Welfare Assessment of Cart Pulling Mule in Durbete Town, North Western Ethiopia

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Abstract: Across sectional study was conducted from October 2015 to March 2016 with the objective of assessing the general health problems and welfare concerns of cart pulling mules in Durbete town. Both direct (animal based) and indirect (owner interview) assessment methods were used. Out of the total 274 examined cart mules,12.4% had dermatological problem due to ectoparasite and harnessing material, 33.9% had musculoskeletal problems 21.9% mules were lame. The effect of wound in this study area was greater than 100% due to the presence of injury more than one anatomical position in one mule from harness contact areas mostly breast, chest and back. And there was no significant association between wound with work type, age and body condition ($p>0.05$) and intensity of wound also didn't significantly associated with age and body condition score ($p>0.05$). According to this study 9.9% of mules had poor body condition and 28.5%, 6.2% and 0.7% of mules also had depressed, difficult to handle and nervousness behavior respectively. The age proportion obtained were 17.5%, 52.6%, 21% and 8.8% in the age group 0-5year, 6-10year, 10-15year and >15year respectively. Result of indirect assessment through interview 110 owners showed that they used different method for the management of diseased cart mules and 79.1% of the respondents were take their mules to veterinary clinic and 20,9% of respondents treat by themselves, but 15.5% owners did not deworm their mules. Among the studied mules 9.1%, 45.5%, 6.4% and 100% mules were used as pack, saddle, drought and cart respectively. In this study 88.2% of owners provide supplementary feed and sufficient amount of clean water and feed were given with the frequency of 5.5%, 47.3%, 18.2% water for once, twice, three times and more than three times respectively and 10%, 36.4%, 29% and 24.5% of feed for once, twice, three times and more than three times respectively but 6.4% owners not give rest within a week. But the welfare of these animals was found compromised. To improve this situation education of owners about overall animal management of cart mules' owner awareness about animal welfare, proper attention to health of equines by the veterinary service were recommended.

[Metadel T, Ashenafi A, Mengestie A, Ayalew N, Kassa D, Mebrie Z, Genene G, Belaynew A, Bruktayet W. **Welfare Assessment of Cart Pulling Mule in Durbete Town, North Western Ethiopia.** *Nat Sci* 2016;14(9):94-102]. ISSN 1545-0740 (print); ISSN 2375-7167 (online). http://www.sciencepub.net/nature. 14. doi:10.7537/marsnsj140916.14.

Key words: cart mule; welfare; direct; indirect; assessment

1. Introduction

Ethiopia has the largest equine population in Africa and 8th in the world, she possess 2.75 million horse, 5.02 million donkeys and 0.63 million mules (Endebu, 2000). There are an estimated 80% of the world equine populations, with the highest population concentrations in central Asia and north Africa (FAO, 2003). Over 95% of all donkeys and mules and 60% of all horse are found in developing countries (Fielding, 1991) and the majority of these will be used for work. Working animals provide an essential transport resource in the developing countries worldwide (Pritchard *et al*., 2005).

Mules are specialized work animals produced by crossing a female horse with a male donkey. They are therefore, only found where both horse and donkeys breed well notably in temperate, semi-arid high- land areas. They make excellent single purpose animals, being harder than horse and stronger than donkeys. The greatest disadvantage of mules is that they are not fertile; so female horse have to kept around to produce baby mules, This makes mules rather expensive (Oudamn, 2004). Animal welfare describes the state of animal with regarded to three concerns natural living, biological function (health, growth, reproduction, physiological system) and feeling of the animal (Broom, 1991).

Recent information regarding the contribution of draught animal power to the economies of developing countries is scarce, although in 1988 it was estimated that working animals including equines produced 75% of traction energy in the developing world and it has been suggested that more than half of the world's population depends on animal power as its main

energy source (Wilson, 2003), today draught animals and humans provide an estimated 80% of the power input on farms in developing countries (Pearson, 2005) but traction animals are often neglected in the allocation of resources such as food, shelter and appropriate equipment, because they belong to members of the poorest sections of society, who cannot afford motorized transport. Welfare assessment systems can be broadly categorized on to animal based or resource based measures, and different applications tend to draw from one or both of these types of measure (Main *et al.*, 2003). In direct method of evaluating the welfare of animals are based on measuring the adequacy of inputs, such as resource and management provision (Bratstussek, 1999).

Direct observation provides the measure of welfare status that is most relevant to the animal itself. The indication of poor welfare include reduced life expectancy, impaired growth, impaired reproduction, body damage, disease, immunosuppressant and behavioral anomalies (Broom, 1991).

As far as the welfare of animals is concerned they need to be protected to live peace fully in their environment without affecting their health and welfare. They must not be unnecessary neglected to have access for feed water and shelter on abused the hearing harming and depraved of their freedom of movements and exercise (Tekleye, 2004). Working animals are not only susceptible to working accidents and injuries due to poor harnessing but also due to any different disease present in the area (Tadich *et al.,* 2010). Health issue affecting animal's welfare includes acute disease and disorders causing immediate suffering and long term, progressive condition causing chronic pain (Rousing *et al.,* 2001).

Physical observation of particular relevance to equines includes body condition score (Henneke *et al*, 1983). Working animals are often overloaded, over worked and mistreated more over they lack basic health care provisions and many are not provided with adequate resources. All of these factors contribute to poor welfare and often shorten their working lives (WSPA, 2007). Generally welfare is state of complete physical, mental and social well being and not merely the absence of disease or infirmity (Thrusfield, 2005).

Health is an important part of welfare, the welfare of an animal is an attempt to cope with its environment, and pathogens are among the environmental factors which affects individuals attempt to cope with pathogen, the effect of pathogens are aspects of welfare. Other aspects of welfare include good and bad feeling and various physiological and behavioral changes (Brood and corke, 2002). Therefore, the objectives of this study were:-to assess welfare status of cart pulling mules and find out the major factors that cause poor welfare of mules in Durbete.

2. Materials And Methods

2.1. Study area

The study was conducted from November 2015 to March 2016 on randomly selected cart pulling mules in Durbete town. It is a town in South Achefer district and the administrictive center of the district, in Amhara region the highlands of north-western part of Ethiopia. The area have an elevation of 2,215 m.a.s.l, latitude of 11°21' 32''N and longitude of 36°57'42''E. The district is also known for its flat topography, but there are also mountains, valleys and undulating areas. The area is characterized by two seasons, the wet season from June to October and dry season from November to May.

2.2. Study population

A cross- sectional study was conducted on 274 male and female cart pulling mules and their drivers found in Durbete town by purposively selected, *i.e.* direct assessment was conducted on purposively selected 164 cart pulling mules and indirect assessment was made by interviewing 110 male and female mule owners and examined for any health and welfare problems during the study period at the study area. All are indigenous breeds.

2.3. Data collection

Direct welfare 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: behavior of the mules, body condition score, wound /physical injuries, lameness and other limb abnormalities, other signs of disease, parasites and skin problems. 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 in to three groups and those were poor, moderate and good body condition scores (Pritchard *et al.,* 2005).

Indirect welfare assessment: A semi structured questionnaire was developed to data on the major constraints in utilizing mules, veterinary service program, nutrition and disease management system. These were obtained by interview made with purposively selected 95 male and 15 female mule owners to generate some information which was missed during direct assessments of the animal.

2.4. Sampling size and Sampling Method

The study was conducted on cart pulling mules at the study area. The owner and cart pulling mules were purposively selected form this study area. Observational visits were under taken to key location and institution of important to the defined cart pulling mule population including veterinary clinic, livestock

and goods market, around flour houses, working place and from mule's house in Durbete town. 274 mules were taken for the study out of which 110 were by questionnaire and physical examination at the same time and 164 were added for physical examination alone. The sample size required for this study was determined by taking expected prevalence of 16.7% (Meseret *et al.,* 2014) according to the formula stated by (Thrusfield, 2005) as follows:

$$N=\frac{1.96^2 \text{ xPexp } (1-\text{Pexp})}{D^2}$$

$$N=\frac{1.96^2 \ X \ 0.167 \ (1-0.167)}{0.05^2} = 214 \text{ mules}$$

Where N=Sample size
P=Expected prevalence
D=Desired level of precision

Purposive method of selection was used to determine the sample size for this study and the previous study was done around this area concerning this title. Therefore, using 16.7% of expected prevalence and 5% absolute precision at 95% confidence level as estimated by the formula 214 mules were considered for the study and to increase the precision 60 mules were added to the sample.

2.5. Data Management and analysis:

The data collected from the 274 mules and interviews made with 110 owners were entered in to Microsoft excel-2007 spread sheet and analyzed using SPSS version20 statistical software. Descriptive statistics were used to quantify the problems and chi-square (x^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 difference were considered as ($p<0.05$).

3. Results

The study showed that,5.5%, 25.5% and 13.5% of owners were only write and read, elementary school and high school respectively with compared that of illiterate 61(55.5%) this is due to illiterates have no more chance to improve their live standard. And also 11.8% and 8.2 are young and old respectively with compared that of adult 88(80%) for the reason of the work is very exhausted so, it requires high energy and well strength person (Table 1).

Table 1: Quesionary survey of cart mule owners' age and educational level in Durbete town.

Detail of cart mule owners		Frequency	Percentage
Educational level	Illiterate	61	55.5
	Only write and read	6	5.5
	Elementary	28	25.5
	High school /above	15	13.5
Age (year)	Young (1-19 year)	13	11.8
	Adult (20-40 year)	88	80
	Old (>41 year)	9	8.2

From total 110 mule owners they use their mules for different purpose, for all mules were used to cart 110(100%), pack10 (9.1%), Saddle 50(45.5%) and drought 7(6.4%) and 37(33.6%) of the owners load their mules at the weight of $\leq$ 500kg and 73(66.4%) owners were load at a weight of 500-1000kg but no owners gives response to load > 1000kg weight or relatively not over loading, Almost all owners gives rest in a week 103(93.6%) to a minimum of 1 days and a maximum of 4 days but only 7(6.4%) owners gives response not give rest in a week.

According to the findings of this study 79.1% and 20.9% of owners were give care for their mules to keep the health by take it to veterinary clinic and themselves after buying the drug from private pharmacy and by other traditional materials like ash, honey etc respectively, but no one leaves their mule abandon it to make survive on its own and take it to traditional healers. And 84.5% of owners were deworming their mules by take to vet clinic and none governmental organization professionals once per year without fee from Bahir dar (Table 2).

Table 2: Response of owners to treat and prevent the health of their mules

Owner's responsibility Frequency	Percentage	
Treat by themselves	23	20.9
Take it to traditional healer	0	0
Take to vet clinic	87	79.1
Abandon it to make survive its own	0	0
Deworming		
No	17	11.5
Yes	93	84.5

This study reveals that 34(12.4%) mules had dermatological problem due to external parasite and harnessing materials, 93(33.9%) with musculo skeletal problems, and 110.2% of mules had the general health problems this percent was greater than 100% due to the presence of more than one health problem in one animal, that is listed in below (Table 3), in addition to this lung worm, wart and stronglyle parasites also includes with this table, 60 (21.9%) were lame this was assessing by moving mules from place to place with the help of their owners and gait also observed, among this grade zero is the highest due to topographical location of the study area is flat.

Table 3: Direct observation; general health problem of the examined mule (n= 274)

Major health problems		Frequency	Percentage
Dermatological problems	Alopecia	28	10.2
	Tick infestation	4	1.5
	Habronemiasis	2	0.7
Other health problems	Ocular discharge	19	6.9
	Nasal discharge	26	9.5
	Abnormal mucus mem.	10	3.6
	Dehydration	7	2.6
	Rough hair coat	138	50.4
	Diarrhea	8	2.9
	Colic	34	12.4
	Pneumonia	15	5.5
	EPL	9	3.3
	AHS	3	1.1
	Other	33	12
Musculo skeletal problems	Posture and gait abnormality	16	5.5
	Hoof over growth	8	2.9
	Hoof deformity	2	0.7
	Cracking and chaffing	12	4.4
	Arthritis	2	0.7
	Puncture wound	6	2.2
	Apparently lame	28	10.2
	Pieces of stone in hoof	27	9.9
Lameness grading	Grade 0	28	10.2
	Grade1	15	5.5
	Grade2	9	3.3
	Grade3	5	1.8
	Grade4	2	0.7
	Grade 5	1	0.4

From 274 totally examined mules 177(64.6%) had alert and good response for the new stimuli, 78(28.5%) were depressed to give response this is due to different factors such as health problems and

working condition like over working and over loading, 17(6.2%) were difficult to handle both for examination and harnessing and the remaining 2(0.7%) were nervousness behavior (Table 4).

According to the result shows there was no significant association (p >0.05) in wound problems with respect to the work type, age and body condition score of mules, this is due to owners give care and properly manage or they give sufficient clean water and feed for their mules and the prevalence of this table was greater than 100% (Table 5) this is because the presence of wound more than one anatomical location in one mule.

Table 4: The relationship between mules and society

Behavior	Frequency	Percentage
Alert	177	64.6
Depressed	78	28.5
Difficult to handle	17	6.2
Nervousness	2	0.7

Table 5: The association of wound with the type of work, age group and body condition score.

Variables	No. of examined	No. of affected	Prevalence
Type of the work[a]			
Flour	32	23	71.9
Construction	93	59	63.4
Water	42	34	81
Timber	13	7	53.8
Multiple	19	14	73.7
Other	75	49	65.3
Age[b]			
0-5	48	33	68.8
6-10	144	92	63.9
11-15	58	40	69
>15	24	15	62.5
Body condition[c]			
Good	27	16	59.3
Moderate	194	135	69.6
Poor	53	32	60.4

[a]x^2 =6.0579, p =0.301; [b]x^2 =1.4826, p=0.686; [c]x^2 =2.3574, p =0.308

Based on this result the relation between body condition score and age of mules with that of the work type had not statistically significance association, this is because owners give their mules sufficient clean water, feed and almost all not harness over load (Table 6).

Table 6: The association of work type with body condition score and age.

Variables	No of examined	Prevalence (Total)						
		Body condition score[a]			Age[b]			
		1	2	3	0-5	6-10	10-15	>15
Flour	32	1(3.1%)	21(65.6%)	10(31.2%)	5(15.6%)	20(62.5%)	3(9.4%)	4(12.5%)
Construction	93	8(8.6%)	73 (78.5%)	12(12.9%)	13(14%)	52(55.9%)	20(21.5%)	8(8.6%)
Water	42	4 (9.5%)	29 (69%)	9 (21.4%)	12(28.6%)	21(50%)	7(16.7%)	2(4.7%)
Timber	13	1(7.7%)	9(69.2%)	3 (23.1%)	4(30.8%)	6(46.1%)	3(23.1%)	0(0%)
Multiple	19	4(21.1%)	12(63.1%)	3(15.8%)	4(21.1%)	8(42.1%)	4(21.1%)	3(15.5%)
Other	75	11(14.7%)	46(61.3%)	18(24%)	10(13.3%)	37(49.3%)	21(28%)	7(9.3%)

[a]x^2 = 13.6788, p = 0.188; [b]x^2 =15.0519, p =0.448

The wound intensity was compared with that of age and body condition score. There was no statistically significant difference (p>0.05), this is due to the awareness of owners; they give rest from 1 up to 4 days within a week and treat the wound early (Table 7).

Table 7: Intensity of wound associated with age and body condition score

Variables	No. of examined	No. of affected			Prevalence (Total)
Age[a]		Mild	Moderate	Severe	
0-5	48	28(58.3%),	18(37.5%),	2(4.2%)	100%
6-10	144	81(56.3%)	47(32.6%)	15(10.4%)	
10-15	58	33(56.9%)	16(27.6%)	9(15.5%)	
>15	24	16(66.7%)	5(20.8%)	3(12.5%)	
Body condition[b]					
Good	27	16(59, 3%)	8(29.6%)	3(11.1%)	
Moderate	194	112(57.7%)	61(31, 4%)	20(10.3%)	
Poor	53	30(56.6%)	17(32.1%)	6(11.3%)	

[a]x^2 =6.350, P = 0.704; [b]x^2 =0.518, P =0.998

5. Discussion

The objective of this study was to assess the welfare of cart pulling mule in Durbete town by taking important welfare parameters like behavior, body condition score, wound, lameness and other signs of disease were the five pillars of welfare assessment. From total 110 mule owners that participate in questionnaires survey they use their mules for different purpose, for all mules were used to cart 110(100%). A lower result was reported from Bahir dar by Fentie *et al.,* (2014) in which 84.5% of mules were used for cart pulling. This difference was because most owners were use their cart mules as the main source of income in this study area, and for pack10 (9.1%), Saddle 50(45.5%) and drought 7(6.4%) but this purpose of mules depends on the season of the year. Almost all owners gives rest in a week 103(93.6%) to a minimum of 1 days and a maximum of 4 days but only 7(6.4%) owners gives response not give rest in a week, this exposes the mules for lameness and wound (Meseret *et al*., 2014).

In terms of watering and feeding it was observed that all respondent provide adequate and clean water for their mules from those, 11(10%), 40(36.4%), 32(29.1%), 27(24.5%) of respondents were give for the frequency of once, twice, three times and more than three times per day water respectively. This result was less than the previous study in Hawassa, Solomon (2013) in which 53.3% of animals were provided water for three times per day and 41.6% of them only two times per day. The variation of this result was due to the study area and management practices of owners. And almost all respondents also provide supplementary feed 97(88.2%) and free grazing 13(1.8%). In this result the first one was slightly agree and the second one was disagree with Demesiew (2011) which in 70% and 25% respectively. This difference was due to improve the awareness of owners from time to time for management of their mules properly in order to gain their expected income.

The study also showed that 6 (5.5%) of feed once per day, 52(47.3%) of feed twice per day, 20(18.2%) of feed three times per day and 32(29.1%) of feed provides more than three times per day. This result was disagree with the previous study in Hawassa, by Solomon (2013) and in Addis Ababa University by Dinka *et al.,* (2007) welfare assessment of working equines reported that the amount of feed given per day was 33% of feed once per day, 25% of feed twice per day and 42% of feed three times per day, and 46% of feed once per day, 24% of feed twice per day and 24% of feed three times per day respectively. The variation of this result also due to the study area, time of study, distance of working place and the awareness of owners regards to management of their working equids.

Based on the result of this study about 87(79.1%) of respondents treat their mules by taking to veterinary clinic and only a few respondents 23(20.9%) were treat by themselves by buying the drug from private pharmacy and other traditional materials, but no one leaves their mules not to do anything when their mules gets sick and take to traditional healer. This result was agree with Morka *et al*., (2014) in east wollega zone recorded 88.2% respondents take their mules to vet clinic, 10.6% of respondents try to treat by themselves and 0.5% of respondents abandon it to make survive its own respectively. But this result was disagree with that of Demseiew (2011) and Fentie *et al.,* (2014) in Bahir dar, northwestern Ethiopia, recorded 31% of respondents take their mules to vet clinic and 45% of respondents try to treat by themselves and 24% of respondents abandon it to make survive its own and 18% of respondents take to vet clinic, 51.6% of respondents try to treat by themselves and 20.4% of respondents abandon it to make survive its own respectively, and this result also higher than Demelash and Moges (2006) in Hawassa, Southern Ethiopia reported 16.6% of respondents take their mules to vet clinic. These variations were due the time of study,

place of study area and owners had good awareness for the welfare of their mules related with health (Fraser and Broom, 1990) after gaining of training by donkey sanctuary professionals from Bahir dar, and 93(84.5%) of owners gives response their mules were deworming at 3 month interval by go to veterinary clinic and also once per year by donkey sanctuary professionals without fee as they told to me for the concept of prevention is clearly good for keeping the welfare of the animal (Freeman *et al*; 1999).

Regards to the shelter of mules 7.3%, 70%, 9.1% and 12.7% of owners gives response to keep their mules at a night time, with in shelter together with other animals, in separate shelter, loose in a compound and loose in the village respectively. Mules also keep at a time of rest by 2.7% in tethering with other mule, 15.5% by hobble alone and 81.8% of mules were freely relaxed. This result was disagree with that of Demseiew (2011) from Bahir dar which in the result of 45%, 28% and 27% respectively. This difference was due to the place of the study area, in Bahir dar there is no enough place for freely exercise with compared that of durbete which is almost rural area. At the working time the owners can communicate with their mules 10.1% of respondents calling with name, 15.5% of respondents by grooming, and 22.7% of respondents by shouting and 50.1% of respondents by beating. Beating induces pain and injury to the animal and this reduce the quality of welfare of animal by intervening into freedom of pain and injury (FAWC, 1993).

From 274 physically examined 34(12.4%) mules had been recorded with a dermatological problem like alopecia, ectoparasite (tick infestation and habronemiasis) and sarcoides. This result was disagree with the similar study by Demseiew (2011) in Bahir dar, northwestern Ethiopia recorded as 56%. The difference of this result was due to the responsibility of owners to give treatment for skin disease and harness their mules properly.

Based on this study the body condition score of the mule was not significantly associated with wound and intensity of wound and also type of work ($p > 0.05$). Regards to the intensity of wound it was more severe in poor body condition mules than moderate body condition, 6 (11.3%) and 20(10.3%) respectively. This result was agree with Fentie *et al.,* (2014) in Bahir dar, north western Ethiopia, mules with poor body condition score was affected at the rate of 68 (27%) and moderate body condition score at the rate of 25 (10.6%).The variation of this result was due to management practices of the owner, over loading, over working and the skin of this animal was thin. This study also revealed that, 27 (9.9%) of mules were poor, 194 (70.8%) of mules were moderate and 53(19.3%) of mules were good body condition score. Similarly less result also recorded by Morka *et al.,* (2006) in east wollega zone, in which 26.2% of mules were poor body condition score, 70.2% of mules were moderate and 3.6% mules were good body condition score. This difference was due to the awareness of respondents they didn't harness over loading in my study area and improving management practices or providing supplementary feed like hay, maize residue and barley.

The study also showed that age and intensity of wound hadn't been significantly associated ($p > 0.05$). This indicates that age was not influence the severity of wound. The age profile of mules in the present study was from 0-5 year 48(17.5%), 6-10year 144 (52.6%), 10-15year 58(21.2%) and >15 year 24(8.8%). The present study also revealed that the occurrence of wound varies with the age of the mules and there was no significantly associated ($p>0.05$). This result was disagreeing with Fentie *et al*., (2014) who found a big relation between age and the occurrence of wound. Regards to the association of wound related with type of work, age and body condition score, there were no any significance association ($p > 0.05$). This indicates that work type, age and body condition score of mules did, t influence the occurrence of wound. This result was disagree in Mekele welfare assessment of working donkey by Niraj *et al.,* (2014) who found big association between the occurrence of wound with related to type of work, age and body condition score.

Based on this result, mules had highly affected by wound at a time of water fetching (81%) next to multiple work (73.7%), this is due to the nature of material and harnessing problem of the owner and also age group 10-15 year (69%) were highly affected next to that of age group 0-5 year (68.8%) This study also recorded in Bahir dar by Fentie *et al.,* (2014) which in 16.4% of injuries in adult and 10.8% of juries in young. The variation of these results was due to owners give care to harness younger's than adults because they said that these mules were not complete their growth. And mules which had moderate body condition score due to over loading. Wounds were occur almost all in the site of harness contact area and rope tying area like back, breast, chest, tail and leg (due to hobble) and also bite sore such as hyena bite, bird bite and other mule bite and hoof sore due to piece of stones from the contact area. The percentage value of this wounds were greater than 100% because the presence of wound more than one anatomical position on one mule especially breast, chest and back area due to bad harnessing system. These were due to neglecting of the owners to their mules and low attitude about the wound and its effect on animals and economic impact. These neglecting of the mules influence on the health of the animals, and this in turn

compromise the welfare of mules, freedom from pain, injury and disease (FAWC, 1993).

From the total 274 mules examined 93(33.9%) musculo skeletal problem or limb abnormalities. The most common limb abnormalities found were apparently lameness, the presence of pieces of stone in the sole, posture and gait abnormality, hoof over growth and cracking and chaffing (10.2%, 9.9%. 5.5% and 4.4%) respectively. This current result was similar to the finding reported from Bahir dar by Demseiew (2011) and Fentie *et al.,* (2014) in which 43% and 44.1% of mules had musculo skeletal or limb abnormalities respectively. Another reporter Pritchard *et al.,* (2005) in Afghanistan, Egypt, India, Jordan and Pakistan also revealed that 90.9% mules were with limb abnormalities. This variation was due to work type and management problem of the respondents.

Each animal was assessed carefully for presence of lameness by moving the animal from place to place with the help of their owners and gait also observed. From this study, 60 (21.9%) of mules were lamed ranging from apparently to sever caused by over working, over loading, disease and also the area was flat and marshy, This result was higher than the previous study Meseret *et al.,* (2014) in Adet town which records 16.7% and less than in Morka *et al.,* (2006) in east wollega zone which in 40% of mules was lamed. This variation was due to study area, time of study and management practices of the owners.

In addition to wound, external parasite, limb abnormalities and lameness health problems, 101.2% of mules had other health problems this is mainly by 50.4% of mules had rough hair coat, 12% of mules by GIT parasite like lung worm and strongly, 12.4% of mules by colic, 9.5% of mules had nasal discharge, 5,5% of mules affected by pneumonia,3.3 of mules by epizootic lymphangitis, 2.9% of mules had diarrhea and 2.6% of mules were dehydrated, etc health problems were encountered, this result also greater than 100% because one mule had more than one other health problems. This result was disagreeing with Pritchard *et al.,* (2005) from Afghanistan, Egypt, India Jordan and Pakistan in which 45.9% of mules were dehydrated. This difference was due to season of study. All these health problems were caused by disease, exhaustion from over working and over loading and also malnutrition, this was indicative of welfare compromise like freedom from pain, injury and disease, freedom from fear and distress and freedom from discomfort (FAWC, 1993).

Conclusion and Recommendations

This study reveals that cart mules have been found to be useful and sole source of income for the high proportion of the owners. Despite these, the welfare of these cart mules was not optimal when seen from the perspective of both direct measures (from physical examination of mules) and indirect measures (interview about management practice). Although it was found that the cart mules get sufficient clean water, feed, housing, minimum work rest within the week and most owners were not over load their mules. And majority of cart mule owners were taken to veterinary clinic when their mules get health problems but no one said abandon their mules to make survive its own. The physical examination reveals that majority of mules had inadequate body condition score and were affected by one or more than one health problems especially wound (injury) related to improper harnessing, musculoskeletal problems, dermatological problems and other health problems like GIT parasite mainly lung worm and, strongly (leads to colic), epizootic lymphangitis, ulcerative lymphangitis, AHS and trypanosomiasis etc. health problems were encountered in this study area. But lameness is not a serious problem it is apparently due to topographical location of the area it is flat. Generally it can say that welfare status of cart mules in this area is compromised. These were due to low level of awareness about animal welfare by the society and lake of attention by government.

Based on the above conclusion the following recommendations were forwarded:

- Government and non-governmental organization who work for the welfare and health should design good and cost effective harnessing material and distribute to the society to decrease the problem.
- There must be adequate awareness creation for the owners by giving training about proper management and handling of their mules.
- Veterinarians should promote animal welfare to the general public and should forward legislative motions to authorities in particular to address the issue in a holistic manner.

Acknowledgements

We would like to thank University of Gondar, Faculty of Veterinary Medicine for letting us to study on welfare assessment of mules, which has a great impact on equine. We wish also to express our profound gratitude to personnel of the Faculty of Veterinary Medicine, who assist during study period and suggest valuable comments.

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