



A Survey on Major Health and Management Problems of Donkeys under Traditional Husbandry System at Selected Sites in Central Highland of Ethiopia

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Abstract

The study was conducted from November, 2015 to April, 2016 in four selected districts of central Ethiopia with the aim of assessing the major health and management problems in donkey. The questionnaire survey was carried out on 100 donkey owners who possessed a total of 239 donkeys. A total of 2440 donkeys presented to the mobile clinic of donkey health and welfare project were clinically examined and 359 (14.7%) were positive for one or more types of health problems. Of donkey owners interviewed, 50% viewed disease as the primary problem of donkey production while 30% believed feed and water to be the first ranking. Of the health problems prevailing included musculo-skeletal disorder (48%), with nutritional, parasitic, and miscellaneous disease in the same order. Half of the donkey owners (54%) allow their donkeys to forage for themselves while 46% supplemented their donkey usually before or after work. Of 359 examined donkeys found to be positive for health problems, 20%, 76% and 4% were young, adult and old, respectively with 31%, 63%, and 6% of moderate, poor and good body condition, respectively. Analysis of the clinical cases indicate the incidence of wound, infections disease, musculo-skeletal disorder, internal Parasitism, nutritional and reproductive disease to be in the order of 65%, 9%, 13%, 3%, 6% and 4% respectively.

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From all cases of wound 83.3% involved the long axis comparison of the location showed a significant difference ($p < 0.05, \chi^2 = 25.808$) among the body regions. Animals with poor body condition were significantly affected ($p < 0.05, \chi^2 = 25.808$) with wound, musculo-skeletal disorder and infectious disease than animals with moderate or good body condition. Adult animals were significantly ($p < 0.05, \chi^2 = 29.641$) affected by the same disease than young or old animals. There was also a highly significant difference in the degree of severity of health problems ($p < 0.05, \chi^2 = 134.110$) with the majority of the health problems being either moderate or bad. Musculo-skeletal disorder, nutritional and wound problems assumed to more serious health problems. This study proves that donkeys do suffer from different kinds of ill health often as a result of poor management and ignorance of their owners. Unless the appropriate measure is taken, this will invariably affect the performance of donkeys with serious loss of income particularly for families who almost exclusively depend on donkeys for their livelihood.

Keywords: Ethiopia; Health problem; Management; Working donkeys.

1. Introduction

The donkey has spent hundreds of years being used by man: despite this fact little attempt has been made to study any aspect of this animal [1]. Donkeys are said to have originated in north – east Africa and then spread to other parts of the world. The world equine population is 122.4 million of which 40 million are donkeys. Global distribution is 98% of donkeys found in developing countries. The equine population in Africa is 17.6 million of which 11.6 million are donkeys [2]. Ethiopia having 5.2 million donkeys is the second in donkey population in the world and possesses nearly 40% of African donkey population [3]. According to the present regional classification of Ethiopia, 97% of the donkeys are found in three regions: 44% in Oromia, 34% in Amhara and 19% in Tigray regional states [4].

Donkey is still one of the most important drought animals existing in millions playing a key role in the agricultural economy of most carting threshing farm cultivation, riding [5]. The donkey is considered better than other drought animals because of inherent tolerance for dehydration, low sweat rate and good thermo ability (Singh and his colleagues 2005). Recurrent drought in Ethiopia resulting in increased cattle mortality has also contributed to an increase in donkey usage as drought and pack animal both in rural and urban areas. They account for over 50% of the animal energy scenario in the country [6]. The donkey is more adapted to the Ethiopian terrain than either the mule or the horse [7].

Despite their high population and prominent role in Ethiopian agriculture, the knowledge based on the physiology, nutritional requirement, health problems and management systems of the donkey are limited and rarely available in the literature except the endeavor of the donkey sanctuary since its establishment [8]. Judging from the available evidence, it is reasonable to suppose that the poor husbandry of donkeys is a result of bad management practices and poverty of the owners. In spite of the benefits that the donkey brings to the society and national economy, it remains maltreated and objects of considerable negligence. Although donkeys are described as hard and resistant animals, they do suffer a number of health problems. Donkeys in Ethiopia, at least in the Donkey Health and Welfare Project (DHWP) operation sites, are subjected to a variety of health

disorders including multi-parasitism, back sores and other wounds, hoof problems, ophthalmic problems, colic; various infectious diseases are among the most frequently cited equine production constraints [9]. Apart from causing mortality, diseases affecting production, growth rate and traction power output [10]. Donkeys also suffer from many work related health problems. They are often subjected to a variety of stressors such as long-term poor nutrition, over work in terms of load and time, sudden changes in the quality of nutrition, the weather and a change from one handler to another [11]. If a donkey fall ill or die, its owners may be faced with a disaster from which they may not recover. Therefore, the objectives of this paper are

- To study the major donkey health problems
- To study the most prevailing management problems of donkeys husbandry

2. Materials and Methods

2.1. Study area

The study was conducted from November, 2015 to April, 2016 in selected districts with in the central highlands of Ethiopia namely, Adea, Lume, Boset, and Bereh. This selection was made based on their higher donkey population and role of donkeys in the livelihood of farmers.

Adaa: It is located at 45 km south east of the Capital, Addis Ababa. It has an altitude ranging from 1500 to 1800 meter. The rain fall is bimodal. It receives an annual rain fall of 850mm with a mean maximum and minimum temperature of 30.7°C and 8.5°C, respectively and a mean relative humidity of 61.3% [12]. It has a donkey population of 46,222 [13]. Donkeys are mainly used for transporting farm products, wood and water.

Lume: It is located in the Rift Valley, at 8° 35' N and 39° 10' E, and 70 km south east of Addis Ababa [14]. It is composed of 30% high land, 45% mid altitude and 25% low land [15]. The minimum and maximum temperatures are 18°C and 28°C, respectively. The rainfall distribution of the area is from 500 – 1200 mm. The donkey population is estimated to be 15,701. Donkeys are mainly engaged in carrying farm products and water.

Boset: It is located in the Rift Valley, 100 km, southeast of Addis Ababa. The altitude is around 1500masl. It's annual rainfall range of between 550-700mm and a mean relative humidity of 45%. The mean daily maximum and minimum temperature are 34°C and 28°C, respectively [12]. It has a donkey population 737,181 [13]. Donkeys are used mainly for carrying water, wood and charcoal.

Bereh: It is located 44 Km north of Addis Ababa and is basically a highland with 2000masl. The annual rainfall is about 985 mm. The average daily maximum and minimum temperature are 28°C and 15°C, respectively. The relative humidity is 50.5% [12]. The donkey population is estimated to be 24,395 [13]. Donkeys are mainly used for transporting goods such as farm products and wood. They carry water but this is less important compared to other districts.

2.2 Study Animals

The study animals were donkeys presented to the mobile and stationary clinics of the donkey health and welfare project. The area consists of many donkeys, which are used for different purpose such as packing, carting, threshing, farm cultivation and riding. All available donkeys irrespective of age, sex and color at these selected districts were examined for any health and management problems.

2.3 Study Design

2.3.1 Questionnaire Survey

A structured questionnaire was designed to collect data on such as socio-economics of donkey production, management and health problems. The questionnaire was pre-tested at field and revised before the formal survey. A total 20 peasant associations (5 from each study area) were randomly selected from a list of all peasant association in the study areas. A total of 100 donkey owners were interviewed (5 owners' from each peasant associations).

2.3.2 Clinical survey

This study was performed in collaboration with the mobile clinic of the donkey health and welfare project. Sites within the study area already identified by the donkey health and welfare project were visited and all donkeys presented to the mobile veterinary clinic were subjected to physical clinical examination. The clinical examination was performed systematically including identification of the animal, history, clinical finding by system of the body involved. The age was determined using the dentition according to [16] whereas the body condition was scored to [1]. Age was conventionally classified as young (<4) years, adult (4 – 12) years and old (>12) years. The animals were examined for external lesions, and clinical signs. Lesions were characterized for their specific location, region of the body affected, organ involved, and severity. All data was recorded on a pre-designed patient card. Samples were collected for further confirmation as required.

2.4. Data management and analysis

Data was entered in to computer using Excel spread sheet. It was later on analyzed using statistical software, SPSS for windows Version 11.0. Descriptive statistics (mean, minimum, maximum, mode, frequency and percentiles) were calculated for the different variables. Distribution of health problems were characterized according to age (young, adult and old), severity (light, moderate, bad, severe and very severe) and work performance level (light work, medium work, heavy work). Comparison between variables was made using chi square and ANOVA. The confidence level was held at 95% and $p < 0.05$ had been set for level of significance.

3. Result

3.1 Questionnaire survey

3.1.1. Livestock population demography

Out of the total 239 donkeys owned by 100 donkey owners, 107, 121, and 11 were Jennies, jacks and foals, respectively. Summary of the overall livestock population demography is presented in table 1.

Table 1: Number of livestock owned by respondents with days of activity / week, distance traveled/ day and weight carried/ day of donkeys.

Valid	Mean	Mode	Freq. of	Min	Max	S.D
N=100			Mode			
No of Mares	0.09	0.00	92	0.00	2.0	0.32
No of Stallion	0.08	0.00	92	0.00	1.0	0.27
No of Foals	0.02	0.00	98	0.00	1.0	0.14
No of Jennies	1.07	0.00	45	0.00	6.0	1.37
No of Jacks	1.21	1	42	0	5	1.0
No of D. foals	0.11	0.00	91	0.00	2.0	0.37
No of Mules	0.26	0.00	87	0.00	3.0	0.69
No of Cattle	5.95	2.00	18	0.00	45.0	6.13
No of Shoat	5.38	0.00	39	0.00	55.0	8.32

Distribution of equine population among the study sites were in the order of 0.8jennies,1.52jacks,and 0.12donkey-foals for Adaa,0.28mares,0.32stallion,0.08 foals,1.48jennies,0.72jacks,0.24donkey-foals,0.24mule for Bereh,0.68jennies,and 1.32jacks for Boset, and 1.32jennies,1.28jacks,and0.6mules for Lume. Out of the total donkey owners, 92% were known to depend primarily on crop cultivation for income.

3.1.2. Donkey use and management

Eighty eight percent of donkey owners respond that they use their donkeys only for pack where as 10% for pack as well as breeding and only 2% for draft and pack. Donkeys were found to be transport a wide Varsity of goods in all the study districts. A donkey in the study area was found to carry an estimated average load of 57.75

(range 30-100) kg and travel an average distance of 10.67km (range 2-25km) with an average working days per week of 4.39 days (range 1-7days) per week. Majority (60%) of the owners kept their donkeys at night in stable yard near the house. The remaining 33% just the open air while 7% of donkeys share the same house with their owners. Analysis of the feeding system showed 54% of owners to exclusively depend on the natural pasture while 46% do also supplement their donkeys before or after work.

Donkeys, when not busy, were known to spend more than 6 hours grazing during the day at all study sites. The majority of the donkey owners (85%) interviewed provides water every day and few (14%) at every other day interval but the rest provided water for donkeys at irregular interval. Pregnant animals never received any form of care in 60% of the cases whereas provision of supplement and reduction of load in advanced stage of pregnancy were the best care when given.

3.1.3 Major donkey production problems as perceived by owners

According to the response obtained from all donkey owners 50% viewed disease as primary problem or constraint of donkey production while 30% believed feed and water to be the first ranking production constraint. Analysis of constraints showed 48% of the cases to be a musculo-skeletal disorder with nutritional, parasitic and miscellaneous diseases occurring in the same order of importance.

Ninety percent of donkey owners that mentioned feed and water to be their second ranking problem also mentioned disease to be their first ranking problem. Almost all (99%) of donkey owners did not cull their donkey for any problem. Majority of the respondents (69%) handled equine health problems through veterinary services whereas 30% of the respondents did not care.

3.2. Clinical observation and examination

Out of the total 359 donkeys clinically examined, 20%, 76% and 4% were young, adult and old, respectively with 31%, 63% and 6% moderate, poor and good body conditions, respectively. The list of the clinical cases as presented to the mobile clinic included wound, infectious diseases, internal parasitism, nutritional problems and reproductive diseases.

Adult animals with poor body conditions were more affected with different kinds of health problems (particularly wound, musculo-skeletal diseases and infectious disease) than well-conditioned young and old animals (Figure 1). Chi-square test showed that the presence of significant difference ($p < 0.05$, $\chi^2 = 25.808$) in distribution of cases among the different body condition categories.

Figure 2 indicates the severity of health problems and figure 4 indicates distribution of the severity with age category. Severity of the health problem was known to vary for different age groups, where adult animals were more affected by different kinds of health problems than the young and old. Particularly, they were more affected by wound, musculo-skeletal disease and infectious disease. Chi-square test showed the presence of significant difference ($p < 0.05$, $\chi^2 = 29.641$) in distribution of cases among the different age categories.

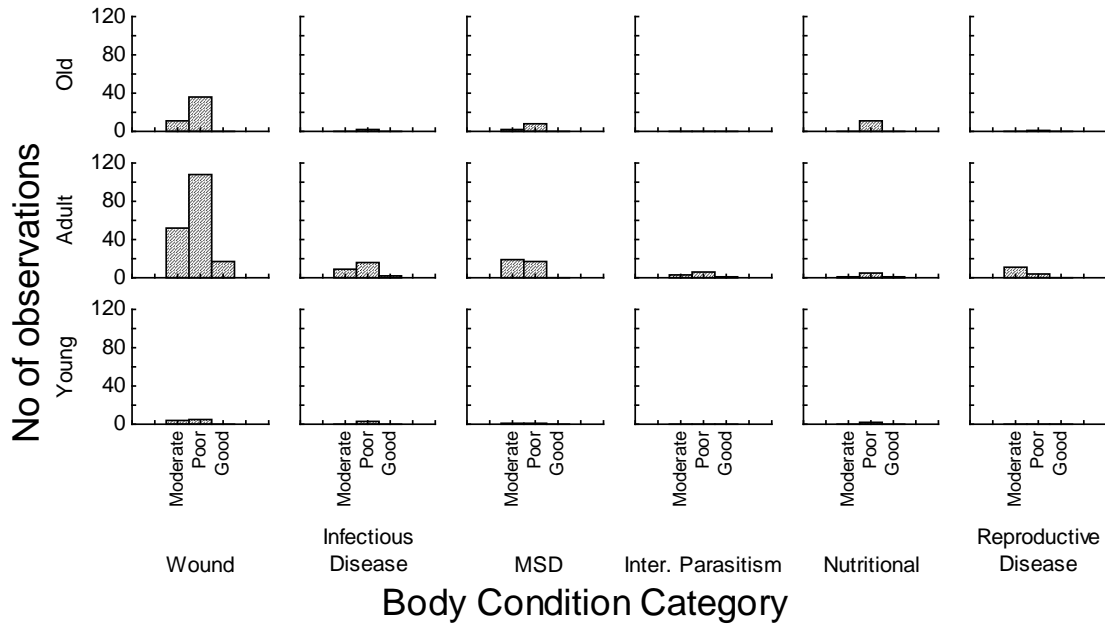


Figure 1: Distribution of donkey health problem based on the body condition and different age groups

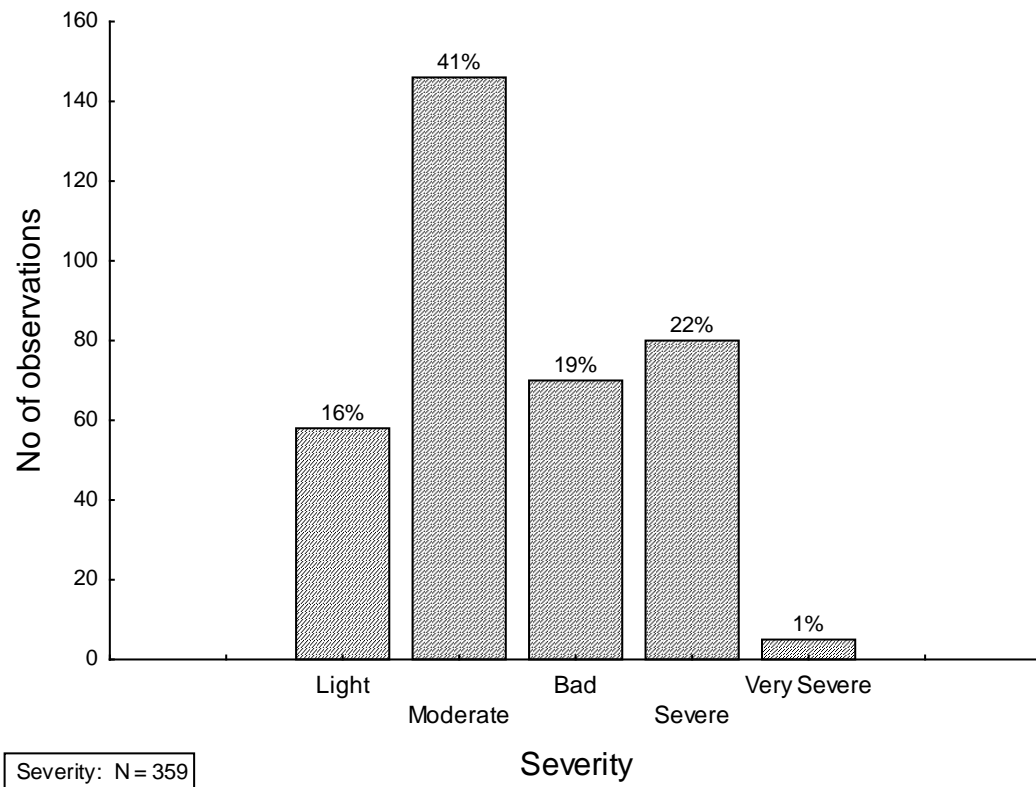


Figure 2: Health problems of donkeys by severity of the problem

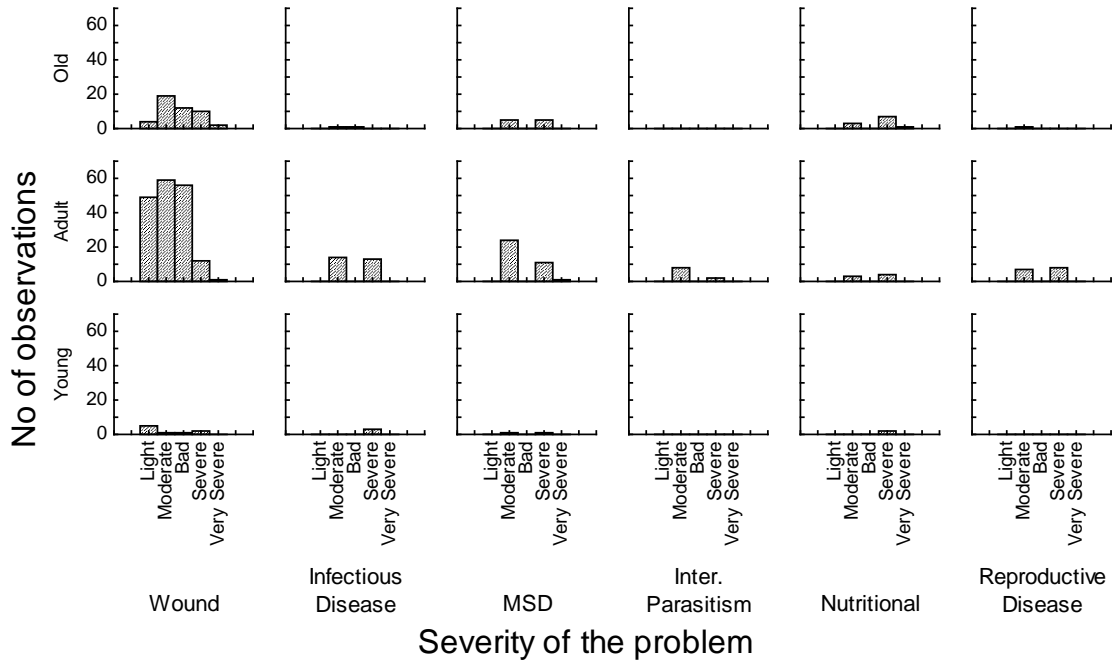


Figure 3: Distribution of donkey health problems by age and severity of the problem

Of the total 359 examined cases, 233 (65%) were different kinds of wound cases, which were distributed on different parts of the body with different frequency (Table 2)

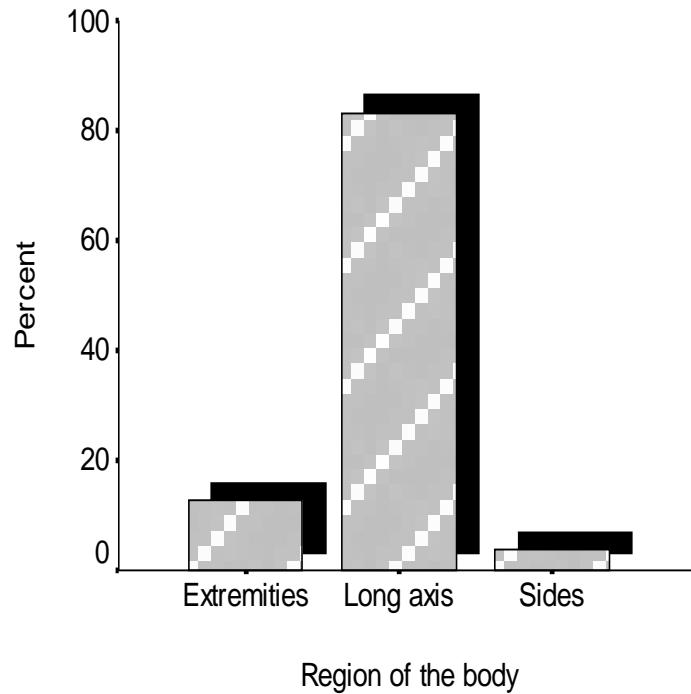


Figure 4: Proportional distribution of wound on the body region (n = 233)

Table 2: Wound distribution on specific location of the body parts.

Specific	Frequency		Percent
Location			
Anal region	11	4.7	
Back	132	56.7	
Chest	4	1.7	
Eye	3	1.3	
Limb	13	5.6	
Lumbar	18	7.7	
Mandible	2		0.9
Neck	7		3.0
Rib	5		2.1
Sacrum	1	0.4	
Tail	10	4.3	
Vagina	1		0.4
Wither	26		11.2

Analysis of the distribution of the lesions by body regions (extremities, long axis and sides) showed 83.3% of the cases to affect the long axis while the rest 12.9% and 3.9% of the cases were found on the extremities and sides with different degree of severity, respectively (figure 5). Summary of the distribution the degree of the lesions as categorized in to five levels is given in figure 6. Chi square test showed the presence of a highly significant difference ($p < 0.001$, $\chi^2 = 91.358$) in the severity of the health problem among the different regions of the body affected. Health problems occurring on extremities and sides. Particularly the highest proportion of wounds was occurring on the back and was occurring in severe form. There was also a highly significant difference in the degree of severity of health problems ($p < 0.05$, $\chi^2 = 134.110$). Musculo-skeletal diseases,

nutritional and wound problems always assumed a more serious health problem ranging from moderate to very severe conditions.

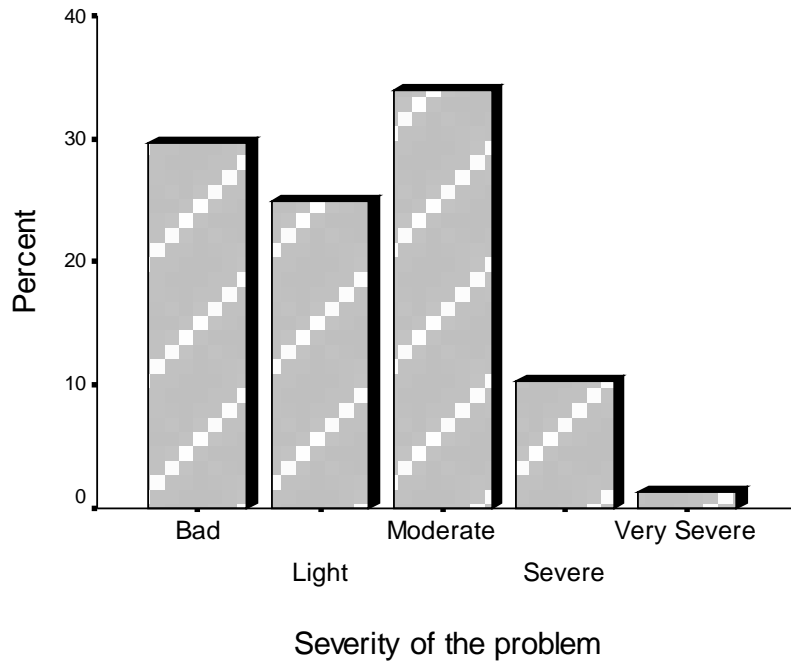


Figure 5: Distribution of health problems by degree of severity.

4. Discussion

4.1. Questioner survey

Donkeys are the basic ground for many people who engaged in working with them as means of income for the whole family [9]. Among the families the distributions of donkeys were not even. In large families where there are few donkeys working to support the family, there will naturally be heavy work load on the donkeys predisposing them to different ailments [17].

A questionnaire survey conducted with the aim of assessing the overall situation of donkeys in the study area indicated that the average donkey ownership per household was 2.39 with an average of 1.07, 1.21 and 0.11 of jennies, Jacks and foals, respectively which is comparable with work of [3], an average of 2.6% in four districts of central Ethiopia [18] a density of 2.72 in DebreBirhan. There were more adult donkeys in the study districts as compared to the other age groups. This result is in agreement with the finding of in the central parts of Ethiopia [3].

Grazing of donkeys with other livestock at communal pasture is a common practice in all the study sites. Donkeys are known to require a concentrate ration [2], [19] an average sized donkey (150kg) will need about 60% extra energy in going 10 km, 100% extra energy in going 20 km and about 140% extra energy if they travels 30km doing work, either pulling a cart over a hard road or carrying a load on its back. However, the fact

that some proportion of the donkeys in this study was not receiving supplementation shows the presence of poor feeding management. At best donkeys in these study areas were supplemented with crop residues only during heavy working particularly during crop harvesting which is not sufficient.

Though water is the most important nutrition for working animals, the frequency of watering observed for most of donkeys in this study seems to be appropriate for most animals. However, the best advice given [19] on how to meet water requirement which is offering water to the donkey at every opportunity and at least 4 times a day, or more if it is working in the heat may not have been met.

In all the study sites, almost all of the donkey owner generated their income from on crop cultivation agrees with previous reports for the same area [3]. The finding in the majority functions of donkeys was slightly different from the study of [20] 58.4% of donkey in central Ethiopia are kept mainly for breeding and transport, but similar with the study of [3] less than 20% of donkeys in the central Ethiopia are used for breeding, all working donkeys in the study sites were mainly used to transport water for household use, fire wood, charcoal, vegetables, fruits, and grain to market location and to flour mill, harvested crops from farm to threshing. Few donkeys in the study areas were used for threshing. All donkeys in the study area carry an estimated average distance of 10.67 (2-25) km with an average working of 4-5 days per week. In addition, people use them to fetch water all over the week. This indicates that the burden of the work is high during crop harvesting time, which might predispose donkeys to stress and different health problems.

A study by [11] a pack donkey can safely carry one-third to one-half of its own weight over several hours if it is in reasonable conditions. This will be approximately 45-65 kg for tropical donkey. A working average of these recommendations is 40% of load per 100 kg live weight. Taking this in to account, the load of 30-100 kg as pack practiced by more than half of the respondents, clearly shows that most donkeys are overloaded and at high risk of over work stress. Stress from over work to be main cause of abortion and reproductive failure [21].

Housing systems are mainly designed to protect animals from predators and in some cases from rain. Absence of roofing in stable yard does expose animals to rain, wind and cold weather. This could serve as source of stress which predispose to many infectious and parasitic disease as well as indirectly influencing working and reproductive performance of equines [22] the highest proportion of donkeys in these study area were kept either on open air or in stable yard which has no roof. This implies that the majority of donkeys are exposed to rain, wind and cold, thus the working performance and health are affected.

Most of the respondents do not give any special care to their pregnant donkeys, i.e., they use them similar to the non-pregnant ones in terms of amount of load and frequency of use. This might predispose pregnant donkeys to different reproductive problems. But 40% of the respondents reported that they usually decreased the amount of load and frequency of use of pregnant donkeys during the last period of gestation, which is comparative with the work of who reported that 45% of farmers decreased the amount of load and frequency of use pregnant donkeys during last period of gestation [20].

Even though donkeys have often been described as sturdy animals, they succumb to a variety of disease and a

number of other conditions [9]. From the questionnaire directed to the owners high percent of the problem prevailing in the study area was musculo skeletal disease with nutritional, parasitic and miscellaneous disease occurring in the same order of importance. Similar incidence of different health problems in donkeys [6, 23]. Half of the current respondents viewed disease as primary problem or constraint of donkey production while 30% believed feed and water to be the first ranking production constraint, disease and feed to be the primary production constraint in equine of central Ethiopia [3]. Almost all respondents presented that they did not cull their donkey for any problem. Since owners brought their animals for veterinary services whenever there is donkey health and welfare project mobile team, we cannot say that the owners are reluctant to take care of their donkeys. Therefore, the most probable explanation for not culling the donkeys could be due to the low income of the owners. Majority of the respondents took their donkey to donkey health and welfare project stationary and /or mobile clinics during apparent health problems. This could be attributed to the extension and education services offered on donkey health and management to the farmers in the study area by the donkey health and welfare project veterinary team. More than half of the working donkey population did receive proper health care [24].

4.2. Clinical observation and examination

The higher severity of different health problems on adult donkeys in the current study might be associated with the owners preference to use this age group for work which predisposes them to work related problems like wounds and musculo skeletal disease. Stress from over work and malnutrition can also predispose these animals to the higher infectious diseases diagnosed.

The digestive system of donkey is designed to handle frequent small meals. They are continuous grazers by nature and usually do best when kept at pasture. If this is not possible good –quality hay fed in frequent meals is the next best thing to pasture, most of donkeys affected with different kinds of work related disease during high working time that is during crop harvesting due to less grazing hrs. [25]. The current study further strengthens this fact where the majority of the clinical examination was conducted in and after the harvesting season and indicated higher work related problems, i.e., wounds and musculo skeletal disease.

Animals with poor body condition categories were more affected than those with moderate and good conditions, particularly for wound. This might be due to the direct friction between the load and the back bone of the donkey as a result of less flesh. A large proportion of donkeys suffered from various degrees of wounds, which is high compared to the 34%, the main sources of wounds were in appropriate harness, Hobbes, and saddle design, hyena bite, donkey bite, and car accident, injury by the owners or other people [2, 9]. Harness related problems were raised from incorrect size, in appropriate fitness, too narrow or too thin, made of unsuitable synthetic materials .poor padding, poor design and synthetic rope to fix the load were the problems related with using pack saddles [9]. Personal observation of the authors and history gathered from the donkey owners confirmed this report. Moreover, high proportion of wound were observed on the long axis of the body region of the donkeys which are wither, back, lumber, sacrum, tail and neck than extremities (head, ear, limbs, vagina, perineum, eye etc.) and sides (Ribs, chest and flank).The long axis of the body is highly exposed to different work and the cause is similar with [2,9].

The incidence of musculo skeletal disease found in this study is higher compared to other similar studies 4.4% around Jimma [26, 27]. The higher incidence of musculo skeletal disease among the working donkeys could be related to their work. Donkeys are considered the most affected equine species in this respect, due to work related stresses and faulty confirmation [28]. Over working cause strain on the entire musculoskeletal system, which is a major cause of musculo skeletal disease. The prolonged time to work during each day and each week and the amount of loads they carry seemed to be an important factor. In addition to the long working time, wounds caused by goading when reluctant to work may render the donkeys to have higher musculo skeletal disease [23, 29].

The proportion of internal parasitism obtained in relation to other problems (wound, musculo skeletal disease, and infectious disease, nutritional and reproductive disease) was very few. This is because clinical examination was done after most of the donkeys in the study area were dewormed by the mobile clinic of the donkey health and welfare project team.

4.3 Limitations of the study

Lack of qualitative components of study design

5. Conclusion and Recommendations

The present study has shown that donkeys have crucial roles in the livelihoods of marginalized farmers. In spite of the fact, they have been suffering from high incidence of wound followed by musculo skeletal disease, infectious disease, nutritional, Reproductive and parasitic disease in the same order of importance. Most of these problems affected adult working donkeys and were related to poor donkey management system practiced by the donkey owners. Particularly the high incidence of wound on the long axis of the animal is associated with improper harnessing and over loading. Though the primary constraint indicated by respondents was known to be disease, feed and water were similarly perceived as a very high problem among the donkey owners. Generally adult animals with poor body condition were more affected with different kinds of health problems.

Based on the findings the following recommendations were forwarded.

- Designing of extension programs or any other suitable strategies is recommended to create awareness of donkey owners about the impact of management system on donkeys' health and welfare.
- To reduce the higher incidence of work related diseases, proper veterinary services should be given to working donkeys.
- Research organization and developmental organizations should give due attention to health and management problems of donkeys.

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