

Study on the Health and Welfare of Working Donkeys in Mirab Abaya District, Southern Ethiopia

Sitota Tesfaye, Benti Deressa and Endale Teshome

Jimma University College of Agriculture and Veterinary Medicine, Jimma, Ethiopia

Abstract: A cross-sectional study was done from November 2015 to April 2016 with the objectives to assess the major health problems and associated factors compromising welfare and health of working donkeys in Mirab Abaya district, Southern Ethiopia. Both direct (Animal based) and owner/user interviews were used to collect data. A total of 384 randomly selected working donkeys were examined and 120 owners or users were interviewed. From these 59.7%, 25.8%, 15.2%, 5.4% and 11.4% were suffering with different type of wounds, dermatological, musculoskeletal, unilateral and bilateral eye problems respectively. Fewer proportions (11.5%) of animals showed abnormal dental structure. The occurrences of wound vary significantly among age categories and higher prevalence was noticed in old animals (64.3%). The body condition scoring was found to be significantly associated with wound prevalence; donkeys with poor body condition had higher prevalence of wound (66.2%). In addition, Donkeys which are used with insufficient or without any saddle had higher prevalence of wound (63.3%). Among the 120 respondents interviewed, 67.5% were in adult age group and most of the respondents (94.2%) of the study area had no knowledge and information on donkey welfare. Working donkeys in the present study area were experiencing a compounded health and welfare problems. Awareness creation through mass education, training and extension service should be promoted in the study area in order to ensure better donkey welfare and productivity.

Key words: Mirab Abaya • Donkeys • Welfare • Wound Prevalence

INTRODUCTION

There are an estimated 90 million equines in the developing world, with the highest population concentration in central Asia and north and east Africa [1]. Over 90% of all donkeys and mules and 60% of all horses are found in developing countries [2]. With the majority of these being used for work.

Ethiopia possesses approximately half of Africa's equine population with 32%, 58% and 46% of all African donkeys, horses and mules, respectively [3]. Equines are important animals to the resource-poor communities in rural and urban areas of Ethiopia, providing traction power and transport services at low cost. The use of equines in door-to-door transport service also provides urban dwellers with the opportunity of income generation. The majority of the income generation product of equines mainly comes from donkeys [4, 5].

The world donkey population is estimated to about 44 million; half is found in Asia, just over one quarter in Africa and the rest mainly in Latin America [6]. Ethiopia has approximately 6.21 million donkeys or 32% in Africa and 10% of the world population [7] which makes Ethiopia harboring the largest population of donkeys in Africa and the second largest donkey population in the world after china [8].

According to FAO STAT [9] there are 27 donkeys per 100 people in Ethiopia, which is the one of the highest ratio in the world. In Ethiopia 44%, 34% and 19% donkeys are found in Oromiya, Amhara and Tigray regions respectively. Although donkeys are widely distributed in all the ecological zones (Arid to alpine) in Ethiopia, the majorities are found in the highlands [10, 11].

Poor infrastructure and very rugged topography in many part of rural Ethiopia have made transportation vehicle inaccessible. Hence, farmers use alternative means

like draught animals especially, donkeys to combat transportation problems [12]. Moreover, increasing human population in Ethiopia has resulted in an increase in demands of donkeys for multipurpose activities such as transport crops, fuel wood and water, building materials and people by carts or on their back from farms and/or markets to home. In most zones of Ethiopia, donkeys are primarily used as pack animals. They work from 4 to 12 hours/day, depending on the season and type of work and also pull carts carrying heavy loads 3 to 4 times their body weight [13]

Working equines, particularly of donkeys, play a significant role in helping to empower women in many developing countries [6]. Draught animals along with humans provide 80% of the power input on farms in developing nations [14] but animals often suffer from maltreatment, overloading and inappropriate feeding during work period [15].

The most principal adaptation of the donkey is because of natural ability to endure a degree of dehydration about equal to 30% their body weight and to minimize absorption of solar heat in dry arid environment [16, 17]. Their browsing behavior on plants that contains high levels of hard silicates results in the exposure of teeth to greater attrition forces, prone to wear and tear than those of domestic horse [16].

Despite their use, the husbandry practices of working equines especially of donkeys are poor [18]. Unlike horses, donkeys are not provided with feed supplements. Feed shortage and disease are the major constraints to productivity and work performance of equines. Loading without proper padding and overloading for long distances causes external injury to donkeys. They are brutally treated, made to work overtime without adequate feed or health care indicating their poor welfare status [18,19].

Wounds are also one of the welfare concerns of working equids [19]. Wound is characterized by pain, gaping, bleeding and functional disturbance [20]. The type of wound in working donkeys includes tissue damage with or without factors blood/exudates/ pus, abscess formation, or any secondary bacterial complication. Bites (Lacerated wounds) will be identified by irregular edges underlying tissues removed as well as hemorrhage [21]. The most common cause of these wounds in working equine are over loading, improper position of load predisposing to falling, beating of donkeys, hyena bites, donkey bites, injuries inflicted by horned Zebu [20]. Some hobbling methods, inappropriate

harnesses or yokes that may be heavy and ragged, long working hours may cause discomfort and inflict wounds [18].

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 topography, dehydration, malnutrition, lesions and hoof problems [22]. Animals are often engaged in work for long hours and when get free, they are left to browse and feed on garbage. These have a potential to affect negatively their welfare and quality of life [23].

Such neglect is not only in humane, but also lowers working efficiency and leading to a very low economic return to their owners [24]. This misuse, mistreatment and lack of veterinary care for donkey have contributed enormously to early death; currently have working life expectancy of 4 to 6 years. However, in countries where animal welfare is in practice, the life expectancy of donkeys reaches up to 30 years [25]. Although there is an increase in mechanization throughout the world donkeys are still well deserving name beast of burden with their inherent ability to harsh and mountainous environments in developing countries like Ethiopia [26].

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. Research conducted in Ethiopia demonstrated that improvements in the welfare of small donkeys had significantly improved their work output which in turn improved livelihood situations of the poorest communities in the rural and peri-urban areas [27].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 Wilson [28] and Pearson and Krecek [29].

Even though donkeys are involved in various activities in rural and urban communities and provide invaluable support for the communities in their day to day activities, there is limited information regarding donkey welfare issues in study area particularly in Mirab Abaya district, Southern Nation, Nationalities and People Regional State. Little attention has been given for this animal and there was no study conducted regarding the welfare issues and major health management of donkey. Studies to elucidate the magnitude of this problem are

lacking in the 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 health problems and welfare of working donkeys and factors associated for compromising welfare and health of working donkeys in the area.

MATERIALS AND METHODS

Study Area: The study was conducted from November 2015 to April 2016 on purposively selected study areas of, Mirab Abaya district, Gamo Gofa zone, Southern Nations Nationalities and people regional state (SNNPR). The districts were selected based on agro ecological set-ups, donkey populations and absence of previous study of donkey welfare in the area.

Mirab Abaya is one of the woreda in the Southern Nations, Nationalities and Peoples' Regional state of the Gamo Gofa Zone and is one of fifteen woredas in the zone. Mirab Abaya is bordered by Lake Abaya which separates it from the Oromia Region on the east and Arba Minch Zuria woreda, on the south, on the west by Chenchu woreda, on the northwest by Borena zone and on the north by the Wolayita Zone. Town in Mirab Abaya includes Birbir. Mirab Abaya was part of former Boreda Abaya woreda.

Mirab abaya is located 463 kilometers south of Addis Ababa and has a total land in hectare of 107971. The district is situated between 1200 m to 2500m above sea level. The district have three agro ecological zones, namely, Dega, Woina Dega and kola which account for about 11%, 27% and 62% of the total area respectively. The rainfall regime in the district is bimodal. The first round of rain occurs between March to May. The second round of rain occurs from June to August.

The total population of the district is 89718 of which 44903 are female and the rest are males. Mixed crop-livestock production is the predominant farming system in the area. The district has 46417 cattle, 2165 equines, 8102 sheep, 29869 goats and 24071 chicken populations [30]. The centre of the woreda is Mirab Abaya, 230 kms away from the regional capital, Hawassa. Lake Abaya is situated near Mirab Abaya town and the name of the woreda means 'West of Lake Abaya'.

Mirab Abaya district of Gamo Gofa zone has location 5° 57'N latitude and 37° 32'E longitude, in SNNPR regional state of south western Ethiopia. The area has a sub-humid climate with moderately hot temperature. The vegetation is dominantly occupied by wood-grass land (WGL) especially along the sides of grazing. The areas have also mean annual rainfall of 900-1000mm and mean annual temperature of 23°C [31].

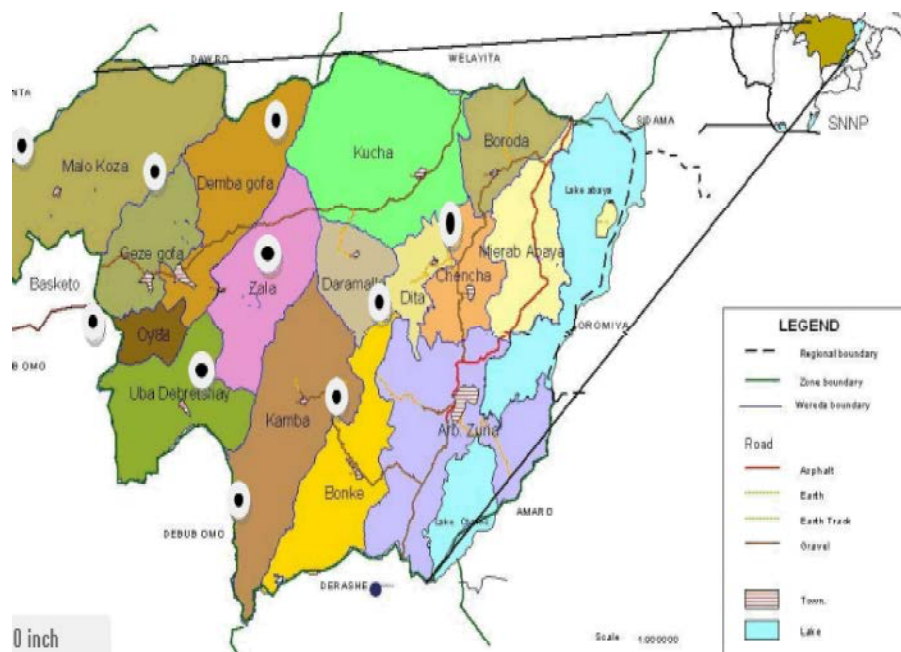


Fig. 1: Study area
Source: Defaru and Tuma [32]

Study Population: A study is conducted to assess major health problem and welfare issue and other related factors that compromise welfare and health of working donkeys. Area visiting and questionnaire survey carried out from November 2015 to April 2016 in selected district of SNNPR to identify donkey management, health problem, use of donkey and associated other factors that compromise the welfare and health of working donkey. A total of 384 working donkeys were selected, 128 donkeys from Molie, 125 from Dalbo and 131 from Wanke Wajefo were sampled proportionally. For this survey purposes, 40 donkey owners/ users from each peasant association, a total of 120 respondents selected to assess in donkey welfare issues in the area.

Sample Size and Sampling Method: A total of 384 donkeys were sampled simple randomly for physical examination and questionnaire survey of their owners which are present in selected peasant association. The sample size has been determined according to the formula given by Thrusfield [33]. Based on simple random sampling methods and 95% confidence interval with required 5% precision, the sample size was determined as:

$$n = \frac{Z^2 \times P \times [1 - P]}{d^2}$$

Since there is no information regarding the area, it is possible to take the expected prevalence of health problem observed based on compromised welfare issue in the area as 50% with the required precision (d) of 5% (0.05) and z value at 95% confidence level is 1.96. By substituting the value in the above formula, we get the sample size 384.

Study Design and Methodology: The cross - sectional study was carried out on pack and draught donkeys found in three selected peasant association (PA). PAs were selected based on their accessibility, easy of logistic and number of donkey populations in the area. The PAs were Dalbo, Wanke Wajefo and Molie of Mirab abaya district. The study has considered randomly selected donkeys and all of which are indigenous breeds with irrespective of age, sex and body condition score to investigate the welfare and associated risk factors.

Data Collection

Direct Welfare Assessment: Direct observational data collection format for direct assessment was developed and data were collected by direct physical examination of factors. Prior to the assessment, consent was obtained

from animal's owners or users after explaining the objective of the study. If the animal owner is not willing, then opportunity was given to the next willing animal owner. The same procedure was continued steadily until the sample size attained throughout study period.

All sampled animals were physically restrained by animal owner and causal worker. Mouth was thoroughly examined for the presence of any feed pack on teeth. If there is feedback on teeth was removed; not to interfere age estimation and abnormal teeth identification.

Information regarding general body condition such as wound type, dermatological disease, musculoskeletal disease, problem on the eye, age categories, body condition score, work type and condition of saddling (Padding) were properly recorded on this study depicted data collection format. Assessment carried out at field level, market and around homestead on the daytime. Animals were allowed to stand for 5-10 minutes after, being held by head collar and lead rope assessment began, without causing major disturbance to donkey routine work. According to Crane [34] age profile of donkey classified into four (<5, 6-10, 11-15 and >15) and additionally age of the animal estimated based on the observation of the front teeth (Incisors) [35]. Dental abnormalities were also observed and recorded. But for the ease of study simplification and absence of donkeys that are too old, this study took three age categories as <5, 5-10 and >10 that are considered as young, adult and old respectively.

Body condition score was done according to the criteria described by Pritchard *et al.* [36] and animals were examined from all sides without touching it. The donkey body condition was scored as 0 to 5 (0 = very thin, 1 = thin, 2 = fair, 3 = good, 4 = fat and 5 = very fat). However, for the purpose of data analysis, body conditions 0 to 5 were categorized into three distinct groups: Categories 0, 1 and 2 were grouped as "Poor", category 3 was defined as "medium" and body condition scores 4 and 5 were categorized as "Good".

Based on the types of work animals were categorized as draught, pack or multipurpose. Draught animals are those used for transport of goods by carts. Pack animals are those used for transport of goods on their back (Pack). Multipurpose animals are those used for one and or both of work and other purpose like breeding [36].

As a part of Wound Assessment lesions were recorded with regard to anatomical location as back sore, tail base sore, chest sore, bite sore, beat sore, head and neck wound, wound at the wither and wound at the hind quarter (Hobble wound). Wound assessments are expressed as a proportion within each age group, within

each sex, within each work type, use of pad and body condition as well as duration on work, length of transport and load transported by the working donkeys.

Musculoskeletal problems were graded that comprises abnormal gait or hoof over growth, lameness and fracture. The grading system was based on modified observed version of the American practitioners [6].

Indirect Welfare Assessment: Questionnaire was developed to collect data on major welfare problems in working donkey management practice, (Feeding, watering, health care, pad use and resting time), working nature (Duration on work, weight carried, length of journey covered, nature of working environment), age of workers and people working on animal. These were obtained by interview made with 120 selected donkey owners/ user to assess knowledge and perceptions regarding donkey welfare issues in the area.

Data Analysis and Presentation: Data both from the direct physical examination and questionnaire were properly coded and entered into Microsoft Excel-2007 spread sheet. The data was filtered for any invalid entry and then transferred to SPSS 20 version for windows package (2007) for statistical analysis. Descriptive statistics was made and a difference (Associations) in the prevalence of wound within each risk factor was tested for significance through Pearson’s Chi-square analysis at a probability level of 0.05. In all calculations, the confidence interval was set at 95% and statistically significant at P – value < 0.05, the analysis is presented through illustrative figures and tables below.

RESULTS

Descriptive statistic for sex, age and body condition score of the sampled donkeys is illustrated in table blow.

Table 1: Descriptive statistics for sex, age and body condition score of physically examined donkeys. (n=384)

Variable	Number examined	Percent (%)
Sex		
Male	273	71
Female	111	28.9
Age		
Young	46	11.9
adult	186	48.4
old	152	39.5
BCS		
Poor	163	42.4
Medium	60	15.6
Good	161	41.9

(BCS=Body condition score)

From 384 examined donkeys, 71%, 48.4% and 42.4% donkeys were male, adult in age and had poor body condition respectively.

As shown in the table blow, from the working donkeys examined in the study area about 59.7 %, 25.8%, 11.6%, 3.9% and 11.4% were suffering from different type of wounds, skin problems, musculoskeletal problems, unilateral and bilateral eye problems respectively. Abnormal dentition was observed on 11.5% of examined donkeys.

Table 2: General body condition of working donkey in the study area based on wound type; (n=384)

Type of wound	Frequency	Percent (%)	Overall percent (%)
Back sore	43	11.2	
Chest wound	18	4.7	59.7
Bite sore	21	6.5	
Beat sore	102	26.6	
Tail sore	29	7.6	
Wither wound	5	1.3	
Wound at head and neck	7	1.8	
Hind quarter	4	1	

Table 3: General body condition of working donkey in the study area based on skin problem; (n=384)

Skin problem	Frequency	Percent (%)	Overall percent (%)
Alopecia	12	3.1	
Sarcoid	3	0.8	25.8
Habronemiasis	6	1.6	
Ectoparasite	61	15.9	
Loss of elasticity	17	4.4	

Table 4: General body condition of working donkey in the study area based musculoskeletal problem; (n=384)

Musculoskeletal Problem	Frequency	Percent (%)	Overall percent (%)
Hoof overgrowth	23	5.9	
Lameness	22	5.7	15.2
Fracture	14	3.6	

Table 5: General body condition of working donkey in the study area based on unilateral eye problem; (n=384)

Unilateral eye problem	Frequency	Percent (%)	Overall percent (%)
Lacrimation	12	3.1	
Loss of vision	1	0.3	5.4
Swelling	2	0.5	
Inflammation	6	1.5	

Table 6: General body condition of working donkey in the study area based on bilateral eye problem; (n=384)

Bilateral eye problem	Frequency	Percent (%)	Overall percent (%)
Lacrimation	26	6.8	
Loss of vision	0	0	11.4
Swelling	3	0.8	
Inflammation	14	3.6	

Table 7: General body condition of working donkey in the study area based on dental abnormality; (n=384)

Dental problem	Frequency	Percent (%)	Overall percent (%)
Present	44	11.5	11.5
Absent	340	88.5	

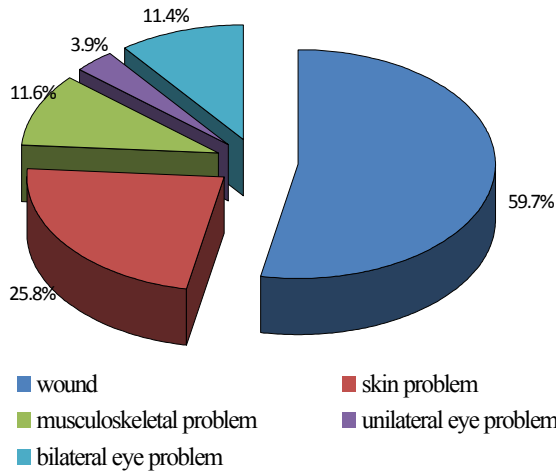


Fig. 2: Distribution of overall abnormality on the body of examined donkeys

There was a statistically significant difference ($\chi^2 = 6.79$, $P= 0.03$) in the prevalence of wound among different body condition scores. The prevalence of wound was also significantly higher in old (64.3%) than other age categories ($\chi^2=9.43$, $P=0.009$). The study result indicated that there is a significant association of prevalence of wound with various working nature. The donkeys that transported weight greater than 50kg have greater prevalence of wound (65.6%) as compared to the less weight load transporting donkeys with statistically significant association ($\chi^2=6.51$, $p= 0.038$). The result also indicated that significant association between the duration of work to the prevalence of wound ($\chi^2=15.07$, $p= 0.001$).

Table 8: Prevalence of wound based on sex, body condition scores, age group and work type; (n=384)

Variable	Number examined	Number affected	Prevalence	χ^2	P- value
Work type					
Drought	236	146	61.8	1.27	0.52
Pack	127	71	55.9		
Multipurpose	21	12	57.1		
Sex					
Male	273	165	60.4	0.25	0.61
Female	111	64	57.6		
BCS					
Poor	163	108	66.2	6.79	0.03
Medium	60	38	63.3		
Good	161	88	54.6		
Age (year)					
Young	46	19	41.3	9.43	0.009
Adult	186	109	58.6		
Old	152	101	64.3		

Multipurpose (Drought, pack, breed)

Table 9: Prevalence of wound based on work nature and duration; n=384

Variable	Number examined	Number affected	Prevalence	χ^2	P- value
Pad usage					
Pad used	231	132	57.1	1.49	0.22
No pad	153	97	63.3		
Average weight loaded at time (kg)					
< 50	22	8	36.3	6.51	0.038
50_100	102	67	65.6		
>100	260	154	59.2		
Average length of trip per day(km)					
<50	82	50	60.9	1.15	0.56
50_100	234	135	57.6		
>100	68	44	64.7		
Type of load					
Multipurpose	189	104	55	3.52	0.17
Wood and charcoal	116	76	65.5		
Floor from grind mill house and farm product	79	49	62		
Duration on work (hour)					
<6	78	46	58.9		
6_9	216	114	52.7		
>9	90	69	76.6	15.07	0.001

Multipurpose (Wood and charcoal, farm product, water, banana etc)

Among the respondents interviewed for this survey 67.5% of persons working on donkeys were in adult age group. Regarding persons working on animals 84.2% of the participants responded as they were working by themselves with their own donkeys whereas only 15.8% respondents allow other persons to work on their animals. Most of the respondents (55.8%) were illiterate.

Table 10: Distribution of respondents characteristics; (n=120)

Attribute	frequency	proportion (%)
Age		
Young	27	22.5
Adult	81	67.5
Old	12	10
Person		
Owner	101	84.2
Not owner	19	15.8
Educational status		
Illiterate	67	55.8
Grade	1-6	45 37.5
Grade	7-1	28 6.7
Collage	0	0

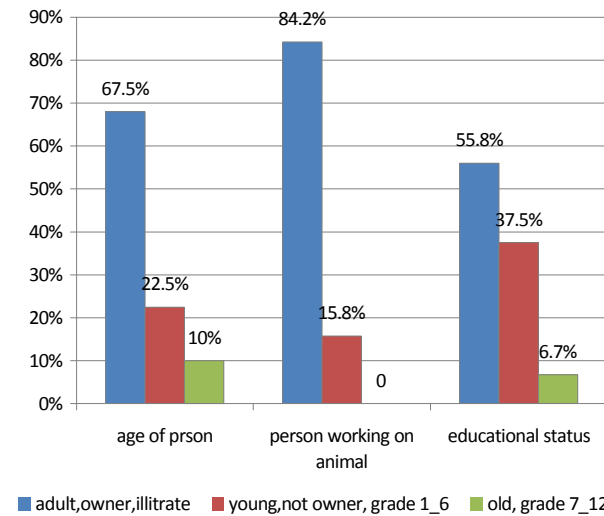


Fig. 3: Distribution of age of workers, peoples working on animal and educational status of respondents. (n=120)

The study also showed that most of the respondents (94.2%) of the study area had no knowledge and information on donkey welfare. The majority of the respondents of the study area separately feeding their animal and give care and treatment for sick animal and rest for animal after work. Most of the respondents give feed before work and provide feed at least twice per a day. The respondents indicated that most of them provide water three times per day. 42.5% of respondents replied that the responsibility of maintaining working donkeys' welfare is in the hand of veterinarian.

Table 11: Distribution of respondent's knowledge on working donkey welfare (n=120)

Respondent knowledge	Frequency	Proportion (%)
Animal welfare knowledge		
Free from injury and disease	3	2.5
Free from thirst and hungry	4	3.3
No information	113	94.2
Care for sick		
Yes	101	84.2
No	19	15.8
Type of care given		
Take to veterinary clinic	58	48.3
Treat with some medicinal plant	43	35.8
Do nothing	19	15.8
Feeding method		
Separately	107	89.7
With other animal	13	10.8

Table 12: Response of the respondents to the way of management; (n=120)

Respondent knowledge	Frequency	proportion (%)
Time of feeding		
Before loading	58	48.3
After loading	29	24.2
Both before and after loading	33	27.5
Frequency of watering		
Once per a day	0	0
Twice per a day	18	15
Three times per a day	102	85
Frequency of feeding		
Once per a day	25	20.8
Twice per a day	87	72.5
Three times per a day	8	6.7
Presence of rest		
Yes	93	77.5
No	27	22.5
Use of pregnant		
Yes	78	65
No	42	35
Consultation from veterinarian		
Yes	0	0
No	120	100
Own shelter		
Yes	93	77.5
No	27	22.5
Responsible group on donkey welfare		
Owner	48	40
Veterinarian	51	42.5
Government	21	17.5

DISCUSSION

The purpose of this study was to identify the general health parameters and body found with conditions which were indicators of poor welfare and the magnitude of the problem in the study area. This study helps identify and prioritize donkey welfare issue significant to animals, so that, the identified problems will be dealt with appropriately [37].

In this study most of the respondents had no formal education and were adults. Most of them have no awareness on animal welfare issues as general and working donkey welfare specifically (94.2%). Persons working with working donkey are mainly owners (84.2%) and some of them assume that maintaining working donkey welfare is the responsibility veterinarian.

In this study, it was observed that all donkeys were used for work, mainly for pack and drought. Similar [18] in Hawassa city reported that all equines are mainly kept to transport people and goods in order to assure their owners' daily income. This study is also in agreement with other studies [36, 38-40] those equines were kept mainly for transportation.

In the present study, the overall prevalence of wound in working donkeys is 59.7% which was in agreement with prevalence reported by Mulisa *et al.* [41] in southern Ethiopia, Wolaita (58.6%) and Burn *et al.* [42] in Jordan (59%). However, this finding was higher than the prevalence of 40% in Central Ethiopia [43] 42.2% in Adet town [44] and 54% in Morocco [45]. On the other hand, the current result was markedly lower than the previous report, 77.5% and 79.4% by Biffa and Woldemeskel [13] and Curran *et al.* [46] respectively in Ethiopia. The present study revealed that beat sore (26.6), back sore (11.2), tail base sore (7.6), bite sore (5.5) and chest wound (4.7) were among the major type of wound identified in the area. Earlier studies have identified that as there was a probability of occurrence of all type of wound on the same donkey [36, 37]. Kumar *et al.* [47] reported similar result that 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 tail region (7%) whereas the least distribution accounts for the head region (1%). This result also agreed with Helen [48] 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 [49] 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.

Wounds are often caused by a combination of multi-factorial reasons. The difference in management and husbandry practices including environmental factors, the type of harness material used (Natural or synthetic), the fit of the harness, the behavior of the owner, the frequency of work and the load were among risk factors that contribute to the onset of different type of wounds in working donkeys [18, 44]. As according to Biffa and Woldemeskel [13] reported donkeys were involved in a wide array of activities, yet very little management was accorded to them. They were made to carry heavy loads over long distances and hours. They travel as far as 70 km/day while carrying an average weight load of 150 kg. This was evidence for the present findings as more cases of injuries in donkeys due to overloading and overweight.

Pearson *et al.* [50] reported a similar situation in central Ethiopia where over weight and type of load/work contributed to high cases of back sores in donkeys. Similarly, Fred [51] also reported that donkeys in Kenya developed extensive sores and wounds due to overworking.

The prevalence of dermatological disease such as ectoparasites, loss of elasticity, alopecia, saricoid and habronemiasis were common among working donkeys of study areas. This might be associated with owner's poor knowledge of health care, feeding and irregular or no medication for parasites [52]. The present overall finding of dermatological disease was 25.8%, which is higher than the findings of Kumar *et al.* [47] in Mekelle city (23.7 %) and Sameeh *et al.* [53] in Jordan (22.7%), Ahmed *et al.* [54] in Pakistan (11%) and Mulisa *et al.* [41] in Wolaita zuria (12.6%). Mekuria and Abebe [55] made similar observation, where 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.* [56] also reported that skin lesions as one of the major prevalent and severe welfare issue in working donkeys.

Another most important donkey cases that were observed in this survey mainly related to the musculoskeletal system including lameness, fracture, hoof overgrowth and abnormal gait. Overall problem of 15.2%, which is close to Kumar *et al.* [47] finding in Mekelle city (18.2%) but lower than Mulisa *et al.* [41] in Wolaita zuria (21.8%), Sameeh *et al.* [53] finding in Jordan (32.2%).

This is likely due to many reasons such as overloading, lack of hoof care and continuous movement in various landscapes and on rough roads were 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 [57].

From the present study it was observed that other disease problems that most frequently encountered in the study areas were unilateral eye problem (5.4%), bilateral eye problem (11.4%) and dental problems (11.5%). This finding disagrees with the report done by Sameeh *et al.* [53] (4%) eye problem in Jordan. But it closely agrees with the finding of Kumar *et al.* [47] in Mekelle city (19.3%) eye problem and dental 16.2% problem. These differences might arise due to difference in topographical nature and misuse, low level of donkey health care keeping characteristics, feeding characteristics and age of working donkey. The proportion of abnormal teeth might be due to the old age of donkey which is physiological but considered as abnormality because it causes problem on feeding resulting inefficient feed intake and digestion [24].

The present study shows that donkeys used for draught purpose were with higher prevalence of wound (61.8%) than those used for other purpose. This finding was higher than Pritchard *et al.* [36] in Afghanistan and Pakistan (31.8%). The explanations for this variation might be due to several reasons such as environmental factors like bumpy roads and rugged landscape, the fit of harness and saddle not cover all parts; gravitational force directed back ward pulling, the frequency of work and the load all contribute to the onset of health problems. Other possible reasons might also be due to the fact that animal owner do not train their donkey before using for draught power and animal do not adapted the work easily that result on beat by owner, self-trauma with wheel tree and breeches [41].

According to Henneke *et al.* [58] poor body condition score is an indicator of reduced body fat. In the current study wound was found to be significantly associated with body condition, where donkeys with poor body condition found to be developing wound higher than those having good body condition. This is in line with the reports by Solomon *et al.* [59] in Hawassa city and Pearson *et al.* [43] in central Ethiopia, who indicated that poor physical condition occurs mainly due to malnutrition, is the leading causes of sores in donkeys. The probable reason for such association is due to donkeys with a poor body condition score might have less natural padding protecting them from pressure, friction and shear lesions caused by saddle. In contrast to

no significance difference between wound prevalence and body condition score on the research done in morocco [45]. These might be due to dehydration decrease the elasticity of the skin in poor body condition animals and the prominence of bones leading to easy skin injury. Hence, poor body condition could be due to other factors like poor management, shortage of nutrients had been because of scarcity of feed and less supplementary diets [41]. There was no significant difference in the overall wound prevalence among sex.

The present finding has showed that higher prevalence of wound was observed in older donkey (69.2%) than other age group; with significant difference in the overall wound prevalence among age groups. This finding was in agreement with the report of Demelash and Moges [60] who stated that older donkeys had greater wound risk than other age group. This might be due to more exposure to work and carrying, heavy load over a long distance, less owners' attention to wound management and the immune defense mechanism also reduce with age advancement. Condition of saddling or padding affects prevalence of back sore. Those donkeys which are used with insufficient or without any saddle were of having sore (63.3 %) than those with proper saddle (57.1%). This was markedly higher than the report of Girma *et al.* [44] who stated donkey with insufficient saddle or no pad had wound prevalence of 26.9%. In agreement with the present report improper harness and saddle were major causes of injuries in equines from central Ethiopia [50] and Northern Ethiopia [48]. Injuries were demonstrated to be commonly distributed with poorly designed and ill-fitted harnesses and saddles.

In terms of working nature, it has been shown that donkeys usually transport load weighing more than 50kgs were significantly higher in prevalence of wound than those usually transporting a load weighing less. Similarly, donkeys working for more than 100kms per day trip were with higher prevalence of wound matters most than those usually working for shorter distances (<50km); a similar situation was reported by Sells *et al.* [45] in morocco and Pritchard *et al.* [36] conducted their studies in Afghanistan and Pakistan. The probable reason for such association is due to donkeys in bad working condition (Over loading and working without rest) can predispose the donkey to persistent irritation and reduce their body condition score and this may lead the donkey to have less natural padding, protecting them from pressure and the pressure exerted by the load will force the donkey to lose its balance and fall to the ground, this results in development friction and shear lesions.

This finding determined that donkeys involved in transporting wood and charcoal showed higher prevalence of wound than those used for other purpose. This study was closely in agreement with the report of Kumar *et al.* [47] in Mekele city 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. It was contrary to the report of Girma *et al.* [44] who stated donkeys used to carry construction material (Cement, sand and metal showed a significantly higher prevalence of wound (66.7%) than those donkeys used carried other goods. On the other hand, duration on work is significantly associated with the prevalence of wound. Those animals working for longer hour have high prevalence of wound (76.6%) than those working for shorter hour. The possible reason was due to maltreatment of the animal by the owner and ignorance of associated injury that on the donkey to work for longer time.

The majority of the participant enrolled in the present study confirmed that they practice separate feeding (89.2%) and watering system for their donkey, which closely agree with the report of Dinka *et al.* [39] in southern Ethiopia with (98.6%) provided feed and water separately at different frequencies in a day. The type and amount of feed fed varies according to the workload of the donkey [61, 62] suggested that animals which are being used year round need more feeds than animals that are only worked for periods seasonally. The majority of the participant enrolled in the present study confirmed that they practice feeding twice per day (72.5%) and water three times per a day (85%). Contrary reported by Morka *et al.* [35] 40% of the respondents provided feed for horses once daily. Most of the working donkey owners provided feed before loading (48.3%). This report was in agreement with Morka *et al.* [35] indicated that all animal owners do provide water and feed to equine at home.

The current study showed that 84.2% of respondent provide care for their sick animal out of which 48.3% took donkey to nearby veterinary clinic, 35.8% provide house medication (Treat with the medicinal plant) and 15.8% do nothing. The finding closely agreed with Mulisa *et al.* [41] in Wolaita zuria that 90% of respondents provided care for sick donkey and 49% of respondent sick animal to the nearby veterinary clinic and 31% provide house made medication (Medicine purchased from market).

This result was disagreed with the findings of Kumar *et al.* [47] in Mekelle city that 31.6% of diseased were taken to the nearby veterinary clinics, 10.5% were treated traditionally and 57.9% did not get any help from their owner and forced to work regardless of health problem. Other study also identified that low number of donkeys in Ethiopia presented annually to the clinic compared to other domestic animals [12]. Another contrary report was made as the majority of donkey owners (31.85%) seek for traditional healers whenever their donkeys get wounded. Few owners managed their sick donkeys differently by allowing them to have access to appropriate veterinary care (19.75%) and long-term rest until recovery by Girma *et al.* [44]. Pearson *et al.* [43] in central Ethiopia reported where only a few people look for veterinary advice on treatment of sores factors associated with occurrence of external injuries in working equines in Ethiopia. This difference might be influenced by owner economic status and knowledge on donkey welfare issues as the majority of working animal owners are poor, illiterate and most of them were not aware of animal welfare issues and engaged in earning extra money with the animal [52].

The present study indicated that 81.6% of respondent provided shelter for their animal. In closely agreement 76.6% provide shelter to equine at home and 22.9% of the owners of cart horses in Nekemte town reflected that they couldn't provide shelter at home specially at night and they release to the strait, forest after work, this is due to the fact that to cover a wide range of role of equine the owners do not have their own house and live in rented homes as a result of this, animals were exposed to predators', environmental factors, car accident and easily stolen by thieves [35].

CONCLUSION

In conclusion present study revealed that welfare issues were the major problems encountered in working donkeys in Mirab Abaya district, Gammo Gofa zone, Southern Ethiopia. Beat sore, tail base sore, back sore and bite sore were among the major type of wound identified in working donkeys in the study area. Overworking (Over loading and long restless travels) and work nature, improper saddling or padding and poor body condition of donkeys were found as contributors to the occurrence of wound in working donkeys.

Others like musculoskeletal, dermatological diseases, eye problem and dental problems were among commonly encountered health problems in donkeys.

Owner's poor awareness to provide good nutrition, veterinary care, absence of welfare knowledge and animal beating practice were among indicators of poor donkey welfare.

Based on the current finding it can be recommended that:

- Comprehensive awareness creation on donkey welfare issues should be promoted through training, extension service by the government and different NGOs.
- Policies and legal frameworks that used to support animal welfare issues and inspect animal facilities should be promoted in order to ensure animal welfare issues.
- A comprehensive approach targeting the welfare of working equids should be given priority by stakeholders
- And further and detailed investigations are required to be done to have wider scope able to mitigate the problems on time.

REFERENCES

1. FAO., 2003. FAO statistical data base web site. Food and agriculture organization, Rome, Italy (FAO STATS: <http://apps.fao.org>).
2. Fielding, D., 1991. The number and distribution of in the world in preceding of the colloquium on donkeys, mules and horses in tropical agricultural development, Edinburgh, 3-6 September, pp: 62-66.
3. FAO, Food and Agricultural Organization, 1996. Production Year Book. FAO: Rome, Italy, 158.
4. Wilson, R.T., 1991. Equines in Ethiopia. In: Fielding D, Pearson RA, eds. Donkeys, Mules and Horses in Tropical Agricultural Development. Proceedings of Colloquium Held 3-6 September 1990. Centre for Tropical Veterinary Medicine: University of Edinburgh, Scotland, pp: 33-47.
5. Agajie, T., D. Tamirat, A. Pearson and T. Temesgen, 2000. Socio-economic circumstances of donkeys use and management in the rural and urban areas of central parts of Ethiopia. Proceedings of the Workshop on Promoting the Peri-Urban Livelihood through Better Donkey Welfare. Debre-zeit, Ethiopia, pp: 16-28.
6. Fielding, D. and P. Starkey, 2004. Donkey, people and development. A resource book of the animal traction network for Eastern and Southern Africa (ATNESA). ACP, EU. Technical Center for Agricultural and Rural cooperation (CTA), Wageningen, the Netherlands, pp: 1247.
7. Mearg, F. and M.A. Kirmani, 2015. Population dynamic production statistics of horse and ass in Ethiopia: A Review. *J. Bio. Agri. Healthcare*, 5(1): 2224-3208.
8. Anon, 2007. FAO Statistical Database Website. Food and Agricultural Organization of the United Nations: <Http://faostat.fao.org/>. (Accessed 22 October 2009).
9. FAO STAT., 2006. FAO Statistical Database Website. Food and Agricultural Organization of the United Nations. <<http://faostat.fao.org/site/409/default.aspx>> (Accessed 7.06.08).
10. Starkey, P. and D. Fielding, 1997. Donkeys, people and development. A resource book of the Animal, Traction Network for Eastern and Southern Africa (ATNESA). DebreZeit, Ethiopia: Bulawayo.
11. CSA, 2010. Central Statistical Agency, Agricultural sample survey. Report on livestock and livestock characteristics, 236: 11-15.
12. Mohammed, A., 1991. Management and breeding aspects of donkeys around Awassa, Ethiopia. In: Fielding, D. and Pearson, R.A. (eds.): Donkeys, Mules and Horses in Tropical Agricultural Development. CTVM: Edinburgh UK, pp: 185-188.
13. Biffa, D. and M. Woldemeskel, 2006. Causes and factors associated with occurrence of external injuries in working equines in Ethiopia. *Inter. J. App. Res. Vet. Med.*, 4: 1-7.
14. Pearson, R.A., 2005. Contributions to society: Draught and Transport. *Encyc. Anim. Sci.*, pp: 248-250.
15. Swarup, D., 2007. Current status of animal welfare in India: Issues and options. Short course on animal behavior and welfare under CAS in Veterinary Physiology: IVRI, pp: 23-27.
16. Darya, G., 1997. Adaptation to Water lack In: *Dukes Physiology of Domestic Animal: 9 ed. India. Newth Delhi*, pp: 223.
17. Dixon, P.M. and I. Dacre, 2005. A Review of Equine Dental Disorder. *Veterinary Journal*, 169(2): 159-161.
18. Mekuria, S., M. Matusala and A. Rahameto, 2013. Management practices and welfare problems encountered on working equids in Hawassa town, Southern Ethiopia. *Journal of Veterinary Medicine and Animal Health*, 5(9): 243-250.
19. Pearson, R., T. Simalenga and R. Krecek, 2003. Harnessing and hitching donkey, horse and mule for work. Center for Tropical vet. Med. University of Edinburgh, pp: 34.
20. DACA. (Drug Administration and control Authority), 2006. Standard treatment Guideline for veterinary practice of Ethiopia, pp: 209-211.

21. Svendsen, E., 2008. The professional handbook of the donkey. 4th ed. London: Whittet Books Limited.
22. Brooke, 2007. Bearing a Heavy Burden. http://www.fao.org/fileadmin/user_upload/animal_welfare/BROOKE_Report.pdf (Accessed 02/ 08/ 2009).
23. Yilma, J., G. Feseha, E.D. Svendsen and A. Mohammed, 1991. Health problems of working donkeys in Debre-Zeite and Menagesha regions of Ethiopia. Center for Tropical Veterinary Medicine, 31. 6: 151-155.
24. Ian, D., P.M. Dixon and L. Gasden, 2008. Dental problems in: The professional Hand book of the Donkey: 4 ed., pp: 62-79.
25. Fred, O. and K. Pascal, 2006. Extension approaches to improving the welfare of working equines. Kenya Network for Dissemination of Agricultural Technologies (KENDAT): Kenya, Nairobi, pp: 1-28.
26. Gebreab, F., 1997. Disease and Health Problems in Donkey. Whittet Books Limited. London, pp: 207-226.
27. Smith, D., 2004. Final technical report R7350: Use and management of donkey by poor society's peri-urban areas of Ethiopia. Center for Tropical Veterinary Medicine, 2: 13-15.
28. Wilson, R.T., 2002. Specific welfare problems associated with working horses. In: Waran N (eds). The welfare of horses. Kluwer Academic Publishers, Dordrecht. pp: 203-218.
29. Pearson, R.A. and R.C. Krecek, 2006. Delivery of health and husbandry improvements to working animals in Africa. Tropical Animal Health and Production, 38: 93-101.
30. Yikal, T., 2015. Small Ruminant Production and Marketing: Constraints and Opportunities in Chench and Mirab Abaya Districts, Southern Ethiopia. World Journal of Biology and Medical Sciences, 2 (1): 14-32.
31. Girma, K., T. Meseret, Z. Tilahun, D. Haimanot, L. Firew, K. Tadele and A. Zelalem, 2014. Prevalence of Bovine Trypanosomosis, its Vector Density and Distribution in and Around Arbaminch, Gamo gofa zone, Ethiopia. Acta Parasitologica Globalis Southern Tsetse Eradication Project, South, Ethiopia, 5(3): 169-176.
32. Defaru, D. and A. Tuma, 2013. Land Use Patterns and its Implication for Climate Change: The Case of Gamo Gofa, Southern Ethiopia. Int. J. Scie. Re. and Rev., 2(3): 155-173.
33. Thrusfield, M., 2005. Veterinary Epidemiology. 3 ed. UK: Blackwell Science.
34. Crane, M., 1997. Medical. In: Svendsen, E. (ed) The professional hand book of the donkey. 3 ed. w140 by London: Whittet Books LTD, pp: 29.
35. Morka, A., H. Adisalem, E. Bojia, H. Eyob and M. Bedasso, 2014. Health and welfare assessment of working equine in and around Nekemte Town, East Wollega Zone, Ethiopia. Am- Euras. J. Sci. Res., 9(6): 163-174.
36. Pritchard, J.C., A.C. Lindberg and D.C.J. H.R. Whay, 2005. Assessment of the welfare of working horses, mules and donkeys, using health and behavior parameters. Prev. Vet. Med., 69: 265-283
37. Dennison, T., A. Hassan and M. Shabir, 2006. Welfare assessment in Enseno, Butajira, Ethiopia. Equine Vet. J. Supp., 23: 12-19.
38. Blackeway, S.J., 1994. The welfare of Donkeys. In: Network UK, the welfare of Donkeys-htm. Accessed on 5/2/2008.
39. Dinka, H., B. Shelima, A. Abalti, T. Geleta, T. Mumeand and R. Chala, 2007. Socio-economic importance and management of cart horses in the mid rift valley of Ethiopia. In: R.A. Pearson, C.J. Muir and M. Farrow, 2007. (Editors). The Future for Working. The fifth International Colloquium on Working. Proceeding of an International Colloquium held at the Addis Ababa University, Ethiopia, 30th October to 2nd November 2006, pp: 181-188.
40. Solomon, M. and A. Rahmeto, 2006. Observation on major welfare problems of equine in Meskan district, Southern Ethiopia. DVM thesis Hawassa University, Faculty of Veterinary Medicine (Published), pp: 8-25.
41. Mulisa, M., H. Tamirat, N. Ayalew and F. Teka, 2015. Assessment on Working Donkey Welfare Issue in Wolaita Soddo Zuria District, Southern Ethiopia, Global Veterinaria, 14(6): 867-875.
42. Burn, C.C., J. Pritchard, M. Farajat, A. Twaissi and R. Whay, 2007. Risk factors for strap related lesions in working donkeys at the World Heritage Site of Petra in Jordan. Vet. J., 178(2): 263-271.
43. Pearson, R., Mengistu, T.A., Agajie, E.F., D.G. Allanand and M.A. Smith, 2002. Use and management of donkeys in Peri-Urban areas of Ethiopia. Center for Tropical Veterinary Medicine 5: 9-13.
44. Girma, B., Mersha, C., Tewodros, T., Anteneh, K., Bekele, M. and Nahom, W., 2014. Incidence of wound and associated risk factors in working donkeys in Yilmana Densa District. Global Veterinaria, 13(1): 133-140.

45. Sells, P., G. Pinchbeck, H. Mezzane, J. Ibourki and M. Crane, 2010. Pack wounds of donkeys and mules: In the Northern high atlas and lowlands of Morocco. *Equine Vet. J.*, 42(3): 219-226
46. Curran, M., G. Feseha and D. Smith, 2005. The impact of access to animal health services on donkey health and livelihoods in Ethiopia. *Trop. Anim. Health. Prod.*, 37(1): 47-65.
47. Kumar, N., K.K. Fisseha, N. Shishay and Y. Hagos, 2014. Welfare assessment of working donkeys in Mekelle city, Ethiopia. *Global Veterinaria*, 12(3): 314-319.
48. Helen, B., 2001. The Gharry horses of Gonder. *Draught Animal News*. Centre for Tropical Veterinary Medicine: University of Edinburgh, Scotland, 35: 23-24.
49. Mandefro, A., 2008. A study on harnessing problems of working donkeys in Sidama zone. DVM Thesis, Addis Ababa University, Faculty of Veterinary Vet. Med., 4(1): 1-7. Medicine, Debre-Zeit
50. Pearson, R.A., A. Mengistu, T. Agajie, F.A. Eleanor, G.S. David and A. Mesfin, 2000. Use and management of donkeys in peri-urban areas of Ethiopia. Centre for Tropical Veterinary Medicine: University of Edinburgh, Scotland; Draught Animal Power Technical Report, 5.
51. Fred, O.O., 2002. Sustained utilization and welfare of work donkeys for Kenya. *Draught Animal News*. Centre for Tropical Veterinary Medicine: University of Edinburgh, Scotland, 37:13-21.
52. Biswas, P., T. Dutt, M. Patel, R. Kamal, P.K. Bharti and S. Sahu, 2013. Assessment of pack animal welfare in of and around Bareilly city of India. *Vet. World*, 6(6):332-336.
53. Sameeh, M., M. Dirar, H. Zain and F. Sarah, 2014. Equine diseases and welfare in Jordan: A retrospective study (1261 cases). *Jordan J. Agri. Sci.*, 10(3): 21-24.
54. Ahmed, S., G. Muhammad, M. Saleem and I. Rashid, 2010. Comparative aspects of prevalence and chemotherapy of ecto-parasite, endo-parasite and blood parasites of draught equines in Faisalabad metropolis Pakistan. The Brooke (eds.): The 6th International Colloquium on Working Equids. Proceedings of an International improving the welfare in working equines held at the India Habitat Centre, New Delhi. The Brooke, 30 Farringdon Street, London, EC4A4HH: UK, pp: 262-265.
55. Mekuria, S. and R. Abebe, 2010. Observation on major welfare problems of equine in Meskan district, Southern Ethiopia. *Livestock Research for Rural Development*, 22(3).
56. Whay, H.R., M. Farajat, A.M. Twaissi and J.C. Pritchard, 2006. A strategic approach to improving the health and welfare of working donkeys in Petra, Jordan. University of Bristol, department of clinical veterinary science: Langford, Bristol, UK.
57. Hemsworth, P.H., J.L. Barnett and J.G. Coleman, 1993. The human-animal relationship in agriculture and its consequences for the animal. *Anim. Welfare*, 2: 33-51.
58. Henneke, D., G. Potter, J. Kreider and B. Yeates, 1983. Relationship between body condition score, physical measurement and body fat percentage in mares. *Equine Vet. J.*, 15: 371-372.
59. Solomon, M., M. Matusala and A. Rahmeto, 2013. Management practices and welfare problems encountered on working equids in Hawassa town Southern Ethiopia. *J. Vet. Med. Anim. Health*, 5(9): 243-250.
60. Demelash, B. and W. Moges, 2006. Causes and factors associated with the occurrence of external injuries in working equine in Ethiopia. *Int. J. Appl. Vet. Med.*, 4(1): 1-7.
61. Anderson, M. and R. Dennis, 1994. Improving animal based transport options, approaches, issues and impact. In: Paul, S., Emmanuel, M. and John, S. (eds.): Improving animal traction technology. Proceeding of the first workshop of the animal traction network for Eastern and Southern Africa (ATNESA) held 18-23th January, 1992. Lusaka: Zambia, pp: 378-395
62. Harris, P.A., 1999. Review of equine feeding and stable management practices in the UK. *Equine Vet. J. Supp.*, 28: 46-54.