 71(38.2%). This difference between both sexes was statistically significant ( $p = 0.013$ ). The study has showed a significantly higher prevalence of wounds in old donkeys 75(46.6%) which was followed by adults 89(44.1%) and young 8(21.6%). There was statistical difference ( $p = 0.001$ ) among age groups. Similarly, the distribution rate of wound on working donkeys which have different body condition were studied and the highest rate was recorded in donkeys with poor body condition 149(45.8%) than those with good body conditions 23 (31.1%). Statistically significant variation ( $p = 0.000$ ) in the prevalence of wound was recorded among body condition scores. Prevalence of wound among sex, age and BCS were summarized in tables 1.

Table 1: Prevalence of wound in relation to sex, age and body condition of donkeys.

Variables	No. of examined	No. of affected	Prevalence (%)	$\chi^2$	P-value
Sex					
Male	214	101	47.2	16.23	0.013
Female	186	71	38.2		
Age					
Young	37	8	21.6	38.65	0.001
Adult	202	89	44.1		
Old	161	75	46.6		
BCS					
Poor	325	149	45.8	7.82	0.000
Good	75	23	31.1		

Significant difference ( $p = 0.004$ ) was also observed in the distribution of wounds among different parts of the body in donkeys where the highest numbers of wounds were recorded in prescapular areas(8.2%) while, the lower number of wound recorded in head region (2.2%) (Table 2).

Table 2: Distribution of wound on various body parts of donkeys.

Sites of wound	No. of affected	Prevalence (%)	$\chi^2$	p-value
Head	9	2.2	57.18	0.004
Neck	15	3.8		
Shoulder	9	2.3		
Chest	12	3.0		
Forelimb	11	2.8		
Prescapular	33	8.2		
Back	22	5.5		
Abdomen	14	3.5		
Hind limb	20	5.0		
Mixed	27	6.7		
Total	172	43.0		

The majority of wounds in donkeys were caused by improper harness and saddle design and biting. The lower prevalence of wounds were caused by falling. There was a significant variation ( $p = 0.000$ ) among various causes of wounds in donkeys (Table 3).

Table 3: Causes of wounds in donkeys.

Causes of wound	No. of affected	Prevalence (%)	$\chi^2$	p-value
Improper harness	52	13.0	43.62	0.000
Infectious diseases	19	4.7		
Biting	50	12.5		
Injury by horn	20	5.0		
Over loading	15	3.7		
Falling	7	1.8		
Unknown	9	2.3		
Total	172	43.0		

There was statistically significant difference ( $p = 0.021$ ) among types of wound in donkeys. Abrasion was the highest wound types(24.5%) which was followed by lacerative (8.7%), puncture (6.8%)and incise (3.0%) types of wound in donkeys (Table 4).

Table 4: Prevalence of types of wounds in donkeys.

Types of wound	No. of affected	Prevalence (%)	$\chi^2$	p-value
Abrasion	98	24.5	78.32	0.021
Puncture	27	6.8		
Laceration	35	8.7		
Incise	12	3.0		
Total	172	43.0		

#### 4. DISCUSSION

In the present study, the overall prevalence of wound in working donkeys was 43%. This finding was markedly lower than the reported 79.4% in Hawassa (Biffa and Woldemeskel, 2006) and 59% in Jordan (Burn *et al.* (2007) but closer to the report by Pearsons *et al.* (2002) that reported 40% in Central Ethiopia. This might be due to variation in management and husbandry to the donkeys in the region. This study also revealed that sex did have a significant effect on the occurrence of wound in the study area with higher proportion of wound in males

(47.2%) than female(38.2%). This might be due to the unavailability of female donkeys in market in the study area. Thus, males are most frequently used for work than female and are hence highly exposed to wound injury in the present study area

From the age categories the present finding has showed that 21.6% of wound in young, 44.1% in adults and 46.6% were in old donkeys. This showed that a significantly higher prevalence of wound was recorded in old donkeys. This might be due to the fact that olds were involved in a wide array of activities, yet very little management was accorded to them. They were made to carry heavy loads over long distances and hours. It could also be attributed by lack of regular feeding and health care provision were not practiced regularly and aggravates donkey wound in old followed by adult and young. Similar scenarios were reported by Biffa and Woldemeskel (Biffa and Woldemeskel, 2006).

In the current study, the distribution rate of wound in donkeys of different body condition was studied and the highest rate was recorded in donkeys with poor body condition (45.8%) followed by those with good body conditions (31.1%). This is in line with the reports by Mekuria *et al.* (2013) and Pearson *et al.* (2002), those indicated that poor physical condition mainly due to malnutrition is the leading causes of sores in donkeys. The probable reason for such association is due to donkeys with a poor body condition score may have less natural padding protecting them from pressure, friction and shear lesions caused by saddle. In contrast no significance difference between wound prevalence and body condition score was reported in a research done in morocco by Sells *et al.* (2010).

In the current study, the highest distributions of wound was found in prescapular region (8.2%) followed by mixed (6.7%), back (5.5%), hind limb (5%), neck (3.8%), chest (3%), fore limb (2.8%), shoulder (2.3%), and head (2.2%). Donkey wounds were found commonly distributed on the prescapular and back region. Similarly, Biffa and Woldemeskel (2006) and Tesfaye and Curran (2005) reported the same scenario in South and Central Ethiopia respectively. This might be due to poorly designed and ill fitted saddles and straps manufactured by unskilled artisans or donkey owners. Where as in the report done by Sells *et al.* (2010) in Morocco the most common site of a wound was the withers; this difference might be attributed to the different design in saddle and strap.

In the current study, significant difference was recorded in the number of abrasion wounds (24.5%), lacerative wounds (8.7%), punctured wounds (6.8%) and incised wounds (3%). The highest prevalence of wound was caused by improper harnessing (6.9%) followed by biting (12%), injury by horn (5%), infectious diseases (4.7%), over load (3.7%), unknown cause (2.3%), and falling (1.8%). This means that improper harnessing was the main causes of injuries in the area as the harnessing materials were made from wood and metal materials by local harnessing material makers who didn't consider the prepared materials with the body condition of the donkeys, movement and balance of the weight. As a result, the materials are unable to distribute the weight equally in either side of the animal leading to injury. This finding is consistent with results reported by Pearson *et al.*, (2000) in central Ethiopia and Helen (2001) in Northern Ethiopia that improper harnessing and saddle were major causes of injuries.

In the present study infection related injuries were also shown as causes of wound indicating involvement of bacterial and mycotic pathogens in the injury. Such type of infections were identified and characterized by abscess, ulceration and their typical clinical signs observed in the donkeys. Similar to this observation, Bojia (1996) and Gobena, (2001) reported that mycotic dermatitis, ulcerative and epizootic lymphangitis were the major infectious skin disease of equines in Ethiopia. Damages caused by biting and overloading were the causes of wounds in donkeys which were also reported in Hawassa, Ethiopia (Biffa and Woldemeskel, 2006).

## 5. CONCLUSION

The present study has revealed high prevalence of wounds in working donkeys in and around Wolaita Sodo town, Ethiopia. Improper harnessing and saddle, biting, injury by horn, over load and infectious diseases were the major contributor to the higher prevalence of the wound in donkeys. The possible risk factors responsible for the occurrence of wounds in working donkeys were sex, age and body condition. In donkeys the abrasion wounds were more prevalent that followed by lacerative wound, punctured wound and incised wound. Conclusively, wound problems were prevalent in working donkeys in the study area calling for formulation of strategic control measures like health education about the disease transmission, risk factors reduction, use of proper harnessing and saddles, and care and proper handling of their animals.

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