

## A study on wound prevalence and its associated risk factors in donkeys in and around Shashemene town, Oromia Regional state, Ethiopia

Kufa Mustefa <sup>1,\*</sup>, Hamid Gelcha <sup>2</sup>, Furi Beriso <sup>2</sup> and Yonas Gizaw <sup>3</sup>

<sup>1</sup> Shashemene town agriculture and natural resource development office, Ethiopia.

<sup>2</sup> Shashemene Woreda agriculture and natural resource development office, Ethiopia.

<sup>3</sup> Arsi University College of agriculture and environmental science department of veterinary medicine, Ethiopia.

International Journal of Scholarly Research in Medicine and Dentistry, 2022, 01(01), 028–035

Publication history: Received on 12 June 2022; revised on 20 July 2022; accepted on 23 July 2022

Article DOI: <https://doi.org/10.56781/ijsrmd.2022.1.1.0024>

### Abstract

A cross-sectional study was conducted to estimate the prevalence of wound and associated risk factors in equines in and around Shashemene town, Ethiopia. A total of 338 randomly selected working donkeys were physically examined out of which 199 (59%) were affected by wounds. In this study body condition was significantly associated ( $p < 0.05$ ) with wound prevalence while age and sex of donkeys were not associated as  $p$ -value was  $> 0.05$ . This study also showed as floor and weight load carried by donkey was significant with a  $p$ -value 0.033 and 0.000 respectively. The mean weight carried by donkey was 519.08 kg with the maximum and minimum weight was 800 kg and 100 kg respectively. The highest wound distribution was found at back or withers of the donkeys with a prevalence of 24.3% and followed by shoulder, prescapular, chest, forelimb, neck and hind limb with 11.83%, 10.35%, 4.14%, 3.84%, 3.55%, 0.88% prevalence respectively. Variation in a wound type, abrasion, laceration, punctures and incises, was also significant with  $p$ -value 0.000 and 35.23%, 17.8%, 5.3% and 0.6% prevalence respectively and most of the wound was a moderate (21.89%) and followed by mild (18.93%) and severe (18.04%). The highest wound prevalence was caused by improper harness design and saddle (45.85%) followed by unknown cause (5.32%) nail piercing (0.3%), overloading and overworking (0.3%) and infectious disease (0.01%) of wound prevalence. Most of the owners take their donkeys to the nearby veterinary service (50.75%) out of 58.9% of prevalence and most of them were give to their donkeys a short term rest. Generally, the study has clearly indicated wound as a prevailing health and welfare problem of working donkeys in and around Shashemene town. Hence, implementing a comprehensive donkey health and welfare improvement program that focus towards the attitude of owners and awareness creation which was not limited by boundary between town and country side should be a priority for concerned stakeholder.

**Keywords:** Donkeys; Prevalence; Risk factor; Shashemene; Wound

### 1. Introduction

Ethiopia has the largest population of equines, approximately 8.8 million, in Africa and the second largest equine population in the world after china (Anon, B. 2007 and Martha Geiger, 2020). Donkeys have a prominent position in agricultural systems of many developing countries including Ethiopia (Feye and Bekele, 2016). They play an important role in rural communities providing power and transport at low cost (Pearson et al, 2003). They transport goods to and from markets, farms, and shops, travelling long distances. They also pull carts carrying heavy loads 3 to 4 times their body weight. They work from 4 to 12 hours/day, depending on the season and type of work. The increasing human population, demands for transport of goods to and from far, remote areas, and construction activities around the town are making equines highly demanded animals (Demelash and Moges, 2006).

\* Corresponding author: Kufa Mustefa

Shashemene town agriculture and natural resource development office, Ethiopia.

Despite the valuable services in livelihood in rural and peri-urban Ethiopians, much of healthcare services are directed toward cattle than equines. This resulted in multiple welfare problems (Ameni, 2006).

Skin injuries associated with inappropriate harnessing are among the most important problems in donkeys in Ethiopia (Demelash Biffa and Moges Woldemeskel, 2006). A large proportion of donkeys suffered various degrees of wound reported that the main source of wounds were inappropriate harness. Hobbles and saddle design, hyena bite, donkey bite and car accident, injury by the owners or other people (Pearson et al, 2003). Wound can involve superficial layer, deep skin underlying tissue or it may involve vital structures such as joints (Stashak and Theoret, 2008). Studies to elucidate the magnitude of this problem are limited. Such information would be useful for designing strategies that would help improve equine health and welfare (Demelash and Moges, 2006). Therefore the objective of this paper was to estimate the prevalence of wound in donkeys and to identify the risk factor that associated with wound in donkeys.

---

## 2. Material and methods

### 2.1 Study area

The study was conducted in West Arsi Zone of the Oromia National Regional State, in and around Shashemene. Shashemene town is located 70N and 380E with an altitude of 1700 to 2600 m above sea level in the southern rift valley of Ethiopia, lying 250 km south of Addis Ababa (SWARDO, 2006). It had mean annual rain fall of about 1,343mm of which 84% falls during the long rainy season that extends from June to September and the remaining is during the short rainy season that extends from October to May. The mean annual minimum and maximum temperatures were 90C and 240C, respectively and the mean relative humidity was about 75 % (CSA, 2009):

### 2.2 Study Population

The study population was working donkeys in and around Shashemene town. The target population was all randomly selected donkeys in and around Shashemene town.

### 2.3 Study Design

A cross sectional study was conducted on working donkeys in and around Shashemene town from July to August 2021.

### 2.4 Sampling Technique and Sample Size Determination

Systematic random sampling technique was used select a sample from the population and sample size was determined according to thrusfield formula. The expected prevalence in the study area was assumed to be 50% at 95% confidence interval because of absence of previous study on injury of working equines in the area. Therefore, the sample size for infinite population size was calculated based on the formula given by (Thrusfield, 2007).

$$n = 1.962 \times Pex (1 - Pex),$$

$$d2$$

.....Where n = number of sample size

d2 = absolute precision (5%),

Pex = Expected prevalence (50%).

$$n = (1.96)^2 \times 50\% (1 - 50\%) = 3.8416 \times 0.5 \times 0.5 =$$

$$(5\%)^2 (0.05)^2 = 384$$

But due to the time gap only 338 donkeys was examined to estimate the prevalence and risk factor associated with it.

### 2.5 Study methodology

#### 2.5.1 Questionnaire Survey and clinical examination

Physical examination and questionnaire survey were carried out simultaneously. Questionnaire was developed to collect data, including sex and educational status of respondents, donkeys' age, weight load that carried by donkeys,

floor of the resting place of donkey, intensity of injury, injury management, and fate of injured animals. Study animals were examined physically and any grossly visible injuries were characterized and causes identified. Injuries were 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 hemorrhage (Feseha, 1997). The age of the selected equines were determined by inspecting and estimating the incisor eruption times (Crane, 1997; Svendsen, 1997). Equines were grouped into two age categories namely young (< 5 years) and adult (>5 years). The body condition was scored as poor, medium and good as described by Carroll and Huntington (1988) and Svendsen (1997). Wounds were classified as abrasion when it involves superficial denuding of the epidermis with minimal (capillary) bleeding and usually some serum/plasma exudation. Non-penetrating wounds of the skin that arises from abrasion against a rough or hard object such as a road surface were considered as abrasion. Moreover, the wounds in the skin and hoof that arises from sharp objects such as nails, glass shards, or other foreign bodies that penetrate and generally look minor by making small skin tears or holes were categorized as puncture wound. Furthermore, a wounds with sharp defined margin and caused by sharp metal or glass in which the skin is cut cleanly with minimal tearing and bruising of the wound margins were categorized as incision wounds whereas, the traumatic tearing of the skin in an uncontrolled direction was considered laceration as described by Knottenbelt (2003).

### 3. Results

#### 3.1 Prevalence and associated risk factor

From a total of 338 examined working donkeys 199 (58.89%) were having wound in their body parts. From total surveyed donkey 337 was male while only one donkey was female and this female donkey was used for pack transport at the time this study was conducted. Age of donkey were not significantly associated with wound prevalence (p-value > 0.05), while body condition was significantly associated with wound prevalence; a high proportion of wound prevalence was seen among medium and poor body condition with 68.3% and 64.8% respectively as indicated in table 1 below.

**Table 1** Association of wound between body condition and age of donkeys

Variables		No of examined	No of affected	Proportion (%)	X <sup>2</sup>	p-value
Body condition	Poor	54	35	64.8	10.903	0.004
	Medium	123	84	68.3		
	Good	161	80	49.7		
Age	Young	64	39	60.9	0.139	0.710
	Adult	274	160	58.4		

Weight load carried by working donkey was highly significant with the prevalence of wound in donkeys with a p-value 0.000 and the minimum weight load carried by working donkeys was 100 kg while the maximum was 800. The average weight carried was 519.08kg and the mode was 500kg as summarized in the table 2 below.

**Table 2** Mean weight load carried and its significances for wound prevalence

Weight carried by cart pulling or pack donkeys					
Mean(kg)	Maximum(kg)	Minimum (kg)	Mode (kg)	Standard deviation	p-value
519.08	800	100	500	99.396	0.000

Floor of the donkeys was also other risk factor that had a significant association with wound prevalence with a high prevalence of wound was seen donkeys whose floor was concrete.

**Table 3** Association of floor of donkey and wound prevalence

Floor of donkey	No of donkey examined	No of donkey injured/ had wound (%)	X <sup>2</sup>	p-value
Concrete	133	88(66.16)	6.794	0.033
Mud with drainage	145	74(51.03)		
Mud with no drainage	60	37(61.66)		
Total	338	199(58.89)		

There was also statistically a significant difference among the cause of wound. The majority of wound was caused by improper harness and saddle design with prevalence of 45.85% and nail piercing, overloading and overworking, infectious disease and unknown cause were also not the least in causing wounds.

**Table 4** Cause of wound and its association with wound prevalence

Cause of wound	No of affected	Prevalence	X <sup>2</sup>	p-value
Improper harness	155	45.85	337	0.000
Nail piercing	11	0.03		
Overloading and Overworking	11	0.03		
Infectious disease	4	0.01		
Unknown	18	5.32		
Total	199	58.9		

### 3.2 Distribution and types of wound

Significant difference was also observed in distribution of wound among different body parts, the highest wound was recorded at back of the donkeys, while the least wound was observed at hind limb. The distribution of wound on different parts of the body is shown in table 5 below

**Table 5** Distribution of wound in different body parts of donkeys and its variation significances

Site of wound	No of affected	Prevalence (%)	p-value
Back	82	24.3	0.000
Shoulder	40	11.83	
Prescapular	35	10.35	
Chest	14	4.14	
Forelimb	13	3.84	
Neck	12	3.55	
Hindlimb	3	0.88	
Total	199	58.9	

The variation in wound type was also statistically significant and Laceration was the highest wound type with 33.72% prevalence while abrasion was the second with a prevalence of 19.23%.

**Table 6** Prevalence of different types of wound and its variation significance

Type of wound	No of affected	Prevalence	X <sup>2</sup>	p-value
Puncture	18	5.3	338	0.000
Abrasion	65	35.23		
Incise	2	0.6		
Laceration	114	17.8		
Total	199	58.9		

### 3.3 Result of the questioner survey

On the other hand there was significant variation between respondents toward the wound management which was statistically associated with wound prevalence (p-value <0.05). Most of the respondents manage their donkeys by taking them to nearby veterinary clinic or service.

**Table 7** Owner response to the management of wound

Owner response towards wound management	No of donkey (%)	X <sup>2</sup>	p-value
Take to nearby veterinary service	101(50.75)	337	0.000
Treat with medication purchased from local market	22(11.05)		
Take to local and traditional healer	69(34.67)		
Treat with medicinal plants by themselves	1(0.50)		
Do nothing	6(3.01)		
Total	199 (58.9)		

In addition the intensity of wound was statistically significant (p-value <0.05) with moderate type of wound was relatively high.

**Table 8** Prevalence of Intensity of wound

Wound intensity	No of donkey	Prevalence	X <sup>2</sup>	p-value
Severe	61	18.04	337	0.000
Moderate	74	21.89		
Mild	64	18.93		
Total	199	58.9		

Out of 199 injured donkeys 175 with a prevalence of 51.9% donkeys had got a short term rest while 24 with a prevalence of 7.1% were got a long term rest.

**Table 9** Prevalence of fate of injured donkeys

Fate or chance of donkey after injury	Number of donkey given rest	Prevalence	X <sup>2</sup>	P-value
Given short term rest	175	51.9	337	0.000
Given long term rest	24	7.1		
Total	199	59		

#### 4. Discussion

This study has revealed an overall prevalence of 59% of donkeys wound in and around Shashemenetown which is in agreement with (Abdellaet *al.*, (2017) who reported an overall prevalence of 62.5% equine wound in and around Asella Town. The result of the current study was higher than the study of (Tsegaet *al.* (2016) who reported 38.3% and (Tesfaye and Mekuria, 2017) who reported an overall 43% wound prevalence in Merawi district, in north western Ethiopia and Wolaita Sodo town, southern Ethiopia respectively. However, this finding was lower than the reports of (Biffa and Woldemeskel, 2006) who reported 72.15% of equine wound prevalence in Hawassa town, Southern Ethiopia. This variation may be due to the variation in the husbandry and management in addition to the difference in awareness of the respondents towards the health care of donkeys.

The present finding has also showed high prevalence of wound in medium body condition followed by poor body condition of donkeys this was disagree with finding of (Tsegaet *al.* (2016) and (Heragoet *al.* (2015). This was perhaps due to the difference of the body condition of donkeys in which this study was carried on. In other way age and sex of donkey was not associated with wound prevalence this may be as a result of the study animals which was almost all was male donkey and more than 80% was adult which indicates that there was no sufficient variation to be significant.

In the current study, the highest distributions of wound were found in the back of donkeys (24.3%) followed by shoulder (11.83%), pre-scapular (10.35%), chest (4.14%), forelimb (3.84%), neck (3.55%), and hind limb (0.88%). This finding was in line with the finding of (Aragawet *al.*(2016) which reported the back sore (wither/ spine) as the most prevalent wound in cart and pack donkeys in three districts of Sidama zone, southern Ethiopia. This may be due to improper harness and saddle design.

This study also revealed that there was a significant difference in different types of wounds. Consequently, abrasion (35.2%), Laceration (17.6%), puncture (5.3%) and incise (0.6%) were different types of wounds that found in this study from high to low prevalence in this study. This was the same scenario with the reports of (Tesfaye and Mekuria, 2016) and (Abdellaet *al.*(2017) who reported that abrasion, laceration, puncture and incise as a wound type from a high to low prevalence. Moderate wound was recorded as the most intense wound with 21.9%, followed by mild 18.93% and severe 18.04%. This difference in the intensity of wound was significant with a p-value <0.05 which was in agreement with (Abdellaet *al.*(2017) and (Fikiruet *al.*(2015) this may be due to the owners reaction to the management of the wounds.

Floor of the donkey was one of the significant risk factor for the prevalence of wound with concrete (66.16%), mud with drainage (61.66) and mud with no drainage was (51.03%), this may be as a result of the fact that the concrete floor may exacerbate an initial wound that occur at fore and hind limb and the coldness nature of concrete that may hinder wound healing process by obstructing blood flow. not only this but also weight carried by donkey was also highly associated for the prevalence of wounds in donkeys and it is also a major cause of wound as overloading next to improper harness and saddle design. This was similar to the previous report by (Getnetet *al.* (2014).

In this study most of the wound was caused by improper harness and saddle design which was responsible for 45.85% of wound prevalence and followed by nail piercing 0.03%, overloading and overworking 0.03% infectious disease 0.01% and unknown cause was 5.32% this was in agreement with the study of (Tesfaye and Mekuria, 2017) and (Abdellaet *al.* (2017). This may be due to the poor design of harness and saddle which 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 and predispose donkeys to different wound types.

Most of the owners respond that as they manage their donkeys wound by taking to nearby veterinary service (50.75%) which was inconsistent with (Abdellaet *al.*(2017) this may be most of the cart pulling donkey was work at market area or town or transporting construction commodities where nongovernmental organization was highly reached and also governmental clinic was reached. and followed by purchasing medicine from local market and manage their donkeys wound (11.05%), take to local and traditional healer (34.67%) treat with medicinal plants by themselves (0.5%) and 3.01% owners not do anything to manage their donkeys wound at all. Most owners was give short term rest (51.9 %) and use their donkeys again while only (7.1%) was give a long term rest for the wounded donkeys. This may be due to the attitude of the owners as they believe wound was not a reason to provide donkeys a long term rest until they recover from wound. This was in line with the previous report by (Tsegaet *al.*(2016).

## 5. Conclusion

This study prevailed high prevalence of wound in and around Shashemene town, Ethiopia. Improper harness design and saddle was the major cause of wound while overloading, nail piercing, infectious disease and unknown cause also contributes their part for the occurrence and high prevalence of wound at this study area. Even though, awareness of the owner taking their wounded donkey towards the nearby veterinary service was good but they had attitude of giving only short term rest to their donkeys.

### *Recommendations*

Depending on the above conclusion the following recommendation was forwarded.

- Awareness have to made to the owners of donkeys on the how to prevent wound that raised from improper harness and saddle, nail piercing, infectious disease and unknown causes by all concerned stake holders
- Owners also have to give enough rest to their wounded donkeys
- Governmental organization and Nongovernmental organization have to collaborated to alleviate this health problem of donkeys in urban, per urban and rural areas.
- Policy makers also have to play their role by legislating a law that implemented and vital for health of donkeys.

---

## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest.

---

## References

- [1] Abdela N, Teshome E, Hassan A and Begna FD (2017). Prevalence and associated risk factors of equine wound in and around Asella town, South Eastern Ethiopia. *Journal of Veterinary Medicine and Animal Health* Vol. 9(4), pp. 63-71
- [2] Ameni G., (2006): preliminary trial on the reproducibility of epizootic lymphangitis through experimental infection of two horses. Short communication. *Journal of veterinary*, 172: 553-555.
- [3] Anon, B. 2007: FAO Statistical Database Website. Food and Agricultural Organization of the united nation.....online....
- [4] Aragaw K, Abdella A, Fekadu A, Kassaye A, Hindebu B and Sheferaw D (2016). Skin associated problems in working donkeys in three districts of Sidama Zone, Southern Ethiopia. *Ethiopian Veterinary Journal* Vol. 20 (2):99-118
- [5] Bekele, M., Gebremichael, B., Teshome, M., Zeleke, W., Goshu, D., Mengesha, T., Tesfaye, A. and Mesfin, D., 2013. Assessment of human aspect regarding the welfare of cart horses: perspective of Jimma town, south west Ethiopia. *Res. J. Vet. Sci.*, 6(1), 1-12.
- [6] Biffa D, Woldemeskel M (2006). Causes and factors associated with occurrence of external injuries in working equines in Ethiopia. *Int. J. Appl. Res. Vet. Med.* 4(1):1-7
- [7] Carroll CL, Huntington PJ (1988). Body condition scoring and estimation weight of horses. *Equine Vet. J.* 20(1):41-45.
- [8] Crane M (1997). Medical. In: *The professional hand book of the donkey*, 3rd edition. Whittet Books Limited, 18 AnleyRoad, London W14 0BY. pp.19-36
- [9] CSA, (2009): Central statistical Authority, Agricultural sample survey, Statistical bulletin 302, AddisAbaba, Ethiopia
- [10] Demelash B, Moges W (2006). Causes and influencing factors of external injuries in a working population of horses and donkeys in southern Ethiopia. *Int. J. Appl. Res. Vet. Med.*, 4:
- [11] Feseha GA (1997). Diseases and health problems of donkeys abroad. In: Elisabeth DS, ed. *Professional Hand Book of the Donkeys*. 3rd edition. White Books Limited: London., 207

- [12] Feye A and Bekele T (2016). Prevalence of Equine Lung Worm (*Dictyocaulus Arnfieldi*) and Its Associated Risk Factors in Jimma Town, South West Ethiopia. *Adv.LifeSci.Tech.* 40:26-30
- [13] Fikru A, Tadese A, Gebreegziabher Z (2015). Prevalence of Equine Wound and Associated Risk Factors in and around Kombolcha Town, North Ethiopia. *J. Vet. Sci. Technol.* 6:234
- [14] Getnet F, Feyera T, Alemu F, Niguse A. and Abera T (2014). Injuries in Donkeys and Mules: Causes, Welfare Problems and Management Practices in Amhara Region, Northern Ethiopia. *American-Eurasian Journal of Scientific Research* 9 (4): 98-104
- [15] Herago T, Megersa M, Niguse A, Fayera T (2015). Assessment on working donkey welfare issue in Wolaita Sodo Zuria District, Southern Ethiopia. *Glob.Vet.* 14:867-875.
- [16] Knottenbelt DC (2003). *Handbook of Equine Wound Management*. Liverpool, UK: WB Saunders. pp. 5-11
- [17] Martha Geiger, 2020. Donkeys' economic and social contribution is urgently undervalued in Ethiopia. Available at <https://blogs.lse.ac.uk/africaatlse/2020/02/14/donkeys-economic-social-contribution-development-policy-ethiopia/> accessed at July 11, 2021
- [18] Pearson R. A., Simalenga T. E. and Krecek R. C. (2003): harnessing and hitching donkeys, mules and horses for work. Available at <https://www.vet.ed.ac.uk/ctvm/Research/DAPR/Training%20Publications/Harness%20Hitching%20Donkeys/Harness%20Hitching%20donkeys%20Oct06.pdf> ACCSESD AT [July 11, 2021]
- [19] Stashak, T. S. and Theoret, C., (2008): *Equine Wound Management* 2nd edition, WileyBlackwell, USA.
- [20] Svendsen ED (1997). *Parasites abroad. The professional hand book of the donkey*, 3rd edition, Whittet Books Limited, 18 Anley Road, London W14 0BY. pp.166-182.
- [21] SWARDO, (2006): *Shashemene Woreda Agricultural and Rural Development Office. The annual report, Shashemene, Ethiopia.* Reference
- [22] Tesfaye W, Mekuria K (2017). Prevalence of Wound and Associated Risk Factors in Working Donkeys in and around Wolaita Sodo Town, Southern Ethiopia. *Journal of Biology, Agriculture and Healthcare* Vol.7 (9) pp 77-81
- [23] Thrusfield M (2007). *Veterinary Epidemiology*, 3rd edition. Black Well Science Ltd., 182-98.
- [24] Tsega AM, Worku Y, Tesfaye T, Nazir S (2016). Prevalence of Wound and Associated Risk Factors of Donkeys in Merawi District, North Western Ethiopia. *J. Anim. Res.* 6(5):765-771.