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Prevalence of strongyle infection and associated risk factors in equine in Menz Keya Gerbil District, North-Eastern Ethiopia

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A cross sectional study was conducted to determine the prevalence of equine strongyles in Meneze Keya Geberial district from July 2013 to September 2013. Coprological examination using floatation technique and assessing risk factors were followed. A total of 390 equines, 204 donkeys, 174 horses, and 12 mules were included in the study. The overall prevalence was found to be 64.61% and the species specific prevalence was 62.3, 69, and 41.7% in donkeys, horses and mules, respectively. There was no statistically significant difference (p>0.05) on the prevalence of the gastro-intestinal (GI) strongyles infection among different species of equines. The age level prevalence was 64.6% in young equine and 64.6% in adult equines. Statistically significant difference (p<0.05) in the prevalence of GI strongyles infection in different sex of equine was found. No statistically significant difference (p>0.05) in the prevalence of GI strongyle infection related to age and body condition was found. In conclusion, strongyles infection is widely distributed in equine in the study area. Strategic prevention and control to strongyles infection should be devised and implemented. Further researches on determining the management practices which predisposes equines to strongyle infections should be conducted.

Key words: Ethiopia, equine, Menze Keya Geberial district, prevalence, strongyles.

INTRODUCTION

The equine population in Africa is 17.6 million, 11.6, 2.3 and 3.7 million donkeys, mules and horses, respectively (Pearson et al., 1997). Ethiopia retains a total of 8.6 million equines, 5.2, 2.8 and 0.6 million donkeys, horses and mules, respectively (Addissalem, 2005). This high number of equine in the production system shows the importance of the species in the area.

Most equines are found in the areas of high human population density where the production system is dominated by annual cropping with livestock production (Yilma et al., 1991). Horses are more populated in high land whereas mules and donkeys are relatively more in middle to lower altitude areas of the country (Gezahegn, 2000; Hassan, 2000).

Equines have significant role in transport of the agricultural products and human transport system in Ethiopia. They are used as saddle or cart or pack animals in most parts of the country, but in few regions equines

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are used for ploughing of land for crop production and threshing crops (Gizaw, 1987; Hagos, 2000).

Equines are one of the major hosts for haemoprotozoans and helminth infections (Sumbria et al., 2014). They are known to be infected by 28 genera and 75 species of nematodes, 1 genus and 5 species of trematodes and 3 genera and 22 species of cestodes (Drugde and Lyons, 1986) and more than 50 strongyles species (Lyons and Tolliver, 2009). In Ethiopia, gastro-intestinal (GI) parasite infection is one of the most important health problems of equines contributing to poor body condition, reduced power output, poor reproductive performances and short lifespan. Studies have shown high prevalence of GI parasites such as large and small strongyles, ascarids, pinworm, stomach worm, lung worm and liver fluke (Yilma et al., 1991; Yoseph et al., 2001).

Strongyles are among the most frequently encountered and highly pathogenic helminthes of equidae, responsible for death when control measures are neglected (Drudge and Lyons, 1986; Soulsby, 1982). However, the greatest losses are probably due to failure of youth equine to grow properly and less efficient performances of horse that are moderately parasitized (Radositis et al.,). Large strongyles are generally recognized as the most important of the internal parasites in the horse and the major pathogenic species in this group are *Strongylus vulgaris, Strongylus edentatus* and *Strongylus equinus*. The first two species are distributed worldwide whereas *S. equinus* is relatively uncommon (Fikru et al., 2005).

In recent study by Takele and Nibiret (2013), they reported the overall prevalence of different parasites to be 88.21% in donkeys and 77.91% in mules, where 94.1% of donkeys and 84.33% of mules harbored two or more types of parasites (mixed infection) in and around Bahir Dar, Western Ethiopia. Similarly, Asefa et al. (2011) reported a prevalence of 99.5% of strongyle infection in donkeys in Sululta and Gefersa districts of Central Ethiopia. These findings show the importance of the strongyles in Ethiopia.

Despite the significance of equines to the production system and huge population in the Menz Keya Gabriel district, there was no study on the important strongyle infection on equines. Therefore, it was important to study the epidemiology of strongyles infection and the risk factors associated to the prevalence of equine strongyle infections in Menz Keya Gebreal district. Therefore, this research was conducted with objectives to determine the prevalence and assess risk factors associated with the prevalence of GI strongyle infection in Menz Keya Gebreal district.

MATERIALS AND METHODS

Study area

The study was conducted from July to September, 2013 in Menz Keya Gerbil district. It is located at 312 km from Addis Ababa, North-Eastern Ethiopia at altitude that ranges from 1400 to 2960 meter above sea level (masl). The area receives mean annual rainfall of 1000 mm with mean minimum and maximum annual temperature of 10 and 25°C, respectively. The agro ecology of the area is 20% low land, 42% midland and 38% highland.

Study population

The study animals were equine species, donkeys, horses and mules. All animals used included local breeds of both sex and were grouped into different age groups (young and adult). The body condition score (BCS) of equines were grouped into two, poor (BCS 1 to 2) and good (BCS 3 to 5), adapted from Nicholson and Butterworth (1986).

Study design

A cross-sectional study design was followed and a simple random sampling technique was employed to select study peasant association and study animals. Body condition scoring and fecal samples were collected from study equines throughout the study period. The fecal specimen was collected directly from the rectum.

Fecal sample collection and coprological examination

The specimen directly collected from the rectum were put to universal bottles containing 10% formalin and refrigerated at 4°C if fecal examination is delayed, but in most cases fecal examination was done immediately. Each sample was labeled with code referring to the animal number, species, corresponding owner's name, date, body condition and place of collection. The collected fecal samples were examined in the parasitological laboratory of the district clinic with qualitative flotation technique, as described by Cringoli (2010) and Aymour (1992).

Sample size determination

The samples size was decided by formula of Thrusfield (2005), by assuming 50% expected prevalence, as there were no previous study, and 95% confidence interval.

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

where n is the sample size required, Z is taken from the level for 95% CI (1.96), P is the prevalence expected (50%), and d is the level of precision (5%).

Accordingly, the calculated sample size was 384, and this number of sample was proportionally distributed to the equine species of the district. Accordingly, 204 donkeys, 174 horses and 12 mules were included in proportionate to the total of 390 equines sampled.

Data analyses

The data were analyzed using Statistical Package of Social Sciences (SPSS) version 20 software for windows. Prevalence was obtained by dividing number of equines positive for strangles infection to the total equines examined. Pearson chi-square (χ^2) test was used to assess association of different risk factors to the

Table 1. Prevalence of GIT strongylosis among donkeys, horse and mules.

Equine species	Total sampled	No. of positives	Prevalence (%)	χ^2	p-value
Donkeys	204	127	62.3		
Horses	174	120	69	4.701	0.095
Mules	12	5	41.7		
Total	390	252	64.61		

Table 2. The prevalence of GI strongyles infection in young and adult equines.

Age category	Total sampled	No. of positives	Prevalence (%)	χ^2	p-valve
Adult	229	148	64.6		
Young	161	104	64.37	0.00	0.995
Total	390	252	64.61		

Table 3. The prevalence of GI strongyles infection by sex of equines species.

Sex	Total sampled	No. of positives	Prevalence (%)	χ^2	p-valve
Male	237	144	60.8		
Female	153	108	70.6	3.928	0.047
Total	390	252	64.61		

Table 4. Prevalence of GI strongyles infection in different body condition scored equines.

Body condition	Total sampled	No. of positive	Prevalence (%)	χ^2	p-valve
Good	236	150	63.6		
Poor	154	102	66.2	0.292	0.589
Total	390	212	64.6		

occurrence of the strongyles infection.

RESULTS

Prevalence in different species of equine

The overall prevalence was found to be 64.61% and the species specific prevalence was 62.3, 69, and 41.7% in donkeys, horses and mules, respectively. There was no statistically significant difference (p = 0.095) on the prevalence of the GI strongyles infection in different species of equines in the study area (Table 1).

Prevalence in different age groups of equine

The study animals were categorized into two age groups, young (<2 years) and adult (>2 years of age). The prevalence on age bases was 64.6 and 64.6% in young and adult equines, respectively. There was no statistically significant variation (p = 0.995) in the occurrence of GI strongyles infection with the two age groups (Table 2).

Prevalence in different sex of equines

Sex based prevalence was 70.6 and 60.8% in female and male equine species, respectively. There was statistically significance difference (p = 0.047) in the prevalence of GI strongyles infection in different sex of equine species in the study area (Table 3).

Prevalence in different body condition score of equines

Out of 154 equines with poor body condition score, 102 (66.2%) were positive for strongyles infection, whereas from 236 equines with good body condition score, 150 (63.6%) were positive for strongyles infection. There was no statistically significant difference (P = 0.589) in the prevalence of GI strongyles infection with regard to the body condition score (Table 4).

DISSCUSION

The finding of present study revealed that strongyles infection prevalence of 64.61% is relatively of high rate. This is an indication that strongyles infection is of important health constraints in equine population in all of the three species donkey, horse and mule in the study area. This finding of high prevalence of strongyles infection is in agreement to Adam et al. (2013) who reported the animals harbouring mild strongyle infection and showed the highest incidence of 69.7% in donkeys and 84% in horses, in North Darfur State, South Sudan.

The finding of current study of prevalence of 62.3 and 41.7% in donkeys and mules, respectively, is lower than that of Asefa et al. (2011) who reported 88.21% in donkeys and 77.91% in mules in and around Bahir Dar, Western Ethiopia. This variation could be due to difference in agro-ecology and density of equine population in the areas. Similarly, the finding of the current study of prevalence of 62.3% in donkeys is lower than that of Asefa et al. (2011) who reported a prevalence of 99.5% of strongyle infection in donkeys in Sululta and Gefersa districts of Central Ethiopia. This variation could be due to the variation in agro-ecology or management practices. This relatively lower prevalence of strongyles infection in the current study could be due to the practice of use of anthelmintic therapy for equine in the study area. The age wise occurrence of strongyles infection in this study revealed no significant difference ($p>0.05$) in prevalence rate between young and adult. These finding is not in agreement to Soulsby (1982) and Desalegn (2005) who reported higher prevalence in adult and lower in foals due to the fact that foal management is good than adult equine. This could be due to the difference in management system, whereas in this study population both the young and adult were reared extensively and mixed, thus the likelihood of exposure is almost similar to different age groups.

There was statistically significant difference between different sexes of equine species in this study by current finding. This finding is not in agreement to the findings of Fikru et al. (2005) and Yoseph (1993), both reported no significant different in sex. This could be due to the difference in the management of animal difference. In this study, female equines were managed for breeding purpose, usually kept homestead whereas male equine are used for pack purpose, carrying of goods for long distance to market places, usually crossing different agro ecological area. These conditions could have increased the likelihood of exposure of the male animals to strongyles infection as compared to their female counterparts.

CONCLUSION AND RECOMMENDATIONS

The strongyles infection in equines is found to be widely prevalent and should be considered as one of the important disease of equines in the country. The management practices of equines in general and the agro-ecology of an area are of paramount importance in determining the occurrence of GI strongyles infection in equine. The local management system, where equines are allowed to graze mixed with different species of animal on small communal pasture land, usually overstocked has facilitated GI strongyle infection transmission and prevalence. Hence, the prevention and control of equine strongyles infection should take the management practices of equines and agro-ecology of an area into consideration. Based on the aforementioned conclusion, the following recommendations are forwarded:

(1) Strategic strongyles infection prevention and control should be devised on the bases of the management and agro-ecology of the areas.
(2) Further researches on management practice predisposing equines to strongyles infection should be conducted.
(3) Appropriate management and sanitary standard through strategic deworming has to be followed in combating the impact of strongyles infection in equines.
(4) It is advised that there should be equine health promotion program supported by the government.

Conflict of interest

The authors declare no conflict of interest

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