Major Health and Welfare Problems of Camels in Dire Dawa Administration Council, Eastern Ethiopia

Jabir Teha[1], Lishan Asefa[1], Tadesse Birhanu[1, 2]* and Ayele Gizachew[1]

[1]School of Veterinary Medicine, College of Medical and Health Sciences, Wollega University, P.O. Box:395, Nekemte, Ethiopia.
[2] Department of Animal Science, College of Agriculture, Salale University, P.O. Box: 245, Fitche, Ethiopia
*Corresponding author: drbirhan@yahoo.com

Abstract: A cross sectional study was conducted from October, 2014 to April, 2015at selected districts of Dire Dawa administrative council, eastern Ethiopia to determine the major health and welfare problems of camel. Among 393 inspected camels, 38.4% were suffering from major health problems like enteritis (albatii) (23.9%), *Cephalopina titillator* larvae (Digir) (23.9%), camel contagious ecthzeyma (Afcarro) (13.2%), pneumonia (Qufa) (9.10%) and dermatophilosis (Citto) (8.90%). The study also indicated that overloading (33%), lack of feed and water (15%) and poor attitude (12%) were the main welfare problems in the study area. There was also an association between sex and working activities, a higher proportion of males (79.0%) were engaged in loading than females (27.0%)which was statistically significant (p=0.00). The informants of this study were indicated parasites, pneumonia and enteritis were the major health problems whereas overworking, malnutrition and poor attention were the major problems in study area. Thus, strategic community education should be done in order to improve management system of the camel.
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Introduction

In Ethiopia, camels represent a subset of major livestock resources with a population estimated at greater than 2.3 million. It plays a significant multi-purpose role in the arid and semi-arid parts of the country. The commonest uses of camels by the pastoralists are for transporting grain, water, salt and other goods as well as for milk and meat production. A study in eastern Ethiopia indicated that camels work on average for 16 hours per day by traveling 60 km [1]. The animal is very reliable milk producers even during the dry season and drought years when milk from cattle and goat is scarce. It also possess several attributes as minimum contribution to environmental degradation, utilization of scarce natural resources (feed and water), minimum competition with other ruminants and good adaptation to harsh environment [2].

The importance of the animal is increasing from time to time both at local and global markets. As a result, the country is earning hard currency by exporting life camels to Middle East countries. Moreover; camel husbandry is the main source of living for millions of pastoralists in the arid and semi-arid zones of Ethiopia, including the Hararge, Borana, Afar and Somali lowlands. Undoubtedly, camels represent a vital contribution to food security and human welfare in vulnerable households of the areas. Currently, due to population growth, increased frequencies of drought recurrence, shrinkage and deterioration of the rangeland by bush encroachment (grazing land for their cattle) together with increasing aridity are the major governing factor for the expansion of camels' production [3]. Thus, camels have been indispensable alternative to cope up with the escalating rangeland ecological challenges [4].

Even though camel contributes much to the national economy of the country, its development is hampered by different constraints: widespread diseases, poor veterinary service, welfare problems and lack of attention from government [5]. Camels are believed to be comparatively less susceptible to many diseases that affect other livestock species. However, they are still affected by many endemic diseases. Despite all its ecological and economic importance, and significant role in the life of pastoral community, until recently the animals were neglected by researchers and development planners in Ethiopia. Research agendas, promotion programs, regular vaccination and animal health service deliveries are almost always excluding camels. Few previously conducted studies mainly concentrated on the prevalence of specific diseases [6, 7, 8, 9, 10]. Therefore, the study was designed to identify major health and welfare related problems of the camel in and around Dire Dawa town, Eastern Ethiopia.

Materials And Methods

Study Area

A cross-sectional study design was conducted from October, 2014 to April, 2015 at selected districts of Dire Dawa administrative council, eastern Ethiopia. Dire Dawa town is located at distance of 515km east of Addis Ababa. It is geographically found at $9^0 36^{`}$N and $41^0 52^{`}$E/9.600^0N and 41.867^0E. The main climatic divisions of the area are low land and mid-highland. The annual rainfall varies from 440-760 mm, the rainfall pattern being bimodal. The average temperature of the area is 25.3°c, and the camel population of the areas has been found 5,070 [11]. Mixed crop and livestock farming system is the mode of agriculture in the region with camels and shoats as the major livestock which highly contribute for the livelihood of the local community in addition to generating hard currency for the country [12].

Study Participants

Voluntary camel rearing owners who vary in sex, age, kebeles and lived more than six months were involved in the study. One humped camel (*Camellus dromedarous*) of both sexes and all age categories reared in areas were included to conduct the study.

Sampling and Sample Size Determination

Simple random sampling was used to select the Peasant Associations (PAs) of the study areas and set focus group discussion. From each selected PAs, two groups were formed in which each group containing 8-12 members. Similarly, simple random sampling was applied to select animals of every member group. The sample size was determined using the following formula [13]. Since there was no previous work done in this area, the expected prevalence is to be 50%. So, the sample size was determined using the following formula.

$$n=\frac{1.96^2\,(p)\,(1-p)}{d^2}=384$$

Where; n = Sample size, exp = expected prevalence (50%), 1.96 = the value of Z at 95% confidence level and d^2 = Desired absolute precision = 5%. To increase the precision, the sample size was calculated to be 393 camels.

Data Collection Methods

Participatory epidemiological investigation (Participatory Rural Appraisal) was carried out at each selected settlement using 8-12 key informants. Information was collected using the semi-structured interview and participatory techniques (tools) and principles. The key informants were both men and women herd owners with herding experience and who have rich indigenous knowledge related to camel husbandry and health care. Scoring, proportional piling and ranking methods were employed to gather information, using corn grain (stones) and visualizations. Thus, information on health constraints, camel diseases, management practices, traditional knowledge in health care and disease prevention, their perception on traditional knowledge and existing veterinary services were noticed and collected.

In addition to participatory discussion, semi-structured questionnaire was used to collect data on herd and individual animal disease occurrences and performances. Information on management practices, traditional health care, disease prevention measures and use of veterinary service were collected. Important diseases with their local vernacular names were listed, described and characterized for possible translation into veterinary terms or English names. The finding of participatory discussions and semi-structured questionnaire were triangulated and the validity of information was assessed.

Data Analysis

The collected data were entered and analyzed by using SPSS version 21. Descriptive statistics called person Chi-Square test was used to determine the statistical significance for categorical data analyzed, confidence level was held at 95% and $p<0.05$ was set for significance.

Results

A total of 393 camels were thoroughly observed for major health and welfare related problems. Out of the total, 281 (71.5%) and 112 (28.5%) animals were females and males, respectively. About 63(16%) were under five years of age, 111(28.2%) were between 5 and 14 years, 177(45%) were between 15 and 35 years of age and 42(10.7%) were over 36 years. The observation on the body condition of the animals were categorized into three groups of scores, such as 2 as "Thin", 3 as "Medium", 4 as "good" and 5 as "Fat" shows that 28.2%, 47.1%, 16.5% and 8.10% of animals were thin (Poor), medium, good and Fat body condition, respectively (Table 1).

Table 1: Description of Body Condition Scores of camels in and around Dire Dawa Administrative council, Eastern Ethiopia**.**

Body Condition Score	Percent (%)
Thin(2)	28.2
Medium(3)	47.1
Good(4)	16.5
Fat(5)	8.10

In this study indicated that enteritis and camel nasal bot, each accounts, 94 (23.9) were the leading major health problems of the camel whereas; endo parasites were the least problem of the animal in the study area. The major health and its proportion reflect by the key informants in the study area (Table 2).

Table 2: Describes Health Parameters of Camels in study area during Observational period at Dire Dawa Administrative council, Eastern Ethiopia.

Vernacular Name	Scientific Name	Frequency	Percent (%)
Qufa	Pneumonia	36	9.10
Albatii	Enteritis	94	23.9
Afcarro	Contagious Ecthzeyma	52	13.2
Citto	Dermatophytosis	35	8.90
Aaned	Joint ill	34	8.70
Digir	Camel Nasal Bot	94	23.9
Malka	Local swelling	29	7.40
Ramo	Endo parasite	19	4.80

In this study, tick infestation (28.5%) was the leading ecto-parasites of the camel whereas; lice infestation (6.10%) were the least once (Table 3).

Table 3: Describes the prevalence of ecto-parasite in and around Dire Dawa Administrative council, Eastern Ethiopia.

Ecto-parasites	Frequency	Percent (%)
Mange	53	13.5
Tick	112	28.5
Lice	24	6.10

In the present study, there was an association between sex and working activities, a higher proportion of males (79.0%) were engaged in loading than females (27.0%) which was statistically significant (p=0.00) (Table 4).

Table 4: Describes the association of Sex and occurrence of diseases in camel while observational study, Dire Dawa administrative council, Eastern Ethiopia.

Diseases	Male	Female	$\chi 2$	P-value
Pneumonia	14	80	27.3	**0.00**
CCE	8	44		
Dermatophytosis	9	26		
sand colic	12	24		
Joint ill	15	19		
Nasal Bot	37	57		
Local swelling	13	16		
GIT parasite	4	15		

The study also indicated that camels are actively involved in work at age between 15-35 years followed by 5-15 years (Table 5).

Focus Group Discussion:

Here 20 focus group discussions were established and each group held 8-12 members of men and women who comprise a total of 221 key informants were participated in focus group discussion in 10 selected PAs. The same discussion method was applied to each focus group. Parasites, pneumonia and enteritis were the major health problems whereas, over loading, lacks of food and water, overworking and poor attitude were the main welfare problems of camel in the study area. (Table 6).

Table 5: Describes the proportions of work status with age groups during observational study, Dire Dawa Administrative council, Eastern Ethiopia.

Age group	Not working	Working
Less than 5 years	100%	0%
Between 5 and 15	22.5%	77.5%
Between 15 and 35	18.1%	81.9%
Over 35	24.2%	75.8%

Table 6: Demonstrates welfare problem of camels in observational, Dire Dawa Administrative council, Eastern Ethiopia.

Welfare Problems	Rank	Real (%)
Over loading	1	33
Lack of feed and water	3	15
Poor attitude	4	12
Lack of drugs in clinic	5	9
Diseases	2	8
Housing Problem	6	7
Predator	7	6

Discusion

In this study, it was appreciated that the majority of camel observed 262(66.7%) were used for work, mainly for transporting goods, milk and meat production. There was a variation among different age groups in working status and which was statistically significant ($p<0.05$) and also there was an association between sex and working activities, a higher proportion of males were engaged in loading than females, which was statistically significant (p=0.00), whereas females reared for milk production. The previous study conducted in salt caravan of afar revealed that most males were used as pack animal. This was also indicated in the study conducted by [14] that reports most males were used as pack animal and as they start work at the age of 5 years.

The study revealed a wide spectrum of welfare issues on the study animals, most of which were

significantly associated with the associated risk factors. The observation on the body condition of the animals showed that28.2%, 47.1% and 16.5% were under thin, medium and good body condition category respectively. About38.4% of camels were found to be infected with different diseases in the study area. As indicated in the previous study that show41.5% of different diseases like trypanosomiasis, camel pox, pneumonia, camel contagious ecthyma, skin necrosis, mange mite infestation and internal parasites were among the major health problems of camels in Ethiopia [15, 16].

In this study, pneumonia (29.3%), dehydration (18.7%) camel contagious Ecthyma (13.2%) tick infestation (28.5%) and others (9.2%) was found to be the most health problem within study area. This could be related to the existence of favorable factors that facilitate the occurrence of different diseases. It was mainly associated with stress factors such as internal parasites in case of pneumonia and other predisposing factors like overworking; overloading and malnutrition was the commonest feature that lowers camel resistance. Environmental and management stress like over-work, sudden change of climate, insufficient feed and chronic disease play an important role in disarming the defense mechanisms of the animals and increased the susceptibility to the disease [17].

The key respondents of the study indicated that the disease can occur at any time which has impact on overall productivity due to the long recovery period. On group discussion, the respondents have indicated skin diseases is main camels; health problem in this study area. This is in line with other study [18, 19]. The study also indicated that overloading (33%) and lack of feed and water (15%) were the main welfare problems in the study area. Similar observations were reported in Somalia by [15].

Conclusion

In this study, parasites, pneumonia and enteritis were the major camel health problems whereas, over loading, lack of food and water, overworking and lack of housing are the main welfare problems of camel in the study area. Therefore, strategic community education should be done in order to create awareness about management system and animal welfare.

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Authors' Contributions

Ayele Gizachew designed the study and created survey instrument. Jabir Teha participated in data collection and manuscript writing. Lishan Asefa and Tadesse Birhanu have participated on data analysis and manuscript writing. All authors read and approved the final manuscript.

Conflict Of Interests

The authors declare that there is no conflict of interests regarding the publication of this article.

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