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A Study on Major Health and to Manage Mental Problem of Carthorses in and Around Debre Zeit, Ethiopia

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Abstract

Cross sectional study was done from November 2008 to April 2009 with the objective to identify the major health and management problems of cart horses in and around Debre Zeit town, central Ethiopia. Animal based, retrospective data analysis of clinic cases presented to the society for protection animal abroad (SPANA) veterinary clinic from 2007-2008 and owners interviews used to collect data. A total of 435 randomly selected cart horses were examined and 100 owners or users were interviewed. According to cases brought to veterinary clinic, wound and abscessation recorded highest cases (39.3%), followed by infectious disease (25.28%), respiratory disorder (12.07%), ocular disorder (5.85%), alimentary disorder (4.87%) and dermatological disorder (3.8%). Internal parasite such as *Strongyles, Parascaris equorum* and *Gastrodiscus* species were found in proportion of 61.1%, 29.2% and 9.7%. Compared to the retrospective data analysis, wounds, ocular problems. infectious disease and respiratory problems are decreasing in occurrence while alimentary system disorders such as colic and musculoskeletal disorders increased. Among the 100 respondents interviewed, 69% of cart horse owners interviewed responded that they feed their horses with concentrate, 22% feed with crop residues and concentrate, 4% feed with only crop residue and 5% graze them on pasture and supplementing with hay or straw at night. All respondents of the questionnaire survey indicated that epizootic lymphangitis and helminthosis were the major health problems of their horses followed by wounds. Management and welfare understanding of carthorses owners were found to be un satisfactory. Therefore, equine health and management awareness enhancement education to carthorse owners, development of legislation for the control of abuse of working animals and socio-economic impact of major health problem of equines are recommended.

Keywords: Carthorses; Debre Zeit; Disorder; Health; Management

Introduction

The world equine population is about 112.5 million consisting of 58.5, 44.3 and 15 million horses, donkeys and mules respectively [1]. Out of the global distribution 98% of donkeys, 97% of mules and 60% of horses are distributed in the developing countries and the majority of these will be used for work. The equine population in Africa is 17.6 million, consisting of 11.6 million donkeys, 3.7 million horse and 2.3 million mules [2,3].

According Central Statistical Authority [4] survey report Ethiopia is estimated to have 2.16 million horses, 8.4 million donkey and 0.41 million mules. Equine play an important role in the transport of farm product, fodder, fire wood, agricultural inputs and construction and waste material. Working equids have a direct impact on the lives of rural people by reducing the transport burdens of water, fuel, wood and goods [5], transporting people and in some areas for agricultural purposes [6,7]. Carting was introduced to town in Ethiopia some 60 years ago [8].

Although equines are often described as hardy and resistant animals, they do suffer from a number of health problems [9,10]. Among which the most common entities leading to ill health, suffering and early demise and finally death are infectious diseases and parasitism, which resulted in considerably reduced animals work output, reproductive performance and most of all their longevity [11,12].

Despite the significance of horses in the sector of transportation, there are certain problems that are anticipated to face in almost all the above towns where they are actively involved in serving the residents. African horse sickness, anthrax, rabies, epizootic lymphangitis, dourine, equine infectious anemia, equine piroplasmosis, glanders, horse mange, surra and ulcerative lymphangitis are among the diseases which affect horses [13].

African horse sickness appears to be endemic in tropical regions of central Africa from where it regularly spreads southern Africa [14]. In Ethiopia, Africa horse sickness covers the northern and central highlands where horses are predominately kept [15]. Epizootic lymphangitis is currently in west, north and north east Africa, Middle East India and the Far East [16]. The disease is common in Ethiopia, especially in cart horses, affecting an average of 18.8% of horses in warm, humid areas between 1500 and 2300 meters above sea level [17]. Parasitic diseases are known to infect equines. These include round worms, flukes, tapeworm, protozoan's and fly larvae that infest and damage the intestine, respiratory system and other internal organs [18,19]. Lameness also among the common health problem of horses. Major causes of lameness are associated with manage mental problem which cause traumatic injuries and arthritis on limbs [20]. In Ethiopia, equine management is neglected due to deep-rooted social erroneous belief, health problems and lack of nutrition. Therefore, the objectives of this study were to assess health and manage mental problem of

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carthorses and to implicate appropriate preventive and therapeutic approach against the major health and manage mental problem of carthorses.

Material and Methods

Study area

The study was conducted during the year October 2008 to March 2009 in and around Debre Zeit, Ethiopia which is located at 9°N and 4°E longitudes at an altitude of 1850 meter above sea level in central highlands of Ethiopia at 47 km South East of Addis Ababa capital city. It has annual rainfall of 1151.6 mm of which 84% is in the long rainy season (June to September). The dry season extends from October to February. The mean annual maximum and minimum range of temperatures are 26°C and 14°C respectively, with average relative humidity of 63.8% [21]. In the town, 'there are 160,697 cattle, 22,181 sheep, 37,510 goat, 5660 horse, 38,726 donkey, 268 mule and 191,380 poultry [22]. The means of transportation in the area include vehicle, horse drawn carts. There are 1170 cart horses and 585 carts in Debre Zeit town [23].

Study population and study design

Horses which have been engaged in cart puling activity in and around Debre Zeit were considered as study population. A total of 435 carthorses were closely studied in the cross-sectional study and 3,529 horses were also involved in the retrospective study and 100 carthorse's owners were interviewed using questionnaire developed. To assess the major health and manage mental problems of cart horse in and around Debre Zeit, the study was designed in three different approaches; retrospective study; questionnaire survey and cross-sectional study.

Retrospective study of two years data (2007-2008) have been collected and analyzed from SPANA clinic case records with the aim of identifying disease that have impact on the performance of cart pulling horses in Debre Zeit. Using a semi structured questionnaire format, an attempt was made to generate aspect of cart horses, with emphasis on health and managemental problem. A cross- sectional study was carried out on a total of 435 horses for health and management associated problems.

Sampling technique and sample size determination

Simple random sampling technique was used to select animals in each cart station. The sample size was determined according to Thrusfield [24] for an infinite with 95% confidence level, 5% desired absolute precision and 50% expected prevalence, since there was no previous information on the prevalence of antibodies in the study area. The sample size was calculated by making use of the following formula after Thrusfield [24].

$$n = \frac{1.96^2 P_{exp}\left(1 - P_{exp}\right)}{d^2}$$

where, n= Required sample size; P_{exp}= Expected prevalence; d = Desired absolute precision level at 95% Confidence level; 1.96 is the value of z at 95% confidence level.

A total of 435 carthorses were examined for cross sectional study of health and management associated problems.

Sampling and examination

435 cart horses were randomly selected and identified by their age, sex and plate number of cart and the name of the owner/driver. Diagnostic methods like history, physical clinical examination and laboratory confirmation technique (parasitological and microbiological) were employed to identify causes of major health problems in the area.

Fresh fecal sample was collected directly from the rectum of 242 horses using a plastic glove and placed in to labeled containers. Sedimentation and flotation methods were employed to examine and indentify gastro-intestinal helminthes. Pus discharge obtained from un ruptured nodule was collected and examined with gram stain oil-immersion microscope for the presence of yeast forms of *Histoplasma capsulatum var. farciminosum* as confirmatory procedure.

Data analysis

The collected data will be entered to Microsoft excel spreadsheet in computer. Data wil be analyzed in using SPSS 15.0 for windows will be used to analyze. In the analysis confidence level will be held at 95% and $p<0.05$ will be set for significance.

Results

Questionnaire survey

A total of 100 carthorse owner were interviewed and analyzed during the study period in and around Debre Zeit. 69% of cart horse owners interviewed responded that they feed their horses with concentrate, 22% feed with crop residues and concentrate, 4% feed with only crop residue and 5% graze them on pasture and supplementing with hay or straw at night. 53% respondents provided shelter house of open type protecting only from rain and 47% of carthorse owner respondents provided a closed type housing. Of the total interviewed, 5% of them kept their horses together with other livestock. Of the total respondents, 94% of carthorse owner shod their horses. According to the information obtained, most shoes were made of rubber which has a rectangular shape. Shoeing was done by untrained farrier with an average shoeing cost of Ethiopian Birr for each hoof.

66% of the total carthorse owners interviewed had only a single harness in a two or more horse. The use harness made of piece of clothing or sack and straw was reported to play a role in protecting horses from friction inflicted back sore. 90% of the total carthorse owner interviewed practice grooming their horse for at least twice per week. Of the total carthorse owners interviewed, 85% have provided vaccination for their horses against African horse sickness. 85% of cart horse owner complained that epizootic lymphangitis /"Nidifit"/as anumber one problem of their horses followed by colic and African horse sickness. Out of total interviewed respondents, 48 lost of their horse with probable cause of African horse sickness, colic, tetanus, bloat or Nidift within the last two years(Table 1). 19% of the respondents responded to abandon to their horses when they got severely sick or aged; 9% sell them to others and 72% keep their with them and provided care.

Retrospective data analysis

Retrospective data analysis showed that from 2007-2008 at total of 3,529 horse have been presented to the veterinary clinic of SPANA Ethiopia for various health problem (Table 2). The study revealed that among cases brought to veterinary clinics, wounds and abscessation appeared to be a major health problem accounting about 39.78%, the others being infectious disease (25.28%) and respiratory disorders (12.07%). Preventive measures taken for horses during the interval included deworming (3,73), tooth rasping (12), hoof trimming (42) and vaccination against African Horse Sickness (1,979).

Cause of death	No. of dead horse	Percentage (%)
Epizootic lymphangitis (Nidift)	15	31.4
African horse sickness	5	10.4
Tetanus	3	6.3
Colic	9	18.6
Accident	12	25
Urinary obstruction	1	2.1
Physical injury	3	6.3
Total	48	100

Table 1: Questionnaire analysis result on number of horses died during the last two years.

Disease/syndromes	Retrospective			Cross-sectional		
	No. of horses	% within	% from total	No. of horses	% within	% from total
Alimentary disorder	172		4.89	30		12.00
Colic	104	60.47	2.95	20	66.67	8.00
Diarrhea	66	38.37	1.87	4	13.33	1.60
Other	2	1.16	0.06	6	20.00	2.40
Dermatological disorder	113		3.20	9		3.60
Infectious disease	892		25.28	61		24.00
Epzootic lymphangitis	682	76.46	19.33	55	90.16	22.00
other	210	23.46	5.95	6	9.84	2.40
Wound and abscessation	1,404		39.78	63		25.20
Back sore	440	31.34	12.47	16	25.40	6.40
Subcutaneous abscessation	70	4.99	1.98	7	11.11	2.80
Other	894	63.68	25.33	40	63.49	16.00
Ocular disorder	210		5.95	7		2.80
Musculoskeletal disorder	282		7.99	27		10.80
Lameness	273	96.81	7.74	15	55.56	6.00
others	9	3.19	0.26	12	44.44	4.80
Respiratory disorder	726		12.07	22		8.80
Miscellaneous disorder	30		0.85	31		12.40
Total	**3,529**	**100**	**100**	**250**	**100**	**100**

Table 2: Percentage difference in occurrence of major health disorders between retrospective and cross sectional study on carthorses of Debre Zeit.

Cross- sectional study

Out of 435 horses presented to the Debre Zeit SPANA veterinary clinic, 185 (42.52%) were found to harbor gastro-intestinal parasite. 63 (14.48%) horses were found to possess wounds and abscessation and 61(14.02%) horses were affected by infectious disease and 31(7.13%) horse were affected by miscellaneous cause (Figure 1). Examination of fecal samples taken from carthorses using flotation and sedimentation techniques revealed that 185 of them had ova of various gastro-intestinal helminthes. The identified parasite were *Strongyles* 113 (61.08%), *Parascaris equorum* 54 (29.18%) and *Gastrodiscus* species 18 (9.72%).

A total 56 cases of cart horses were presented to the clinic with cutaneous nodules and abscessation. Out of the 56 pus or discharge samples examined, 55 were positive for *Histoplasma capsulatum var farcinosum* and one horse was positive for *Corynebacterium pseudotuberculosis* which are causes epizootic lymphangitis, respectively.

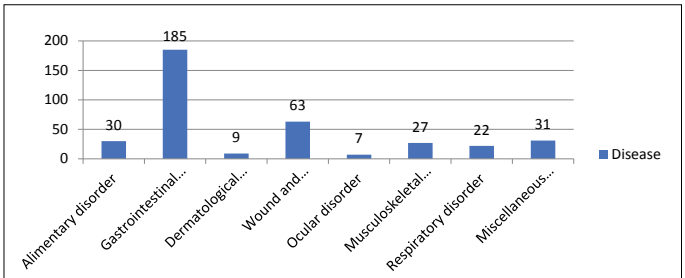

Figure 1: Major health disorder of carthorses identified from cross sectional.

Discussion

The objective of this study was to address cart horse health and management problems at study area. The identified problems are important for intervention and policy maker to alleviate the existing problems. In Bishoftu town, almost all horses are kept to transport people and goods in order to assure their owner's daily income. This observation is in agreement with reports by Mekuria et al. [25] and Pritchard et al. [26] describing that equids are mainly kept for transport purposes and only rarely as source of meat or milk. 69% of cart horse owners interviewed responded that they feed their horses with concentrate, 22% feed with crop residues and concentrate, 4% feed with only crop residue and 5% graze them on pasture and supplementing with hay or straw at night.

All respondents of the questionnaire survey indicated that epizootic lymphangitis and helminthosis were the major health problems of their horses followed by wounds. Among management problems identified from this survey, overworking, improper harnessing and shoeing were given priority by the respondents. As responded by owners the

most deadliest disease was epizootic lymphangitis followed by colic and African horse sickness. Housing system was mainly designed to protect horses from predators and in some case from rain. The highest proportions of carthorses in these study areas were kept on open type of housing or in stable yard without roof which could have exposed horses to rain, wind and cold weather. This could be a source of stress to the animal.

Despite the significance of horse in and around Bishoftu town, where they are used for transportation, no work has been reported regarding their common disease and clinical condition except few case reports and some isolated disease entities [27]. According to cases brought to veterinary clinic, wound and abscessation recorded highest cases (39.3%), followed by infectious disease (25.28%), respiratory disorder (12.07%), ocular disorder (5.85%), alimentary disorder (4.87%) and dermatological disorder (3.8%). The higher cases of wound and abscessation recorded may be reflection of their improper harness and saddle, poor breast strap, poor girth rope. This finding was inline with previous report from central Ethiopia by Pearson et al. [28] who reported 44% prevalence. Compared to the 25% prevalence report from Mekelle town by Sisay [29], the present finding is higher however, it is less than the finding by Biffa et al. [30] who reported (72.1%) prevalence in working in Hawassa. The difference in wound prevalence might be due to varation in husbandry and management practice by the farmers among the different geographic area.

The result of this study indicated that *Epzootic lymphangitis* was endemic to the study area with an average prevalence of 22%. This might be due to the affected and susceptible horse were stabled together at market place and carthorse parking stations; the use of single harness for different cart horse is well practiced in the area. This can facilitate the transmission of the disease among cart horse and may contribute to the high prevalence of the disease. In addition to this the study conducted by Ameni [31] also indicated that it could be due to the fact that there were no control/intervention methods in the country. A similar study conducted by Endebu [32] indicated that EL is the first most important disease of carthorses at Debre-zeit and Akaka towns and an average prevalence of 21% was recorded from the data collected from 28 towns that use carthorses for the transportation of man and goods [33]. The highest prevalence was recorded at Mojo (39%) followed by Ejaji (36.5%), Bati (36%), Debre-zeit (29%), and Wolliso (24.9%) [34].

Clinical manifestations of HCF observed by this study were in agreement with the previous reports [35]. EL was observed to affect any parts of the body with frequent exposure to injury are highly observed on sterna region, limbs, scrotal region, head region and cervical region. All cases of EL were cutaneous which is in line with the previous studies [36]. The microscopic appearance of the yeast forms observed by the present study was consistent with the reports by Ameni [31].

In the present study the overall prevalence of wound and abscession in cart horses was 25.2% which indicate wound as the most serious problem of cart horses in and around Bishoftu town. The finding was in line with the report from Mekelle town [29] who reported 25% prevalence. The present finding is less than the finding by Biffa et al. and Fikru et al. [30,37] who reported (72.1%) prevalence in working equines in Hawassa and (64%) prevalence in and around Kombolcha town. The difference in wound prevalence might be due to variation in husbandry and management practice by the farmers among the different geographic area.

Regarding wound distribution, higher proportions of wound were observed at the back (Wither) and breast areas. This might be due to the using of improper harness and saddle that are manufactured by unskilled artisans which is commonly practiced in different parts of the in Ethiopia. Also, horse-drawn carts are often designed unbalanced and too heavy and do not consider load distribution in relation to the body balance and style of movement. Wooden or iron-made saddles are constantly put on the back/shoulder and strongly tied to the body by plastic rope, which causes persistent irritation and injuries. In most cases, harnesses were made of hard plastic strips, which cut in to the skin of the equines and form large open wounds. These findings concur with previous reports by Pearson et al. and Biffa et al. [28,30].

The Current study also indicated that musculo-skeletal disorder were among major health problem of carthorses in Bishoftu with an overall prevalence of 10.8%. This finding is lower than reports of 28.7% Hawassa and Shashemene [38] and 67.9% in Debrezeit, Mojo, Akaki and Debre-Brhan Moti and 43.9% in Debre-Zeit, Debre-Brehan and Nazareth/Adama [39]. The difference could be due to variation on awareness level of carthorse owners in the study areas.

The prevalence of Strongyle-type eggs in horses was 61.08% in the current study which is in close agreement with 58.50% report of Saeed [40]. The current result is lower than work of Fikru et al. [37] who reported 91%. The lower prevalence in the present study could be due to all horses of this study were cart horses that are less exposed and in some cases totally restricted from pasture. The prevalence of *Parascaris equorum* was 29.18% in cart horses. This result is higher than the prevalence reported in Ethiopia by Getachew et al., Yoseph et al. and Fikru et al. [37,41,42] who reported 16.2%, 15.7% and 7.3%, respectively and in Lesotho by Melissa et al. [43] who reported 21.6%. The difference in prevalence of *Parascaris equorum f*rom different reports in developing countries is somewhat conflicting and this could be due to compromised immune responses relating to concurrent disease, but is worthy of further investigation [44]. The prevalence of *Gastroduscus* sp. was 9.72% in cart horses. This result is in close agreement with 7.14% [3], 7.31% [45], 6% [46].

Conclusion and Recommendations

This study and retrospective analysis revealed that carthorses are affected by many health and management problems. Alimentary, dermatological, respiratory, ocular and musculoskeletal disorders together with infectious disease and wound and abscessation are major health problems of carthorses in Debre Zeit. Wounds, ocular problems, infectious disease and respiratory problems are decreasing in occurrence while alimentary system disorders such as colic and musculoskeletal disorders increased. Internal parasite such as *Strongyles*, *Prasxaris equorum* and *Gastrodiscus* species are common among carthorses. Many carthorses are dying from epizootic lymphangitis, colic and Africa horse sickness causing economic and social crisis on their owners. Therefore, taking these in to account the following measures are recommended:

- Equine health and management awareness enhancement education has to provide to cart horse owner for better and management care of horses.
- Development of legislation for the control of abuse to working animals is recommended to improve their welfare and health status with the input from veterinarians, municipality personnel and traffic polices.
- Proper design of cart and harnesses suitable to local breeds is recommended to minimize occurrence of wounds and suffering.

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