

Research Article

Health and welfare problems of donkeys in North and South Wollo Zones, Amhara Region, Ethiopia

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Abstract: *In Ethiopia there is huge population of donkeys with prominent roles in the rural community. Donkeys play a vital role in the North and South Wollo Zones of Amhara Region, Ethiopia. However, limited studies were found on the welfare, health and management-related problems of donkeys. This study was conducted to assess the health and welfare problems of donkeys in selected districts of Eastern Amhara, Ethiopia. Direct observation and indirect questionnaire assessment methods were used to collect welfare data. A total of 159 working donkeys were examined directly in their homestead, grain mill centers and market of loading and unloading centers. A questionnaire survey (n =780) was conducted on purposively selected donkey owners to assess the attitudes and management practices in relation to welfare and health-related data. The majority of the respondents (93%) in the study area had no knowledge or information on donkey health and welfare issues. Donkey owners (46%) didn't have a separate house for donkeys. Strangles, colic, pneumonia, wound, anthrax and equine sarcoid are important donkey diseases respectively. Heat stroke, disease, feed shortage; improper harnessing, overloading and overworking are important welfare problems of donkeys. Disease (28.5%), overloading (28.4%) and poor harnessing (25.2%) were important causes of wounds. The prevalence of wounds was significantly associated with flour cooling practice ($\chi^2 = 17.1$; $P = 0.001$) where donkeys loaded without flour cooling had a greater prevalence of wound. Despite their benefits, most owners had incorrect attitudes towards their donkeys. In conclusion working donkeys in the study area were experiencing a multifactorial health and welfare problems. Awareness creation about the better management practices of pack donkeys to owners through mass education, training and extension service should be promoted.*

Keywords: Diseases, Eastern Amhara, Pneumonia, Strangle, Welfare, Wound

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1. Introduction

Ethiopia has approximately 2.15 million horses, 10.80 million donkeys, 0.38 million mules, and

around 8.1 million camels (CSA, 2020/21). Equines are important animals to the resource-poor communities in both rural and urban areas, providing

traction power and transport services at low cost in the remote areas of Ethiopia, pack animals offer the only realistic way of obtaining returns from agriculture. Moreover, the increasing human population in Ethiopia has resulted in an increase the demand of donkeys for transportation of foods and construction inputs to and from remote areas (Biffa and Woldemeskel, 2006).

Animal welfare refers to the physical and emotional state that is impacted by the environment in which the animal lives and works human attitudes and practices, and resources available to it. 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 who are dependent on them (Kumar *et al.*, 2014). In developing countries, poverty, attitude and lack of knowledge of animal owners are important factors that compromise animal welfare. When working donkeys can no longer work, the owners lose their livelihoods, either temporarily or permanently.

Working equines are prone to painful, debilitating and often fatal tropical illnesses and conditions such as tetanus, parasitic infection, back sore, lymphangitis, strangle and colic. In addition, working donkeys suffer from animal welfare problems such as gait abnormality, joint swelling, broken skin, deep lesions (Burn *et al.*, 2010a) and dental problems (Kumar *et al.*, 2014). Many of the working donkeys are owned by poor people and the animals' needs are often ignored. These animals work under difficult environmental conditions including intense heat, difficult terrain and often inappropriate harnessing equipment, with inadequate veterinary treatment, shelter, food and water, resulting in exhaustion dehydration, malnutrition, lesions and hoof problems (Pritchard *et al.*, 2005; Brook, 2007).

In Ethiopia, the human population has increased and is expected to increase even more in the near future (Worldometers, 2016). Due to the increasing population and the undeveloped infrastructure, the demand for donkeys has increased. It will still take many years to develop the infrastructure in Ethiopia due to the characteristics of the terrain and the low economic status of the country (Mengistu, 2003). It is very important to manage the health and welfare problems associated with working donkeys, not only for the welfare of the animals but also for the livelihood of the people who own them (Kumar *et al.*, 2014). In the Eastern Amhara regions of Ethiopia, no

previous works were done on the health and welfare problems of donkeys. Thus, this study was proposed to fill the above gaps, by addressing the following specific objectives: i) assess the current donkey health and welfare problems, ii) examine the associated risk factors affecting the health and welfare of pack donkeys, and iii) assess the attitudes and practices of donkey owners on improved health and welfare of donkeys.

2. Materials and Methods

2.1. Description of the study area

The study was conducted in North and South Wollo Zones, Eastern Amhara Region, Ethiopia. From North Wollo, Raya Kobo and Meket and South Wollo Zone, Desssae Zuriya and Legambo districts were included in this study (Figure 1). North Wollo zone is located in Northern Ethiopia between 11° 20'N-11° 50' N and 38° 40' - 39° 30' E, at a distance of 580 kilometres away from Addis Ababa, the capital of Ethiopia. Dessie is the capital of South Wollo Zone of the Amhara Region; it sits at a latitude and longitude of 11°8'N 39°38'E, with an elevation between 2,470 and 2,550 masl. Dessie is 417.4 km from Bahir Dar Amhara Region and 400 km from the capital Addis Ababa. Amhara region has a total equine population of 3.7 million, with North and South Wollo accounting for 293,698 and 664,223 donkeys, respectively (CSA 2020/21).

Legambo district: It is located between 38°28' east and 10°10' north with an average altitude if you are referring to the district locations are in a range not at a point of place of 3270 masl. The minimum and maximum average annual temperatures of the district are about 15 and 20°C respectively. The study area is characterized by bimodal rainy seasons: the main rainy season (*Meher*) occurs from June to September, and the short rainy season (*Belg*) occurs from February to April.

Dessie Zuriya district: Dessie town is located in the Northern part of Ethiopia in Amhara National Regional State, South Wollo zone at a distance of 400 km from Addis Ababa. Its location is at 11°8' - 11°46' North latitude and 39°38' - 41°13' East longitude. It has a mean annual rainfall of 1100 - 1200 mm and the mean annual minimum and

maximum temperatures are 12.5°C and 23.9°C, respectively.

Raya Kobo district is located in the North Eastern parts of Amhara Regional state North Wollo zone, Ethiopia, lying between 11°54'04'' E and 12°20'56'' N latitude and between 39°25'56'' and 39°49'04'' E longitude. The district is found in an altitude range of 1400-3100 masl. The district city Kobo is about 570 km away from Addis Ababa on the way to Mekele (CSA, 2011/12). Raya Kobo is characterized by low and erratic rainfall with mean annual rainfall of 670mm that ranges from 500-850mm. The

temperature of the district varies from 19-23°C annually with a mean annual temperature of 23.1°C.

Meket district is one of the districts in the North Wollo of Amhara Region lying between 12°00'N and 38°45'E with elevations ranging from about 1200 masl at the North Westernmost point to over 3000 masl along the Eastern part of its Southern border. The temperature of the district varies from 7°C to 22°C. The study area experiences a bi-modal monsoon rainfall type, where 40% of the 300-900mm annual rainfall occurs from September to October (Belg) and 60% between June to August (Kiremt) (Gissila *et al.*, 2004).

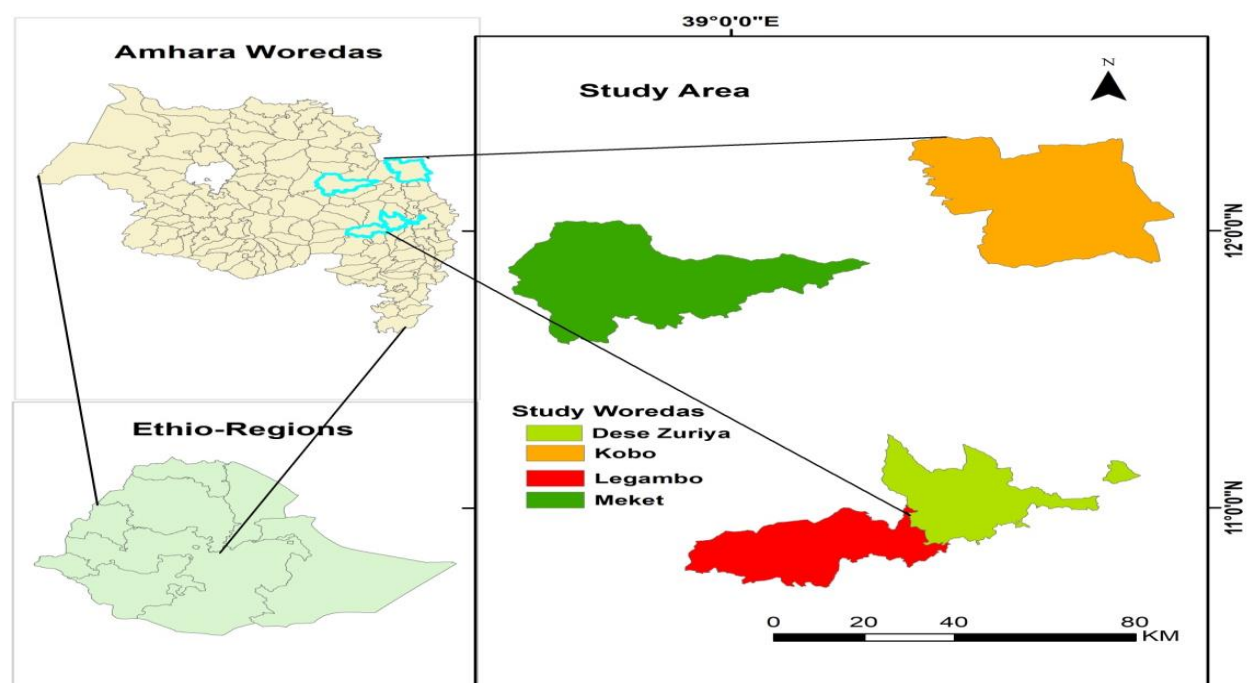


Figure 1: Map of the study area

2.2. Study design, sample size determination and sampling procedure

A cross-sectional study design was employed to generate baseline information on health and welfare problems on working donkeys of both sexes and all age groups in the study areas. Based on the formula proposed by Yamane (1967) a total of 780 pack donkey owners were purposively selected for an interview [1] where 195, 199, 207, 179 donkey owners were selected from Legambo, Dessie Zuriya, Raya Kobo and Meket towns, respectively. In addition, 159 purposively selected pack donkeys from Legambo (n = 40), Dessie Zuriya (n = 39), Raya Kobo (n = 43) and Meket (n = 37) districts were used

for direct observation. Direct observation of donkeys was done at the market (n = 48), grain mill centres (n = 32), homestead/grazing area (n = 42) and loading and transporting sites (n = 37).

$$n = \frac{N}{1+N(e)^2} \quad [1]$$

Where:

n = sample size; N = population size; e = Margin of error, which is 5%.

2.3. Data collection

2.3.1. Questionnaire survey

A semi-structured questionnaire was administered to sampled donkey owners for collection of data on the health and welfare problems of the working donkeys where data related to health, housing, feeding, watering, hobbling, loading and unloading were collected.

2.3.2. Direct observation

The study employed direct observation of purposively selected 159 pack donkeys at the homestead during grazing, loading, transporting sites, market and grain mill centers. Age, sex, presence or absence of oral problems, lameness, clinical signs of diseases and other welfare problems were observed and recorded. Moreover, during direct observation the presence or absence of any kinds of wounds such as back sore, girth sore, bit sore, proud flesh, hobble sore, joint swelling, tail sore, hyena bites and other sores on the body of pack donkeys were examined. The presence of hoof abnormality, hobble wounds, posture and gait abnormality and musculoskeletal disorder were also assessed. The alertness, reaction to human approach, proximity and touch, depression (ear and head drop, tail tuck), difficulty to catch or handle, nervousness and other abnormal behaviors of the donkeys were examined by approaching and closely observing donkeys. Direct observation of clinically identified diseases of donkeys such as epizootic lymphangitis, pneumonia, colic, ocular problems and other illnesses also assessed.

Focus group discussions were conducted to collect the attitudes and practices of donkey owners towards the health and welfare problems of donkeys. Accordingly, a total of 4 FGDs, with eight members per FGD, one from each study district was conducted with purposively selected pack donkey owners. All the members were males above 24 years old and had more than five years experiences of working with pack donkeys. The participants were given a chance to identify the health and welfare problems of pack donkeys in their localities and discuss the severity and frequency of the problems.

2.4. Data management and analysis

The data collected from direct observation of animals and information gathered using questionnaires from the owner were entered into a Microsoft Excel spreadsheet and analyzed using SPSS version 20 statistical software. Descriptive statistics was employed to describe and summarize donkey health and welfare problems in the study area. Besides, Chi-Square (χ^2) was used to evaluate the association between donkey health and welfare problems with

the associated risk factors. During data analysis, a 95% confidence level and 5% level of significance was set to evaluate the significant statistical associations. Statistically significant differences are considered when $p \leq 0.05$.

3. Results and Discussion

3.1. Roles of donkeys

Donkeys were kept mainly for transportation (59.3%) in the study area. This study is in agreement with the reports of Solomon *et al.* (2013) and Usman *et al.* (2015) who described that equids are mainly kept for transport purposes (Table 1). The average life span of donkeys was 16 years in the study area, which is not in line with the reports of Gebreab *et al.* (1998), who estimated that the average life span of working donkeys in Ethiopia to be about 9-13 years, but rarely donkeys can reach an age of more than 35 years when managed well (Starkey, 1998). On average young donkeys start to be loaded and used for transportation starting from 2 years and 6 months. Donkeys reach mature weight between two to three years of age (Wilson, 1991). A healthy and productive donkey could work for 7 and a half hours per day which is in agreement with the reports of other scholars (Panwar *et al.*, 2008; Biswas *et al.*, 2013).

3.2. Management practices of donkey owners: Direct observations

Ensuring access to adequate and appropriate quality and quantity of feed and water for their donkey is an important task for all owners. Donkeys graze free unless they are engaged in working conditions. During working donkeys were provided with 20 kg feed per day as supplementary feed. Earlier studies have reported (Pearson *et al.*, 2000; Kumar *et al.*, 2014) that owners were not providing adequate feed and water, which is in agreement with the findings of the present study observed in market and working sites. Access to insufficient amount of feed and water especially in working donkeys affects their health and work capacity (Starkey, 1998).

The majority of donkey owners load their animals proportional to their body condition and carrying capacities. During direct observation in homestead areas about 65.6% of respondents provided their donkeys supplementary feed (grain, hay, straw or cut grass) (Table 1), which is relatively lower than what was reported by Samson *et al.* (2019) whereas about

83% of the respondents provided supplementary feed to their donkeys.

Donkeys accessed on average about 11.6 liters of water per day. Similarly, 81.8% of donkeys didn't get access to feed while they stay in the market and grain mill centers, which contradicts the rights of animals to get adequate feed and water. Based on the direct observation, about 78.4% of donkey owners had provided feed to their donkeys immediately after unloading, whereas 21.6% of them provided feed while donkeys were loaded. These findings are in contrast to Tesfaye *et al.* (2016), who reported about 48.3% of owners providing feed before loading; about 24.2% of them after loading and 27.5% of the respondents providing their donkeys before and after loading. Agegnehu *et al.* (2017) reported that about 51.3% of the owners are feeding their donkeys both before and after loading at home and the working places.

In rural areas of Ethiopia, it is common to keep the donkeys together with other livestock, mostly cattle. Based on this study, 46% of owners housed their donkeys mixed with cattle during the night-time which may cause damages to the donkeys as cattle can fight with their horns (Table 1). At the market or grain mill centers about 34.2% of donkeys were tied together within a certain fixed material (electric pole, tree) and this contradicts the right to move freely. Pearson *et al.* (2000) supports this idea as donkeys tethered without access to pasture; under trees, in houses or kraals during the day.

This study revealed that cart donkeys were loaded an average of 512 kg (range 200-1000kg) whereas pack donkeys were loaded with an average weight of 62kg (26-160kg), which is relatively high. Most scholars agree that an individual donkey should not carry more than one-third of its body weight (40 - 60 kg) depending on its size (Luurt, 2004). It was observed that 23.9% of donkey owners didn't unload donkeys after they reached to the market or grain mill centres, which violates the right to have a rest after work. There is a significant association between flour cooling practice and wound ($X^2 = 17.1$; $P = 0.001$) (Table 2) where donkeys packed without cooling the flour at the grain mill center are more exposed to wound. The current study agreed with that of Helen

(2001), who reported a higher prevalence of wounds in the back region in Northern Ethiopia, which could be due to improper harnessing and loading of hot flour that causes injuries in working donkeys.

The majority of donkey owners (90.4%) used plastic and synthetic harness materials made of nylon sacking, nylon rope and rubber adjusted with nails which makes animals always get sores and lesions resulting formation of wounds (17%) (Table 1). Virtually, 93% of the donkey owners were using synthetic materials for padding, of which only 47% of pack donkeys were properly padded. Similarly, the present result also agrees with the report of Mandefro (2008), who explained lesions underneath the base of the tail of working donkeys as a result of improper harnessing materials. According to Pearson *et al.* (2003), Donkey owners should use rounded not sharp harness materials made from canvas belting materials, thick cotton and webbing Leather.

About 61.7% of donkey owners hobble their donkeys gently with appropriate harness material, whereas about 5.3% of the owners hobble their donkeys' cruelty with improper harnessing material. About 33% of the respondents did not practice hobbling at all. Hobbling of donkeys may cause discomfort and wounds (Amante *et al.*, 2014) According to Amante *et al.* (2014), hobbles should be made of soft materials to prevent chafing and wounds. In this regard, Pearson *et al.* (2003) recommended hobbling of only one front leg. Never tie the back two legs together or one back leg and one front leg and two animals should never be hobbled together.

According to the direct observation, about 60.8% of donkeys showed health problems such as lesions and wounds on different body parts, which could be associated with improper harnessing. About 68.8% of the animals had hoof overgrowth, which is in agreement with the report of Chala *et al.* (2019) where about 62.5% of donkeys in Holeta town, Walmara district, Ethiopia. The abnormal growth of the hoof causes imbalances in the overall anatomy of donkeys resulting in multifactorial welfare problems. The prevalence of gait, hoof overgrowth and lameness is different as reported by other scholars. Kumar *et al.* (2014) found that only 2.3, 6, and 9% of the donkeys had overgrown hooves, abnormal gait

and lame, respectively. Amante *et al.* (2014) found that 12.4% of the donkeys suffered from lameness while Pritchard *et al.* (2005) and Burn *et al.* (2010) reported about 94.7% and 99.2% of the equines had an abnormal gait, respectively. Generally, lameness

and hoof overgrowth seem to be recurring problems for working donkeys. In this regard, it is very critical to reduce welfare problems associated with improper harnessing, overloading and overworking of donkeys (Kumar *et al.*, 2014).

Table 1: Important health and welfare-related findings in relation to pack donkeys

Variables /questions/	Categories	Frequency (%)
A. Direct observation		
Provision of supplementary feed at homestead area	yes	103 (68.4)
	No	56 (35.2)
Type of harness material used	Plastic and synthetic materials	144 (90.5)
	Clothes	10 (6.3)
	Made of Skin	5 (3.2)
Unloading of donkeys after arrival to destination	Unloaded	121 (76.1)
	Not unloaded	38 (23.9)
B. Questionnaire survey		
Roles of donkeys	Transportation of goods	462 (59.3)
	Water fetching	165 (21.1)
	Breeding	88 (11.3)
	Income source	65 (8.3)
Experience of medication /treatments/	Veterinary clinics	461 (59.1)
	Traditional	112 (14.4)
	Vet. Clinic and traditional	25 (3.2)
	None	182 (23.3)
Emphasis and treatment given to feet problems	Yes	243 (31.1)
	No	537 (68.9)
Housing management of donkeys	Mixed with cattle	359 (46)
	Separate /donkey alone/	421 (54)

Table 2: Association of wound formation with flour cooling practices at grain mill center

Category	No. of examined	No. of affected	Prevalence (%)	X ²	p-value
Flour cooling practice					
Yes	49	5	10.2	17.1	0.001
No	110	48	43.6		

3.3. Health status of working donkey /indirect assessment/

Survey results indicated that donkeys in the Eastern parts of Amhara Region are facing multiple health problems. Untreated wounds of donkeys result in severe complications and death. The present study revealed that about 76.6% of the respondents provide care for their donkeys and visit a government veterinary clinic or private clinic (59.1%) when their donkeys are sick. About 14.3% of the respondents

used traditional medication and about 3.2% visited veterinary clinics as well as treated donkeys with traditional medicine. About 23.4% of the respondents did not use any treatments (Table 2). The results of the present study are in agreement with the findings of Tesfaye *et al.* (2016), who reported about 84.2% of the respondents provide care for their sick animals of which 48.3% took the donkey to a nearby veterinary clinic.

Strangles, colic, pneumonia, wound, anthrax and sarcoid were the most important donkey diseases identified in the study area (Table 3). Bloat (20%) and ascites (26.6%) were important donkey diseases exclusively in Dessie zuriya, and Meket districts, respectively (Data not presented). Bloating is more common during rainy seasons, whereas ascites can occur accidentally throughout the year. This might be due to the highland landscape of the areas where leguminous are grown and used as feed that may cause bloating in equine.

Wound is an important welfare problem of donkeys identified in the study areas where improper harnessing and overloading were identified as major

causes (Table 4). The observed prevalence of wounds (3.2%) in this study (Table 3) were generally lower than reported (38.4%) by Morke et al. (2014), in and around Nekemte Town, East Wollega Zone. Similarly, Biffa and Woldemeskel (2006) and Fikru et al. (2015) reported higher prevalence of 63.4% and 79.4% wound, respectively, as compared to the present study. These differences might be due to variations in management practices and the types of examined work in which the packing donkey was dominant. In addition, the prevalence of wound was calculated for all diseases. In this regard, Yilma et al. (1991) reported that about 34% of the donkeys exhibited saddle sore, which may be associated with lack of saddle or protective materials of donkeys.

Table 3: Major donkey diseases identified based on respondents in the study area

Local name	Scientific name	Seasonal calendar	Proportion (%)
-	Unknown	Year round	48.0
<i>Kuro</i>	Strangle	Year round	24.0
<i>Kurtet</i>	Colic	September- December	15.5
<i>Busa</i>	Pneumonia	December - June	4.4
<i>Kuselet</i>	Wound	June – August	3.2
<i>Abasenga</i>	Anthrax	Year round	3.1
<i>Kintarot</i>	Sarcoid	Year round	1.8

Table 4: Major causes of wound and clinical signs observed on working donkeys

Variables/categories/	Frequency (n=159)	Proportion (%)
Causes of wound		
Overloading	56	35.0
Improper harnessing	76	48.0
Loading hot flour	19	11.7
Disease	8	5.3
Clinical signs		
In appetite	63	39.0
Coughing	38	24.0
Emaciation	17	11.0
Bloat and colic	13	8.4
Others (wound and shivering)	8	5.3
Unknown	20	12.3

3.4. Attitudes of respondents towards donkeys

Most of the respondents (51.3%) abandoned aged donkeys, which is in line with the report of Starkey (1998). According to the authors, donkeys are sometimes abandoned when their health is impaired

and they are not used for work. About 81.8% of owners didn't want to ride donkeys than mules as a preference. Moreover, about 48% of the respondents assumed that donkeys didn't feel any pain. Similarly, 22.7% of them believed that sick donkeys cannot be cured of illness. According to the respondents

(40.3%), donkeys should be beaten to go faster (Table 5). In many cases, local communities, professionals and institutions paid less attention to and have poor attitudes toward donkeys than other animals (Pearson *et al.*, 1999). The results in the present study generally indicated that equines are accorded low attention and are the most neglected animals (Biffa and Woldemeskel, 2006). They are

suffering from serious Welfare problems where the animals are denying the five known freedoms; freedom from hunger or thirst; freedom from discomfort; freedom from pain, injury or disease; freedom to express (most) normal behavior; Freedom from fear and distress (Farm Animal Welfare Council, 1979).

Table 5: Overall attitudes of respondents towards donkeys

Variables/categories/	Frequency (n=159)	Proportion (%)
Ride donkey than mule		
Agree	24	15
Disagree	130	81.8
Not sure	5	3.2
Donkey feels pain		
Agree	72	45.5
Disagree	76	48
Not sure	11	6.5
A sick donkey can't be cured		
Agree	36	22.7
Disagree	108	68.2
Not sure	15	9.1
Abandoning donkeys when aged and diseased		
Agree	82	51.3
Disagree	73	46.1
Not sure	4	2.6
Donkeys go faster when beat-up		
Agree	64	40.3
Disagree	85	53.2
Not sure	10	6.5

4. Conclusion and Recommendations

The present study revealed that donkeys in Eastern Amhara faced multi-factorial welfare problems despite their great importance. Low

level of attitudes of donkey owners on the welfare problems of the animals and poor husbandry practices like feeding, housing,

watering and health care management of donkeys were observed in the study areas. Feed shortage, heat stroke, disease, improper harnessing, overloading and overworking were the most important welfare problems of donkeys. Strangles, colic, pneumonia and wound were major donkey diseases. Improper harnessing, packing hot flour and overloading were the major causes of a wound. Therefore, awareness creation on health care, feeding and working habits of pack donkeys should be given to donkey owners and responsible stakeholders.

Data availability statement

Data will be made available on request.

Conflicts of interest

The authors declared that there is no conflict of interest.

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