

Welfare Assessment of Working Donkeys in Mekelle City, Ethiopia

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Abstract: A cross-sectional type of study was conducted with the objective of assessing the general health problems and welfare concerns of working donkeys in Mekelle city. Both direct (animal based) and indirect (owner interview) assessment methods were used. Out of the total 384 examined donkeys; 30.2% had skin problem, 33.8% infested with external parasites and 18.2% had musculo-skeletal problems. The wound prevalence in the present study area was 37.9% and distribution of wound on the donkey body showed that 14.3%, 11.2%, 7%, 4.4% and 1% at wither and back, varied body part, loin and tail region, limbs and head regions, respectively. The age proportion obtained were 21.1%, 56.3%, 18.2% and 4.4% in the age groups of ≤ 5 years, 6-10 years, 11-15 years and above 15 years, respectively. The body condition score of working donkeys in the present study area were 1-2, 2-3 and 3-4 with a percentage of 37.2%, 46.9% and 15.9%, respectively. The dental problem was significantly associated ($p=0.000$) with age, but not with body condition score ($p=0.140$). Similarly, the wound was significantly associated with the body condition ($p=0.000$), type of the work ($p=0.020$) and age ($p=0.000$). The body condition was significantly associated ($p=0.007$) with the type of the work, but not with the prevalence of external parasite ($p=0.781$). Results of indirect assessment through interview with 38 owners showed that the major constraints of donkeys in decreasing order were, management problem (28.9%), harnessing problem (23.7%), over loading and over working (18.4%), disease and lack of veterinary service program (18.4%), nutritional problem (10.5%). The owners used different methods for the management of diseased donkey and 31.6% of the total respondents were able to take the diseased donkeys to veterinary clinic, 10.5% used traditional treatment and 57.9% of the respondents do nothing. This study showed many of the donkeys working in the area were experiencing multiple welfare problems. Hence, a comprehensive donkey health, management and welfare promotion program is important to alleviate the problem.

Key word: Health Problems • Mekelle • Welfare • Working Donkeys

INTRODUCTION

Ethiopia has the largest population of donkeys in Africa and the second largest donkey population in the world after China [1]. Equines 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 [2].

Despite their invaluable contributions, donkeys in Ethiopia are accorded low status and are consequently the most neglected animals. Working donkeys are prone to painful, debilitating and often fatal tropical illnesses and conditions such as tetanus, parasitic infection and colic. In addition, these animals work under difficult environmental conditions including intense heat, difficult terrain and often inappropriate equipment, with inadequate food and water, resulting in exhaustion, dehydration, malnutrition, lesions and hoof problems [3].

Constraints such as poverty and lack of knowledge mean that animal welfare is being compromised internationally. 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 [4,5]. 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's health and welfare. Therefore, the objectives of the study were to assess welfare of working donkeys and risk factors associated for compromising welfare of working donkeys.

MATERIALS AND METHODS

Study Area: The study was conducted from November 2011 to April 2012 in Tigray Region in the semiarid highlands of northern Ethiopia where the International Donkey Sanctuary Trust (IDST) operates. Tigray Region is located in the northern part of Ethiopia extended between an altitude of 12°15' and 14°50' North and a longitude of 36°17' and 36° 59' East with an elevation range of 1800 to 2225 meters above sea level. The Region stretches encompassing the Sudan's border in the west and Eritrea in the north and bordered by the Ethiopian Amhara and Afar regions in the south and east, respectively [6].

The study area of the region was Mekelle city. Mekelle is the capital city of Tigray Region and located in the northern extremes of Ethiopia extending from 33°25' to 39°38' north latitude and from 36°27' to 40° 18' east longitude at an average altitude of 2000 to 2200 meters above sea level. The mean annual rain fall ranges from 11.3mm to 39.1mm and the temperature varies from 12°C (in November and December) to 27°C (in January and March). Mekelle enjoys humid and hot climate and 783 km from Addis Ababa [7].

Study Population and Sampling Procedure: A cross-sectional study was conducted on 384 male working donkeys which plays major role in the area as pack animal groups. All were indigenous breed. Sampling was conducted after stratifying the donkeys based on their type of work, like transportation of charcoal, construction activities, multipurpose and transportation of flour from milling house. In each group an appropriate *kebele* was assigned and to each *kebele* appropriate sample was allocated. Then direct assessment was conducted on randomly selected donkeys and indirect assessment was made by interviewing 38 randomly selected donkey owners.

Data Collection:

Direct Assessment: A structured direct assessment format was developed and data was collected by direct physical examination of the animals. This includes general health parameters such as:

- Age profile of donkeys
- The body condition score
- Wound/physical injuries
- Lameness and other limb abnormalities
- Parasites and skin problems
- Behavior of the animal
- Problems of visible mucus membrane and eye conditions
- Type of the work
- Other signs of illness.

Animal body mapping were also used as indicators of problems in the animal. For estimating the age of the donkeys, standard reference of Crane [8] was used. The body condition was scored using (1-5, body condition scoring system) used by the donkey sanctuary. The body condition score were categorized during data analysis into three groups and those are, from one to two, from two to three and from three to four body condition scores.

Indirect Welfare Assessment: Semi-structured questionnaire was developed to collect data on the major constraints in utilizing donkeys, veterinary service program and disease management system. These were obtained by interview made with randomly selected 38 donkey owners to generate some information which was missed during direct assessments of the animal.

Data Management and Analysis: The data collected from the 384 donkeys and interviews made with 38 owners were entered into Microsoft excel spread sheet and analyzed using SPSS version15 statistical software. Descriptive statistics were used to quantify the problems and Chi-square (χ^2) was used to determine the association of the problem with the risk factors. In all calculations, the confidence interval was set at 95% and statistical significant differences were considered as ($p < 0.05$).

RESULTS AND DISCUSSION

Direct Assessment Results: As indicated in Table 1, the general health problems of working donkeys have showed that from the total of 384 examined donkeys, 30.2% were found with the skin problems, 33.8% with

Table 1: Encountered general health problems of the examined donkeys

Type	Major health problems	Positives	Prevalence (%)	Total (%)
Skin problem	Rough	43	11.2	30.2
	Loss of elasticity	17	4.4	
	Alopecia	45	11.7	
	Sarcoid	5	1.3	
	Habronemiasis	6	1.6	
Parasites	Ticks	37	9.6	33.8
	Lice	43	11.2	
	Gastrophilus egg	50	13.0	
Visible mucus membrane	Pale	32	8.3	20.0
	Congested	45	11.7	
Eye condition	Lacrimation	68	17.7	19.3
	Loss of vision	6	1.6	
Dental condition	Dental problem	62	16.2	16.2
Musculo-skeletal problem	Hoof over growth	9	2.3	18.2
	Abnormal gait	23	6.0	
	Lameness	38	9.9	
Behavioral observation	Hyperesthesia	12	3.1	19.8
	Depression	64	16.7	
Walks along side	No response	50	13.0	13.0

Table 2: Age and body condition score of donkeys verses dental problem of working donkeys

Variables	No. of examined	Incisor teeth problem	Check teeth problem	Periodontal disease	Dental problem (total)
			Age ^a		
≤ 5	81 (21.1%)	-	-	1(1.2%)	1.2%
6 -10	216 (56.3%)	19 (4.2%)	17 (7.9%)	4 (1.9%)	14%
11-15	70 (18.2%)	5 (7.1%)	14 (20%)	2 (2.9%)	30%
>15	17 (4.4%)	2 (11.8%)	7 (41.2%)	1 (5.9%)	58.9%
			Body condition score ^b		
1-2	143 (37.2%)	4 (2.8%)	22(15.4%)	2(1.4%)	19.6%
2-3	180 (46.9%)	11(6.1%)	12(6.7%)	5(2.8%)	15.6%
3-4	61 (15.9%)	1(1.6%)	4(6.6%)	1(1.6%)	9.8%

^a $\chi^2 = 64.105$, $p=0.000$; ^b $\chi^2 =12.249$, $p=0.140$

external parasites, 20% with pale and congested visible mucus membrane, 19.3% with lacrimation and loss of vision, 16.2% with dental problem and 18.2% with musculoskeletal problem. 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 16.7% and 2.3% of the donkeys had depression and hyperesthesia, respectively. Moreover, 13% of the donkeys do not respond to any stimuli. The reason for the occurrence of such health problems could be due to donkeys are the most neglected animals in Ethiopia receiving less attention by owners and kept under poor management conditions.

The age profile of the donkey in the present study was less than 5 years (21.1%), 6 to 10 years (56.3%), 11 to 15 years (18.2%) and greater than 15 years (4.4%). Since, donkeys reach maturity at approximately three years of age and use them for working purpose before this stage can be detrimental for their health since skeletal

development is not completed. Gebreab [9] estimated the average life span of working donkeys in Ethiopia to be about 9-13 years, but yet donkeys can reach an age of more than 35 years when managed well. The average age of donkeys in this study was found to be 7 years. Moreover, young donkeys used to work the same activities as older donkeys indicating in poor welfare treatment. This might suggest that the people using working donkeys are interested in short term immediate gain, rather than looking to the long term working life of their animals.

As indicated in Table 2, the dental problems in different age groups were ≤ 5years (1.2 %), 6-10 years (14%), 11-15years (30%) and 15-20 years (58.9%). Different age groups of the study animals have shown significant difference ($p=0.000$) on the prevalence of dental problem and such variation in the prevalence could be due to continuous wear and tear and consistency of teeth decrease with age this lead to easily prone to dental

Table 3: Body condition of donkeys with respect to the work type

Work type	No. of animals	Body condition score		
		1-2	2-3	3-4
Multipurpose	96	30(31.3%)	44 (45.8%)	22(22.9%)
Construction	96	36 (37.5%)	45 (46.9%)	15(15.6%)
Charcoal	96	50 (52.1%)	37 (38.5%)	9 (9.4%)
Flour	96	27 (28.1%)	54(56.3%)	15(15.6%)

$\chi^2 = 17.550, p=0.007$

Table 4: Prevalence of wound based on the type of work, different age and BCS groups

Variables	No. of examined	No. of affected	Prevalence
Type of the work ^a			
Multipurpose	96	34	35.3 %
Construction	96	42	43.7%
Charcoal	96	50	52.1%
flour (milling machine)	96	20	20.9%
Body condition ^b			
1-2	143	79	55.3%
2-3	180	54	30%
3-4	61	13	21.3%
Age ^c			
≤ 5	81	20	24.7%
6-10	216	83	38.5%
11-15	70	35	49.9%
15-20	17	8	47.1%

^a $\chi^2 = 28.208, p=0.020$; ^b $\chi^2=70.924, p=0.000$; ^c $\chi^2 = 65.086, p=0.000$

problem. The association between the teeth and welfare could also be explained as the animal owner attitude towards the animal and his knowledge to seek dental care was very low.

Out of 384 examined donkeys, 37.2%, 46.9% and 15.9% was found on BCS between 1-2, 2-3 and 3-4, respectively (Table 2). There was no statistical significant difference ($p=0.140$) in the dental problems with respect to the body condition score of the donkeys. This result disagrees with Hernandez-Gil [10] who found big correlation between body condition scoring and dental problems. However, this study agrees with the result of Cyril Roy [11] who concluded that there was weak correlation between dental problems and body condition score. The reason for poor body condition could be due to other factors like poor management, shortage of nutrients because of scarcity of feed and less supplementary diets.

As indicated in Table 3, the body condition of donkeys was significantly associated ($p=0.007$) with

respect to the work type. Low body condition score was observed in donkeys used for transportation of charcoal. This may be due to the donkeys spent a lot of time carrying the charcoal on their back until it is sold; there was also overworking and over loading. This agrees with Smith [12] that work is inevitably stressful to the donkeys but stress can be minimized by using the donkey regularly and considerably, by working it during the cooler parts of the day and where possible, working it only every second or third day.

As indicated on Table 4, there was a significant difference ($p=0.020$) in the prevalence of wound in donkeys involved on different work type. The highest prevalence was recorded in charcoal transporting donkeys (52.1%). This may be due to burning characters of charcoal and wider surface area of sack that lay on the back of the donkeys in which the whole surface not covered by proper harness leading to at least injury in one area of the anatomical location. There was a significant difference ($p=0.000$) in the prevalence of wound among different body condition scores, donkeys in poor body condition scores were highly affected, then moderate body condition and lower cases was recorded with good body condition. These might be due to dehydration and decrease the elasticity of the skin in poor body condition animals and the prominence of bones leading to easy skin injury. The present study also revealed that the occurrence of wound varies with respect to the age of the donkey and there was significant difference ($p=0.000$) that the older donkeys were seen much more affected than the younger ones. In line with the report of Demelash [13], older equines had 5 times greater at risk than younger equine. This might be due to more exposure to work and carrying, heavy load over a long distance for hours, prolonged and frequent exposure of working animals in working lifetime, less owners' attention to wound management and the immune defense mechanism of an animal also reduce with age advancement.

The donkeys having body condition score between 1 and 2, 2 and 3 and 3 and 4 had infestation with external parasite of 35%, 34.5% and 29.6%, respectively. However differences in the prevalence of external parasite across the different groups of BCS were not statistically significant ($\chi^2=3.21, p=0.781$). This finding was not in agreement with the observation of Kebere [14] that there was high prevalence of external parasite with respect to poor body condition. Hence, poor body condition could be due to other factors like poor management, shortage of nutrients because of scarcity of feed and less supplementary diets.

Of the total examined donkeys, 37.9% were found to be wounded (both active and healed). The greater distribution of the wound were found at wither and back region (14.3%) followed by a mixed distribution (11.2%), limbs (4.4%) and loin and tail region (7%) whereas the least distribution accounts for the head region (1%). Our results agreed with Helen [15] who reported similar situation in the northern Ethiopia and this higher prevalence of wound at the back region could be due to improper harnessing that cause injuries in working donkeys. Similarly, the present result also agrees with the previous report of Mandefro [16], in which, those ill-fitting and improperly made tail straps that usually has sharp edge, causes lesions on the underneath of the base of tail of working donkeys.

Indirect assessment results: Results of indirect assessment through interview with 38 owners showed that the major constraints of donkeys were lack of management, harnessing problem, overloading and over working, disease and veterinary services and nutritional problem (shortage of balanced feed) with a proportion of 28.9%, 23.7%, 18.4%, 18.4% and 10.5%, respectively.

The present study also showed that 31.6% of the diseased donkeys were taken to the nearby veterinary clinics, 10.5 % were treated traditionally, 57.9% did not get any help from their owner and forced to work regardless of the disease. This agrees with Mohammed [17] that low number of donkeys in Ethiopia presented annually to the clinic compared to other domestic animals (for example, 270 donkeys compared to 20,000 head of other domestic animals in 1987-88) and when presented, the donkeys are in an advanced stage of illness, often have been given a number of traditional treatments first.

CONCLUSION

Working donkeys in the present study area were experiencing multiple welfare problems and the major constraints that contribute for poor welfare treatment were lack of good management practices, harnessing problem, over loading and over working, disease and lack of veterinary service program, lack of balanced nutrition and wound. Hence, a comprehensive donkey health, management and welfare promotion program is important to alleviate the problems.

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