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Perception and Welfare Assessment on Working Donkeys in Angacha District, Kambata Tambaro Zone, Southern Ethiopia

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Abstract

A cross-sectional study was conducted on 395 working donkeys from October 2017 to April 2018 to assess the welfare problems of working donkeys in Angecha District, Kambata Tambaro Zone. Welfare problems were assessed through direct physical examination and indirect assessment. Most donkeys (62.3%) worked 2 - 4 days/week while the rest worked > 5 days. It also showed that most of the respondents (80.8%) had no access welfare of donkeys and the Majority 87.8% did not provide additional feeding. The beating of working animals was widely practiced (93.9%) and the majority of the respondents of the study area provided feed and water to their donkeys mixed with horned animals. Out of the total 395 working donkeys examined in the study area about 11.6%, 22.8%, 39.7%, and 48.1% were suffering from different types of dermatological problems, musculoskeletal problems, wounds, and behavior and communication problems respectively. There was a statistically significant association ($P < 0.01$) between wound on donkeys and body condition scores, that is a higher wound proportion (37.2%) was observed in donkeys having poor body condition. According to the study, working donkeys were suffering from various welfare problems due to lack of good husbandry practices, wounds, harnessing problems, workload, disease, and lack of balanced nutrition. Accordingly, inclusive awareness creation on welfare and health management of donkeys should be designed to improve these problems.

Keywords: *Angacha; Perception; Welfare; Working Donkeys*

Introduction

The equid population in the world is approximately 112 million (58.5 million horses, 43.0 million donkeys, and 10.5 million mules), although this is very likely to be a gross underestimate. Ethiopia has approximately 7.4 million donkeys which 32% of Africa and 10% of the world population [1,2], which makes it harboring the largest population of donkeys in the world overtaking China. In Ethiopia, the majority of donkeys are found in highland areas, even though they are widely distributed in all agro-ecological zones of the country [3].

Working equids (horses, mules, and donkeys) have an essential role in the livelihoods of millions of people worldwide. These equids perform numerous activities daily, including the transportation of goods, people, and construction materials, as well as being used in agricultural and tourism activities [1,4,5].

Regardless of the technological advancement throughout the world, donkeys are still well-deserving of the name "beasts of burden". They have a prominent position in the agricultural systems of many developing countries. This is shown by the widespread use of donkeys

in rural and urban areas in Africa. It is suggested that donkeys can play a great role in the frameworks of food security and social equity of high food-insecure countries [6,7].

The low level of development of road transport, network, and rough terrain of the country make donkeys the most valuable, appropriate, and affordable pack animals under the smallholder farming system [8]. Moreover, increasing the human population in Ethiopia has increased the demands of donkeys for multipurpose activities such as transport crops, fuelwood and water, building materials and people by carts or on their back from farms and/or markets to home. Working equines, particularly donkeys, play a significant role in helping to empower women in many developing countries [9,10].

In Ethiopia, equines are the most neglected animals and given low social status even with their invaluable contributions. This resulted in multiple welfare problems associated with inaccessible water, feed, and shelter at the working sites, and suffering from several lesions [9,11]. Loading without proper padding and overloading for long distances cause external injury to donkeys. This misuse, mistreatment, and lack of veterinary care for donkeys have contributed enormously to early death, the majority of which currently have a working life expectancy of 4 to 6 years. Besides, Ocular problems are a frequent problem in working Equidae in developing countries. However, in countries where animal welfare is in practice, the life expectancy of donkeys reaches up to 30 years [12,13].

According to different studies, animal welfare is being compromised due to poverty and lack of knowledge that is considered as the main constraint [14]. When working donkeys can no longer work, the owners lose their livelihoods, either temporarily or permanently. The welfare of working donkeys in developing countries is therefore crucially important, not only for the health and survival of those animals but also for the livelihoods of those people dependent on them [6,15].

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 donkey health and welfare. Regarding the welfare of donkeys, few studies have been done in different parts of Ethiopia. Despite these facts, the assessment of welfare problems in the study district has paramount importance to create awareness and design appropriate mitigating strategies for the welfare problems in working donkeys. Accordingly, this study was conducted to assess the perception and welfare problems on working donkeys in Angacha district.

Materials and Methods

Study area

The current study was conducted from October 2017 to April 2018 in selected districts of Angacha which located in Kambata Tambaro Zone east Showa zone of Southern which is found 165 km to the southeast of Addis Ababa. Angacha is one of the six Districts in Kambata Tambaro Zone, Southern Nations, Nationalities, and Peoples' Region (SNNPR). It is located about 260 km southwest of Addis Ababa. Angacha is bordered on the south by Kacha Bira, on the west by Doyogena, on the north by the Hadiya Zone. It is located at $07^{0}12'\ 47''$ East and $38^{0}\ 79'\ 00''$ North. The area has an average elevation of 2100 meters above sea level and it is a potential Enset production in the area. The major livestock species kept in the area include cattle, goats, donkeys, sheep, horses, and the mule. The total livestock population of the district was 57,452 Cattle, 29,650 Goats, 42,332 Sheep, 18,229 Donkeys, 9,872 Horses, and 2,715 Mule. The agriculture is cereal-based mainly wheat, potato, Enset, teff, maize, and sorghum and entirely depends on oxen and draught power to till the land [3,16].

Study animals

The study animals were working donkeys of different age, sex, and body condition groups in Angacha district, Kambata Tambaro Zone, Southern Ethiopia.

Sample size determination

A perusal of different kinds of literature and published articles, there is no published work regarding welfare problems in working donkeys in the district. Hence, an expected prevalence of 50% was taken into consideration to determine the sample size of the study ani-

mals. Moreover, 95% confidence interval (CI) and 5% desired absolute precision was used to appreciate the significant difference. Thus, the following formula was used to determine the sample size [17]:

$n = Z^2 \times P (1-P)/d^2$

Where, n = The required sample size, Z = Confidence level (regular value = 1.96), P = Expected prevalence (50%) and d = Desired absolute precision (0.05).

Accordingly, the calculated sample size was 384, which is the minimum sample size to be taken in the control area. Hence, the sample size was determined to be 395 in the study area.

Study design and sampling strategy

A cross-sectional study was conducted from October 2017 to April 2018 to identify the health and welfare problems of working donkeys in the study area. Donkeys in the study areas were randomly selected to assesses the welfare problems regardless of age, sex and body condition scores, and color. Sampling method was carried out at field level, market, homestead, and around water point areas on the daytime from respective peasant associations of the district.

During sampling, various factors such as sex, age, and body condition scores of the donkey were recorded. The age of the selected donkeys was determined by dentition patterns after Crane and Svendsen [18]. Body condition score (BCS) was estimated based on the guides published by Svendsen [19]. Accordingly, donkeys were grouped into three age categories: donkeys from 1 - 3 years of age were classified as young; 3 - 10 years were considered as an adult, and those beyond 10 years were classified as old. These age classes were based on the age of first work, productive age, and the life span of Ethiopian donkeys [19].

Method of data collection

Direct welfare assessment

Data collection format that contains the general welfare parameters was developed and data were collected by direct physical examination of donkeys. Prior to the assessment, consent was obtained from the animals' owners by introducing the objective of the study. Information regarding general conditions such as wound type, dermatological disease, musculoskeletal disease, other disease signs and behavior, age categories, body condition scores, work type, and condition of harnessing were properly recorded. The assessment was carried out at field level, market, and around the homestead in the daytime.

Based on the types of work animals were categorized as draught, pack, both draught, and pack. "Draught" animals are those used for the transport of goods by carts. "Pack" animals are those used for transport of goods on their back (pack) and both for draught and pack [5].

Indirect welfare assessment

A semi-structured questionnaire was developed to collect data on major welfare problems associated with working donkeys such as management practices (feeding, watering, housing practice, health care and resting time), age, sex, and educational status of attendants. These were obtained by interviews made with the donkey owners/attendants to assess the knowledge and perceptions regarding donkey welfare issues in the area.

Data management and statistical analysis

Data during surveys were entered into the Microsoft Excel-2016 spreadsheet and analyzed using Stata version 13 statistical software. Descriptive and analytic statistics were made and the results of the analysis were presented through tables. In all the analyses, the confi-

dence level was held at 95% confidence interval and P-values were considered as significant ($P < 0.05$). A chi-square test was also applied to see the association between age, sex, and body condition scores.

Result

Welfare assessment results

Assessment on knowledge on working donkeys

In the present survey, most of the respondents (80.8%) of the study area had no awareness of donkey welfare. The beating of working animals was widely practiced (93.9%) and the majority of the respondents in this study provided feed (86.6%) and water (92.7%) to their donkeys together with the other domestic animals. As to the provision of rest for the working donkeys, most of the respondents (69.6%) give adequate rest for their animals (Table 1).

Conditions		Proportion (%)
Animal welfare awareness	Yes	19.2
	No	80.8
Animal beating	Yes	93.9
	No	6.1
Feeding method	Separately	13.4
	Mixed with others	86.6
Watering method	Separately	7.3
	Mixed with others	92.7
Adequate rest	Yes	69.6
	No	30.4

Table 1: *Distribution of respondent knowledge on donkey welfare.*

Assessment of management practices on working donkey

The owners were interviewed about donkey ownership, management, and working practices. Accordingly, most donkeys (62.3%) spend 2 - 4 days/week on the different types of work while most of the working donkeys that worked 1 - 5 hrs per day (47.3%) and 2 - 4 days per week (52.7%) were having good body condition. Thus, there was a statistically significant association ($P < 0.01$) between working hours and body condition scores, that is a good body condition was observed in donkeys having less working hour. It also showed that the majority of respondents 87.8% did not provide additional feeding for their working donkeys (Table 2).

Health and welfare problems encountered in working donkeys

Direct welfare assessment of 395 working donkeys revealed 39.7%, 11.6%, 22.8%, 48.1%, and 19% were suffering from different types of wounds, dermatological problems, musculoskeletal problems, abnormal behavior and communication, and other disease syndromes, respectively. Whereas about 18.5% of animals showed abnormal behavior such as depression and other odd signs like biting other animals and over-excitement and nervousness (Table 3).

Prevalence of wound and associated risk factor

According to the current study, the was a significant association between the type of work and wound occurrence in working donkeys. A higher prevalence of wound (85.7%, $P < 0.000$) were found in both pack and draught donkeys. Besides, there was a statistically significant difference ($P < 0.01$) in the prevalence of wound among different body condition scores showing donkeys with poor body condition

Variables		No. examined	No. of positive and prevalence of BCS			χ^2	P-value
		Poor	Moderate	Good			
Work Type	Pack	320 (81.0%)	74 (78.7%)	199 (80.9)	47 (85.5%)	2.306	0.680
	Cart	54 (13.7%)	13 (13.8%)	34 (13.8%)	7 (12.7%)		
	Both	21 (5.3%)	7 (7.4%)	13 (5.3)	1 (1.8%)		
Housing practice	Indoor	24 (6.1%)	9 (9.6%)	9 (3.7%)	6 (10.9%)	6.786	0.034
	Outdoor	371 (93.9%)	85 (90.4%)	237 (96.3%)	49 (89.1%)		
Working hours per day	1 - 5 hrs/day	220 (55.7%)	35 (37.2%)	159 (64.6%)	26 (47.3%)	22.530	0.000
	> 7 hrs/day	175 (44.3%)	59 (62.8%)	87 (35.4%)	29 (52.7%)		
Working days per week	2 - 4 days/week	246 (62.3%)	75 (79.8%)	142 (57.7%)	29 (52.7%)	16.575	0.000
	> 5 days/week	149 (37.7%)	19 (20.2%)	104 (42.3%)	26 (47.3%)		
Work Load	< 50 Kg	326 (82.5%)	75 (79.8%)	203 (82.5%)	48 (87.3%)	3.413	0.491
	51 - 100 Kg	46 (11.6%)	14 (14.9%)	26 (10.6%)	6 (10.9%)		
	> 100 Kg	23 (5.8%)	5 (5.3%)	17 (6.9%)	1 (1.8%)		
Additional feed	Not provided	347 (87.8%)	82 (87.2%)	240 (97.6%)	25 (45.5%)	14.368	0.000
	Provided	48 (12.2%)	12 (12.8%)	6 (2.4%)	30 (54.5%)		

Table 2: *Assessment of management practices on working donkey in Angecha district, Southern, Ethiopia.*

Health problems	Condition	Frequency	Proportion (%)	Overall (%)
Wound	Back sore	37	9.4	39.7
	Saddle/Chest sore	14	3.5	
	Beat sore	27	6.8	
	Bite wound	23	5.8	
	Tail base sore	55	13.9	
Dermatological problems	Sarcoid and papilloma	19	4.8	11.6
	Ectoparasite	23	5.8	
	Habronemiasis	4	1.0	
Musculoskeletal problems	Lameness	28	7.1	22.8
	Fracture	6	1.5	
	Hoof overgrowth	56	14.2	
Behavior and Communication	Depressed	105	26.6	48.1
	Other odd signs*	85	21.5	
Other disease syndromes	Digestive problem	8	2.0	19
	Eye problem	44	11.1	
	Respiratory problem	13	3.3	

Table 3: *Health and welfare problems encountered in working donkeys in Angecha district.*

**: Other odd signs are biting other animal and human, nervousness, tail tuck.*

have a higher prevalence of wound (37.2%). On the other hand, a higher prevalence of wound problems was observed in donkeys with improper harness (52.2%, P < 0.000) than the properly harnessed ones. However, there was no statistically significant difference (P > 0.05) on the overall wound prevalence among age, sex, and study sites (Table 4).

Risk factors	Category	Total	Positive No.	Prevalence of wound (%)	Chi-square (χ^2)	P-value
Sex	Male	252	72	28.6	0.019	0.983
	Female	143	41	28.7		
Age	Young	94	30	31.9	3.306	0.191
	Adult	259	67	25.9		
	Old	42	16	38.1		
BCS	Poor	94	35	37.2	8.753	0.013
	Moderate	246	70	28.5		
	Good	55	8	14.5		
Work Type	Pack	320	73	22.8	42.686	0.000
	Draught	54	22	40.7		
	Both	21	18	85.7		
Harnessing Condition	Proper	217	64	29.5	21.141	0.000
	Improper	178	93	52.2		
Sites	Gadalo	37	12	10.6	5.595	0.470
	Kalema	43	15	13.3		
	Satame	67	16	14.2		
	Ambericho wasere	61	13	11.5		
	Bondena	52	14	12.4		
	Fandide	47	12	10.6		
	Aziga	88	31	27.4		

Table 4: *Prevalence of wound based on work type, body condition scores, age, sex, workload, harnessing condition and location.*

Discussion

The current questionnaire survey revealed that the majority (93.9%) of donkeys were kept outdoor that expose them to harsh environmental conditions like fluctuating temperature, moisture and predispose them to predator attack. According to the current study, 87.8% of the donkey owners do not give additional rations like grain, corn, or wheat flour milling byproducts to their donkeys. These causes weak performance in the animals and different deficiency disorders. This finding was in agreement with the Elisabeth report that describes extensive management affects the donkey health and welfare of donkeys [20].

The majority of the participants (80.8%) in this study also revealed that they had no awareness about the welfare of donkeys. Also, the beating of donkeys (86.6%) was also widely practiced and most of the respondents (92.7%) feed and water their donkeys by mixing with the other animals. This finding was different from the previous reports of Dinka., *et al*. (2007) in southern Ethiopia (98.6%) and Herago., *et al*. [1] in Wolaita Sodo (89%) who reported that the majority of the respondents provided feed and water separately at different frequencies per day. This variation might be due to the variation in the workload of the animals and the geographical location of the study area.

In the present study, it was observed that donkeys were used mainly both for pack and drought purposes. This finding was in agreement with Mekuria., *et al*. [2] in Hawassa town where all equines are mainly kept to transport people and goods in order to assure owners' daily income. In the present study, the overall prevalence of wound in working donkeys was 39.7%, which was in agreement with 40% prevalence reported by Pearson., *et al*. [7] in central Ethiopia. However, this finding was lower than the prevalence of 42.2% reported by Birhanu., *et al*. [21] in Adet town, 54% reported by Sells., *et al*. [22] in Morocco and 77.5% and 79.4% by Curran., *et al*. [23] and Biffa and Woldemeskel [9] respectively in Ethiopia.

In the present study bit sore, tail base sore, back sore, chest sore, and hyena bite sore were among the major types of wounds identified in the area. Pritchard., *et al*. [5] and Dennison., *et al*. [24] have stipulated a probability of occurrence of all types of wounds on the same donkey. These wounds are often caused by a combination of multifactorial reasons and mainly associated to management and husbandry practices including environmental factors, the type of harness material used (natural or synthetic), the fitness of the harness, the chariness of the owner, the frequency of work and the load was among risk factors that contribute to the onset of different types of wounds on working donkeys [2,21].

The prevalence of dermatological diseases such as sarcoid/papilloma, habronemiasis, and ectoparasites were common among working donkeys of the study area. This might be associated with owners' poor knowledge of health care, feeding, and irregular or no medication against parasites [25]. In the present study, the overall finding of dermatological disease was 11.6%. This finding was lower than the findings of Niraj., *et al*. [26] in Mekelle city (23.7%) and Sameeh., *et al*. [27] in Jordan (22.7%) but, agree with the finding of Ahmed., *et al*. [25] in Pakistan (11%). Mekuria and Abebe [11] made similar observations, where the higher prevalence of ectoparasites were found in donkeys than horses and suggested that donkeys were the most neglected animals in Ethiopia, receiving less attention by owners and kept under poor management conditions. Whay., *et al*. [28] also reported skin lesions as one of the major prevalent and severe welfare issues in working donkeys.

Some of the cases that were observed in this survey were related to the musculoskeletal system including lameness, fracture, hoof overgrowth, and abnormal gait. The overall problem of 22.8%, was found in the current study which was in agreement with Herago., *et al*. [1] the finding in Wolaita Sodo (21.8%) and in close proximity with Niraj., *et al*. [26] the finding in Mekelle city (18.2%) but lower than Sameeh., *et al*. [27] the finding in Jordan (32.2%). Overloading, lack of hoof care, and continuous movement in various landscapes and on rough roads could be the main reasons for the occurrences of musculoskeletal problems. This implies that any type of interaction between limb abnormalities in these animals may have serious welfare and health problems [29].

Behavioral assessment of working donkeys aimed to give some insight into the animals' emotional state. Exaggerated movement of an animal away from an approaching observer may be an indication of fear of humans has been previously tested in farm animals [30,31]. Besides, animals with poor health problems may also fail to express their normal behavioral and physiological needs as well. The present study has revealed that 48.1% of the donkeys show abnormal behavior (depressed and other odd signs). This result is lower than reports of Dennison., *et al*. [24] in that 68% of working donkeys showed abnormal behavior in Pakistan.

From the present study it was also observed that among other disease problems, the most frequently encountered health problems were eye problems such as ocular discharge (11.1%), respiratory problems (5.9%), and digestive problems (2%). This finding closely agrees with the report of Sameeh., *et al*. [27] who found 21%, 7%, and 4% for the digestive system, respiratory, and eye problems, respectively in Jordan. These differences might arise from differences in topographical nature and misuse; low level of donkey health care, inappropriate husbandry system of the donkey, whereas digestive problems may also be related to high parasite burdens and impaction.

According to Henneke., *et al*. [32] poor body condition score is an indicator of reduced body fat. In the current study, statistically significant association ($P < 0.01$) was found to between body condition and wound, where donkeys with poor body condition found to be

developing wounds than those having good body condition. This is in line with the reports by Mekuria., *et al*. [2] in Hawassa town and Pearson., *et al*. [7] in central Ethiopia, who indicated that poor physical conditions occurring mainly due to malnutrition which is the leading cause of sores in donkeys. The probable reason for such association may be due to donkeys with a poor body condition score might have less natural padding protecting them from pressure, friction and shear lesions caused by saddle.

The present study showed that a significantly higher prevalence of wound (85.7%, P< 0.000) were observed in both pack and draught purpose donkeys. This finding is higher than the report of Pritchard., *et al*. [5] in Afghanistan and Pakistan (31.8%, P < 0.001). The possible explanations for this variation might be due to environmental factors like bumpy roads. The improper harness and saddle that does not cover all parts; gravitational force directed backward pulling, the frequency of work, and the weight of the load all contributing to the onset of health problems. Other possible reasons might be due to the owners do not have enough awareness and training about the welfare of their donkeys.

The present study has shown that a higher prevalence of wound was observed in older donkey (38.1%) than other age groups, but no significant difference (P > 0.05) in the overall wound prevalence among age groups were seen. This finding was in agreement with the report of Biffa and Woldemeskel [9] who stated that older donkeys had greater wound risk than other age groups. This might be due to more exposure to work and carrying a heavy load over a long distance, fewer owners' attention to wound management, and compromised immune defense mechanism of an animal which reduces with age advancement.

In the present study donkeys without proper harness had a high prevalence of (52.2%) wound compared to properly harnessed animals (29.5%) with significant difference (P < 0.00). This is in line with the reports of Niraj., *et al*. [26] from Mekelle city, Ethiopia, who stated the higher prevalence of wound at the back region could be due to improper harnessing which inflicts injuries to the working animal. Other researchers also reported that improper-fitting and improperly made tail strap that usually has sharp edge causes lesions on the underneath of the base of the tail of working donkeys [33].

Conclusion and Recommendations

The present study revealed that donkeys in Angecha district suffer from a variety of welfare problems including poor husbandry practice, wounds of various nature, musculoskeletal disorders, dermatological diseases, and other disease syndromes. These are mostly a result of limited knowledge and awareness of owners to provide good care to their donkeys. Most of them beat their donkeys, do not have particular feeding and watering provision, and provide no housing at night. In conclusion, the donkey owners in the study area have less awareness about the benefit of good management on donkey welfare. Therefore, owners need to be trained on proper management, handling of donkeys, and proper working practices to reduce the welfare problems.

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