Volume 4 • Issue 2 • 2022

Research Article

Archives of Veterinary and Animal Sciences

Study on Prevalence of Gastrointestinal Tract of Helminthiasis in Equine in and Around Chole District East Arsi Zone, Oromia Regional State, Central Ethiopia

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Received: November 26, 2022; **Published:** December 15, 2022

Abstract

A cross-sectional study of gastrointestinal helminth parasites of equine was conducted for 6 months in and around in and around Chole district in East Arsi zone of Oromia Regional State from November 2018 to April 2019. The prevalence of helminth parasites of equines. A total of 384 faecal samples (donkeys (n=238), horses and (n=146) were collected from randomly selected equine for qualitative faecal examination and examined with direct smear, flotation, sedimentation techniques. All species and age groups were infested with identical parasite species. Out of 384 faecal samples examined, five species of parasite helminthes ova/larvae were revealed during the study period. The overall prevalence of GIT parasites was 97.4% (374/384) with the occurrence rate of 97.9% and 96.6% in donkey, and horse, respectively. The more common parasites encountered in equines in order of predominance were, Strongyles spp. (68.71%), Parascaris equorum (29.2%), Oxyuris equi (10%), Anoplocephala spp (5.15%) and strongyloides wesiterii (0.76%). There was no significant difference (p>0.05) in the prevalence of helminthosis between sexes, ages and species of equine species. Generally poly parasitism was the common finding of this work. Equine diseases in general, parasitism in particular, should be given attention in the region where equines are practically participating in all agricultural activities, from tillage to harvest.

Keywords: *Equines; Egg count; Helminths; Gastrointestinal parasites; Prevalence*

Abbreviations: BCS: Body condition score; GIT: Gastrointestinal tract; CSA: Central Statistical Authority; GIP: Gastrointestinal parasites; EARO: Ethiopian Agricultural Research Organization; FAO: Food Agriculture Organization; ELISA: Enzyme linked immune sorbent assay

Introduction

There are an estimated 110 million equines (horses, donkey and mules) in developing worlds (FAOSTAT, 2010) where they provide an essential service. Since Ethiopia is believed to have the largest livestock population in Africa, there are about 1.91 million horses, 6.75 million donkeys, 0.35 million mules, and about 0.92 million camels in the sedentary areas of the country (CSA, 2013). Among the horses aged 3 years and older, about 1.11 million were used for transportation, 0.20 million were for draught and the remaining 0.21 million were used for other purposes. With regard to donkeys, about 4.11 million were used for transportation whereas about 0.88 million and 0.19 million were used for draught and other purposes, respectively. Considering the purpose of the mules, 77.63% was used for transportation and very few were intended for draught and other purposes (CSA, 2013).

The livestock sector has been contributing considerable portion to the economy of the country, and still promising to rally round the economic development of the country (CSA, 2013). The equines [horse, Equus ferus caballus Linnaeus 1758; donkey or ass, Equus asinus Linnaeus 1758; hinny (female)/ mule (male), Equus mulus (synonym) Linnaeus 1758] are mainly use for the heavy work in the most of the mountain area as well as in the cities. Further, their most readily recognizable function against traction and draught in industry and agriculture that they have made the greatest contribution to human welfare and advancement (Matthee et al., 2000; and Perveen et al., 2011).

In horses and donkeys, nematodes are seen to be most prevalent, while cestodes and trematodes are less occurring as reported by Bakırcı, et al., (2004). Horses, among most domestic animals are reported to be more susceptible to a large number of parasites and may harbor different species at any time (Wannas, et al., 2012). Equines are infected with gastrointestinal parasites which show a rough with dull coat, weight-loss, stunted-growth, colic, weakness, diarrhea, dysentery and tail-rubbing. They die from heavy infections and even healthy looking equines die from internal damages due to gastrointestinal helminthes parasites (Swinker, 998). The damage to organs is caused by migration of the parasite through the various tissues. Damage may only be temporary but sometimes permanent problems occur due to the economic significance of GIP, several millions of Dollars are spent annually on the control of these parasites worldwide. Despite this huge investment, GIP still remain a major problem affecting the health and well being of horses in different parts of the world (Mbafor et al., 2012).

Equines harbor a large quantity of parasite that prevail in the GIT including round worms (families: Stronglidae, Spiruridae, oxyuridae, Trichostronglidae and Ascaridae) and tapeworm (family: Anopiocephalidae) which act up and damage the intestine depend on the age and natural defense of the individual equine (Pereia, 2006).

Some of the previous works recoded the status of GIT parasites in different parts of the country with various level of occurrence rate. Thus, it was reported that the prevalence of endo-parasites of equine in Sululta andGefersa districts of Central Ethiopia with 99.5% Strongyles, 53% Parascaris equorum, 9.8% and 2.8% Anoplocephala species (Zerihun, 2011). Getachew et al. (2009) also reported that prevalence of GIT parasite in Ethiopia with the prevalence of 99% of Strongyles spp, 80% of Parascaris and 8% of Tapeworm. Although some of the above-mentioned findings are recorded in the country so far, scarce information is available especially in the current study area. Hence, the study has been done to solving parasitic problems on equines under the following objectives:

- To determine spectrum of species and prevalence of major GIT parasites involved in equines.
- To find associations between measurable parameters and GIT parasites burden.

Literature Review

Equine gastro intestine helminthiasis

Helminthiasis (alternatively spelled helminthosis; plural helminthiases) is any macroparasitic disease of humans and animals in which a part of the body is infected with parasitic worms (also called helminthes.) These parasites are broadly classified into tapeworms, flukes, and roundworms. They often live in the gastrointestinal tract of their hosts, but may also burrow into other organs, where they induce physiological damage (London, 2012). The most serious helminth infections are prevalent in poor tropical and subtropical areas, where helminthiases are classified as neglected tropical diseases (Lustigman, 2012). Internal parasites or worms are a constant concern for equine owners. Parasites can cause illness, digestive upset and damage, and colic episodes (Patricia and Jenifer, 2009).

General description of etiological agent

Nematodes

The nematodes or roundworms constitute the phylum Nematoda. They are a diverse animal phylum inhabiting a very broad range of environments. Nematode species can be difficult to distinguish; and although over 28,000 have been described (Hugot, et al., 2001) of which over 16,000 are parasitic, the total number of nematode species has been estimated to be about 1 million (Lambshead, 1993). Nematodes are slender worms, typically less than 2.5 mm (0.098 in) long. The smallest nematodes are microscopic, while free-living species can reach as much as 5 cm (2.0 in), and some parasitic species are larger still, reaching over a meter in length (Ruppert et al., 2004). The body is often ornamented with ridges, rings, bristles, or other distinctive structures (Weischer and Brown, 2000).

Cestodes

Anoplocephala perfoliata (Goerge, 1782), a cestode belonging to the family Anoplocephalidae in the order Cyclophyllidea, is the commonest intestinal tapeworm of horses worldwide. Clinically,

the parasite has been incriminated as a cause of caeco-caecal intussusceptions (Beroza et al. 1986; Owen et al. 1989), caecal perforation leading to peritonitis (Barclay et al. 1982), intestinal obstruction, caused either by masses of worms attached to the wall of the caecum or terminal ileum (Carmel, 1988) or by mechanical obstruction of the ileocaecal junction (Bello, 1979; Carmel, 1988) and/or ileocaecal colic (Proudman & Edwards, 1993).

Trematodes

Trematodes are characterized by a sucker around the mouth and an additional ventral sucker that is used for locomotion and attachment to the host. Their life-cycle occurs in at least two different hosts and involves several generations (Mehlhorn, 2001). Fasciola hepatica affects mainly cattle and sheep, but can infect all grazing animals. It is common in the wetter, western areas of UK and in Ireland, but infection is spreading geographically, probably associated with changes in climate and the difficulty of controlling this parasite due to increasing resistance to the commonly used anthelmintic, triclabendazole (Fairweather, 2011)

Morphology of common equine helminthes (Cestodes and nematodes)

Nematodes

Parasites – Roundworms (Parascaris equorum): Is a common intestinal parasite of horses worldwide. The adult worm is a rigid, heavy-bodied worm up to 50 cm. long and infects the small intestine of foals and young horses. Known also as ascarids, these worms are quite large (8 to 10 inches) and white to yellow color, with 3 prominent lips (Klei, 1997).

The small strongyles include 40 or so species that commonly infect the cecum and colon of horses and donkeys. Approximately 30 of these have been assigned to the subfamily cyathostomin/ae. They vary in size from 6 to 22mm in length with a reasonably well-developed buccal capsule that is also much smaller than those seen in the large strongyles. Species are differentiated on the basis of size, characteristics of the buccal capsule and, in particular, the arrangement of internal and external leaf crowns (Colin, 1998).

Large srongyles: The large strongyles of horses are also known as blood worms, palisade worms, sclerostomes, or red worms. It is members of the Family Strongylidae and the subfamily strongylinae which includes two genera in domestic horses and donkeys, the genus Strongylus and the genus Triodontophorus (http://www.bimedaequine.com/parasites/strongyles/).

Parasites – Pinworms (Oxyuris equi): Adult pinworms, Oxyuris equi, are more common in horses <18 months old and are found primarily in the terminal portion of the large intestine. (http://www.merckmanuals.com/vet/digestive_system/gastrointestinal_parasites_of_horses/oxyuris_sp_in_horses.html).

Threadworms (Strongyloides, Strongyloides westerii): Thread worms are long and hair like. Adults grow to be 8 to 9 mm in length (about 2/5 inch). (Reinemeyer, 2003)

Tapeworm

Three species of tapeworms are known to infect the horse. *Anoplocephala perfoliata, Anoplocephala magna* and *Paranoplocephala mamillana*. Studies have demonstrated A. perfoliata to be the most common tapeworm in the horse. A. magna is the next most common, and P. mamillana is quite rare (Mercier et al., 2007).

Anoplocephala perfoliata is a short, yellow/green tapeworm with a triangular body. The size of matureworms varies from three to eight centimeters - tapeworms smaller than this are either immature worms or P. mamillana. The head of A. perfoliata is equipped with four suckers with which the parasite can secure itself to the mucosa of its host. Nutrients are absorbed through the parasite's cuticle (Lyons et al., 1993).

Life cycle and epidemiology of common GIT helminthes

Nematodes

Parasites– Strongyles: While pinworms and roundworms have fairly efficient life cycles, strongyles have a very unusual method of reproduction, especially considering that they developed in a desert environment. Large and small strongyles share identical life cycles outside of the horse but behave very differently once they're ingested. (Proudman et al., 1998)

Strongyles are prolific egg layers. A single horse can pass 75-100 million eggs daily. The eggs can crawl up and down a blade of grass many times or bury themselves in the soil to protect against adverse weather (http://www.bimedaequine.com/parasites/roundworms/).

Tapeworm Life Cycle

The tapeworm is different from many other parasites because it has an indirect life cycle. This means it requires an intermediate host in order to develop. The intermediate host of A. perfoliata is the

free-living oribatid mite. This mite is found in very large numbers on pastures and often even in hay and straw (Mercier et al., 2007)

Inside the mite, the tapeworm egg undergoes cellular division and development to become a larva. This process takes 12-15 weeks. Inadvertent ingestion of mites containing infective larvae occurs as horses graze, and it can result in tapeworm infection. Larvae then develop within the primary host - the horse - to mature tapeworms. They can begin shedding segments full of eggs in 6-10 weeks. There appears to be little seasonal variation in the number of horses infected with tapeworms or in the magnitude of infection (Lyons et al., 1993).

Pathogenesis and clinical finding of equine GIT helminthiasis

Nematodes

Parasites – Large Strongyles: No matter where a strongyle larva penetrates, leaves the gut and begins its migration, it will always end up at the same spot - the beginning of the cranial mesenteric artery, which is the primary blood source for the intestinal tract. All these larvae in one spot cause tremendous damage and reaction. In fact, in rare cases, the artery can rupture, causing rapid death. The more common problem is a weakening of the arterial wall, which can lead to a malformed artery - an aneurysm. This malformation causes abnormal blood flow, which can lead to formation of blood clots in the artery. These clots cling to the artery walls like clusters of grapes. Should one of these clots break free, it will be forced downstream in the blood supply of the intestines, where it may block blood flow. This situation, called thromboembolic colic, can result in serious illness and death (Reinemeyer et al., 2003). Other signs include weight loss, anemia, or colic (Foster & Smit, 2004).

Diagnosis and identification of GIT helminthiasis of equine

Nematodes

Parasites -Strongyles: Diagnosis of mixed strongyle infection is based on demonstration of eggs in the feces. Specific diagnosis can be made by identifying the infective larvae after fecal culture. Serologic diagnosis based on a rise in β-globulins has been recommended but is not specific for S vulgaris (Urquhart, 1996).

Parasites – Roundworms (Parascaris equorum): The round worms cause poor growth, rough hair coat, pot belly, chronic respiratory problems and sometimes death. Most of their damage is caused by their migration to the liver and lungs. In the gut, the round worms compete for nutrients and suck blood, growing 12 to 15 inches in length (Evans, and Nadeau, 2009).

Parasites – Pinworms (Oxyuris equi): Fecal examination may or may not reveal a pinworm infection. Samples collected around the perineal region may contain dried female worms or eggs. Application of cellophane tape to the skin of the perineum or scraping the area with a tongue depressor may recover ova for microscopic examination but false-negative tests are common (Lyons et al., 1993).

Threadworms: Diagnosis can be made based on observation of eggs somewhat more oval (http://www.merckmanuals.com/vet/digestive_system/gastrointestinal_parasites_of_horses/strongyloides_sp_in_horses.html).

Stomach Worms (Habronema species): Ante mortem diagnosis is difficult because the thin-shelled eggs or larvae are easily missed in fecal examinations. Molecular methods have recently been developed for this purpose but would not be useful for routine use (http://www.merckmanuals.com/vet/digestive_system/gastrointestinal_parasites_of_horses/habronema_spp_in_horses.html).

Cestodes

Diagnosing tapeworm infection is difficult. Most infections have no symptoms, but cause subclinical damage that may be present for some time before causing visible disease. One textbook describes unthriftiness and anemia as consequences of heavy infestation, but moderate infections may go unnoticed (http://www.bimedaequine.com/parasites/tapeworms).

Another factor making diagnosis difficult is the nature of tapeworm eggs. They occur in very small numbers and often in packets rather than individual eggs. They don't float well in the testing medium, so they are often missed in routine fecal egg-count analysis. More sophisticated tests are needed to visualize tapeworm eggs. Most veterinary practices and labs aren't equipped to do these tests, so, in many cases, the diagnosis is missed. Sometimes, however, tapeworm specimens can be found in the feces of infected horses after they have been treated with drugs active against these parasites (Mercier et al., 2007).

Preventions, treatment and control of GIT helminthiasis

Nematodes

Parasites – Strongyles: Frequent deworming is important. Use an Ivermectin-based wormer for broad-spectrum control. Wormers containing fenbendazole also offer additional control of certain mature stages of strongyles (Foster & Smith, 2004).

The small strongyles are showing resistance to Benzimidazole (Panacur) and Pyrimidine (Pyrantel Pamoate) dewormers and have developed the ability to become encysted or encased, which protects them from most dewormers. Quest is effective against the encysted larvae as well as using a double dose of Panacur for 5 days (Evans, and Nadeau, 2009).

Parasites – Roundworms (Parascaris equorum): Treatment should be started when foals are ~8 wk old and repeated at 6- to 8-wk intervals until they are yearlings. All broad-spectrum equine anthelmintics are effective against the adult and immature worms in the small intestine. Foals and horses younger than two years of age are much more susceptible to roundworm infection than older horses. When first dewormed, foals older than three months are more prone to colic. Consult your veterinarian regarding this condition (Foster & Smith, 2004).

Parasites – Pinworms (Oxyuris equi): It is important to use disposable wipes or paper towels for cleansing the area under the tail, rather than reusable sponges or rags, to avoid spreading the eggs and infection. Wormers containing Ivermectin, fenbendazole, pyrantel pamoate, piperazine, moxidectin, and praziquantel can help control pinworms (Foster & Smith, 2013).

Threadworms (Strongyloides, Strongyloides westerii): An Ivermectin-based wormer suitable for foals helps control threadworms. Generally, foals become immune to threadworms by the time they are about 3 months old (Foster & Smith, 2013).

Stomach Worms (Habronema species): Frequent deworming is important. Use an Ivermectin-based wormer for broad-spectrum control (Foster & Smith, 2013).

Cestode

Until the life cycle of *A. perfoliata* - the common tapeworm - is better understood, it is difficult to decide when to provide horses with appropriate anti-tapeworm drugs. Generally, treatments directed against tapeworms should be given every six months, with treatment in the fall and again in late spring. The role of tapeworms in equine colic should be kept in perspective. They represent a small, but avoidable, risk in certain types of colic (Lyons et al., 1993 and Mercier et al., 2007).

Economic importance of GIT helminthiasis in equine

Parasitic helminthes are one of the most common factors that constrain the health and working performance of donkeys and horses worldwide. They cause various degrees of damage depending on the species and number at present, nutritional and the immune status of eqiuds (Asefa, 2011). They decrease the performance, production and productivity in the animals mainly in the reduction of body weight or failure to gain weight or even increase the mortality in acute case (Ramaswamy, 1994). Internal parasites share with the equines digestible nutrients and causes inflammation and petechial hemorrhages' as a result of the adherence to and penetration of mucous membranes of the gastrointestinal tract (Abuladze, 1982). These factors lead to retard growth or reduce work out put, discomfort and pains of various degrees, and even mortality of the animals. In highland areas where equines population are high the one common factor leading to ill health, suffering and early demise of equines is parasitism (Sevendsen, 1994).

Status of equine GIT helminthiasis in Ethiopia

Some of the previous works recoded the status of GIT parasites in different parts of the country with various level of occurrence rate. Thus, it was reported that the prevalence of endo-parasites of equine in Sululta and Gefersa districts of Central Ethiopia with 99.5% Strongyles, 53% Parascaris equorum, 9,8% fasciola species, 5.7% Gastrodiscus aegypticus and 2.8% Anoplocephala species [Zerihun, et al., 2011). Getachew et al. (2009) also reported that prevalence of GIT parasite in Ethiopia with the prevalence of 99% of Strongyles spp, 80% of Fasciola, 51% of Parascaris and 8% of Tapeworm. Although some of the above-mentioned findings are recorded in the country so far, scarce information is available.

Materials and Methods

Description of the study area

The study will be conducted from November 2017 to April 2018. in Chole district in East Arsi zone of Oromia Regional State, southern east Ethiopia. Chole is one of the East Arsi zone wareda which located 242km from Finfinne (Addis Ababa) east to Asella town. Geographically, the district lies between 8.1385° north, 39.9009° East. The total area of the district is estimated at 68200 hectares. The altitude of the district ranges rarely exceeds 1500 meters above sea level with the annual rainfall of 650 to 750 mm and the mean annual maximum and minimum temperature of 25°C 18 respectively. Chole is bordered on the south by Amigna, on the southwest by Sude, on the northwest by Merti, on the north by Aseko, and on the east by Gololcha. It is inhabited by a human population of about

124,789 population.116,441 (93.31%) rural population and 8348 (6.69%) urban population (CSA, 2014) respectively. The climatic condition of the woreda is divided into high land 48%, wayena dega -18%, lowland -22% and werch- 12% respectively. The topography of this areas includes plates, mountains and hills.

The agricultural system and husbandry practice of the communities specially the farmers is mainly mixed farming system and extensive management system respectively. Even though, chole woreda contains a huge livestock population there are different types of livestock disease which includes the production and productivity rates of animals. The main crops grown in chole wareda are mainly wheat, maize, barley, sorghum, teff, chickpea, sesame and the main animal feeds include crop residues, grass, and some improved forages. According to the total livestock population in data the woreda have a huge livestock population such as cattle 102,506, sheep 42,603, Goat 40,961, Horse 12,443, Donkey 10,387, Mule 4,526, poultry 70,149.

The study Population

A total of 384 equines were subjected to qualitative carpological examination to determine the parasite species prevalence of GIT parasites of equines. Out of which, horses and donkeys comprised 146 and 238 respectively. Mules were not included in the study. All age and sex groups of local origin were included in this study (Table 1).

Animal		Age			Sex		Body condition		
	Number	Young	Adult	Old	Female	Male	Good	Medium	Poor
Horse	244	54	110	41	140	200	81	101	115
Donkey	140	31	86	70	14	10	40	28	19
Total	384	76	196	112	154	230	121	129	134

Table 1: *Number of Equines sampled based on age, body condition and sex.*

As the studied table (1) shows the most horses were males because in and around chole female horses were less in number relating this reason the most sampled horses were cart horses.

Study design

A total of 384 equines were randomly selected from in and around chole town subjected to qualitative carpological examinations to identify the major GIT helminthes parasites involved, to determine their prevalence rates by using cross sectional study. The owner was informed on the importance of the study and to present their equines on specific visit name, dates, age and places. The age of the selected donkeys was determined by dentition (Crane 1997) and it is grouped under three years of age were classed as young, those in range of three to ten years were classed as adult and those beyond ten years were classed as old. These age classes were based on age of first work, productive age and the life span of Ethiopian donkeys (Yoseph et al 2001; Svendsen 1997) and body condition scores were subjectively estimated based on the guides published by Svendsen (1997) as 1 (emaciated), 2 (thin), 3 (good), 4 (fat) and 5 (obese). These were categorized into three groups as ≤2, 3 and ≥4 to represent BCS 1 and 2, 3, 4 and 5, respectively.

Sampling and Sample size determination

The sampling method of this study was based on random sampling method and the sample size was determined according to Thrusfield (2005) with 95% confidence interval and 5% absolute precision. The expected prevalence rate was taken as 50%. Therefore, 384 equines were obtained for the study using formula

$$n = \frac{1.96Pexp\ (1\text{-}Pexp)}{d^2}$$

Where n = sample size, Pexp = expected prevalence, and D = desired absolute precision. Information on different potential risk factors was collected by personal observation during the visiting, records and taking coprological examination was conducted during the study.

Samples collection and examination

Fecal samples were taken directly from the rectum and the ground when the animals were seen defecating with strict sanitation and place in air and water tight sample standard vials, and then brought to the Asella Regional veterinary parasitology laboratory. Gross fecal examinations will be done before the samples subjected to microscopic examinations. Sedimentation and floatation methods were

used to identify and/or larvae of parasitic helminthes (Urquhart et al 1996; and Soulsby 1982) by using compound microscope with 10x and 40x objective.

Data analysis

Data on individual animals and parasitological examination was entered in to MS-excels spreadsheet program to create data base. Descriptive statically tools such as frequency percentage will be used to describe the data. The data will be analyzed using the chi-square testes (SPSS statics, 16). Difference between parameter will be tasted for significant probability.

Results

Overall prevalence

Eggs/larvae of different parasites were observed in both equine species under the study. Five different types of eggs/larvae were observed during carpological examination in horses and donkeys, respectively based on their morphology described by Soulsby (1986). From a total of 384 fecal samples examined, only ten of the samples were free of parasitic helminthes' eggs. On the other hand the overall prevalence of gastrointestinal (GIT) parasitic helminthes of equine in the study area was 97.4 (374/384) with the prevalence of 97.9%, and 96.6% in donkey and horse, respectively. The chi-square analysis revealed the existence of significant difference in the occurrence of parasitic infection and among in body condition (x2 = 11. 809a, P=0.003), where as there were no significant difference between the occurrence of helminthiasis and equine species, sex and age. Summary of the overall prevalence and the potential risk factors percentages were depicted under table

Variables	No. of examined equine	No. of positive (%)	χ^2	p-value
Species	384	374(97.4%)		
Donkey	238	233(97.9%)	0.625	0.429
Horse	146	141(96.6%)		
Sex	384	374(97.4%)		
Male	230	223(97%)	0.436	0.509
Female	154	151(98%)		
Age	384	374(97.4%)		
Young	76	73(96%)	0.839	0.658
Adult	196	191(97.4%)		
Old	112	110(98.2%)		
BCS	384	374(97.4%)		
Poor	134	134(100%)	11.809	0.003
Medium	129	127(98.4%)		
Good	121	113(93.3%)		

Table 2: *Summary of the percentages of potential risk factors for the occurrence of GIT helminthiosis in Equine.*

Accordingly, statistical analysis with SPSS 20 revealed that there was no significant difference (P > 0.05) in the prevalence of helminthiosis between species sex and age, however, there was a statistical significant variation (P< 0.05) in the prevalence of equine helminthiosis and body condition of equine.

Relative Proportion of Each Parasite

Species of Parasites	Number of exmined	Number of Positive	Relative Percentage (%)
Strongyles	384	216	57.75
Ascaris	384	92	24.6
Oxyrus	384	12	3.2
Strongyloides	384	2	0.53
Cestodes	384	4	1.06
Ascaris and Strongyles	384	20	5.3
Strongyles and Oxyrus	384	27	7.22
Strongyloides and Strongyles	384	1	0.26
Total	384	374	100

Table 3: *The relative importance of gastro intestinal helminthes in equine.*

Among the identified gastrointestinal parastic helminthes', the highest relative percentage was recorded for Strongyles (57.75%, 216/374) followed by Parascaris (24.6%, 92/374), Oxyuris equi (3.2%, 12/374), Anapelocephala species (1.6%, 4/374) and strongyloide s (0.53%, 3/374). Similarly, the highest rate of double infection was observed in case of Strongyles and oxyrus (7.22%, 27/374) followed by Strongyles and Parascaris (5.3%, 20/374), and Strongyles and stongloides (%0.26, 1/374) as it was shown in above table (3).

Variable		Number of positive (%) for each Parasites											
	Negative	Strongyles	Paraascaris	Oxyrus	Strongyloides	Anapelocephala	Strongyles and parascaris	Strongyles and oxyrus	Strongyles and sronylodies	Total No of examined	X^2	p-value	
Species	Donkey	5 (2.1%)	136 (57.1%)	51 (21.4%)	10 (4.2%)	1 (0.4%)	1 (0.4%)	10 (4.2%)	23 (9.7%)	1 (0.4%)	238	15.136	.057
	Horse	5 3.4%	80 (54.8%)	41 (28.1%)	2 (1.4%)	1 (0.7%)	3 (2.1%)	10 (6.8%)	4 (2.7%)	0 (0.0%)	146		
	Total	10 2.6%	216 56.2%	92 24.0%	12 3.1%	2 0.5%	4 1.0%	20 5.2%	27 7.0%	1 0.3%	384 100.0%		
Age	Young	3 3.9%	42 55.3%	20 26.3%	3 3.9%	0 0.0%	1 1.3%	2 2.6%	4 5.3%	1 1.3%	76 100.0%	11.17	0.799
	Adult	5 2.6%	110 56.1%	46 23.5%	6 3.1%	2 1.0%	3 1.5%	11 5.6%	13 6.6%	0 0.0%	196 100.0%		
	Old	2 1.8%	64 57.1%	26 23.2%	3 2.7%	0 0.0%	0 0.0%	7 6.2%	10 8.9%	0 0.0%	112 100.0%		
		10	216	92	12	2	4	20	27	1	384		
	Total	2.6%	56.2%	24.0%	3.1%	0.5%	1.0%	5.2%	7.0%	0.3%	100.0%		
Sex	Male	7 3.0%	123 53.5%	54 23.5%	7 3.0%	2 0.9%	4 1.7%	14 6.1%	19 8.3%	0 0.0%	230 100.0%	8.870[a]	0.353
	Female	3 1.9%	93 60.4%	38 24.7%	5 3.2%	0 0.0%	0 0.0%	6 3.9%	8 5.2%	1 0.6%	154 100.0%		
	Total	10 2.6%	216 56.2%	92 24.0%	12 3.1%	2 0.5%	4 1.0%	20 5.2%	27 7.0%	1 0.3%	384 100.0%		
BCS	Poor	0 0.0%	60 44.8%	28 20.9%	3 2.2%	0 0.0%	1 0.7%	17 12.7%	24 17.9%	1 0.7%	134 100.0%	81.142[a]	0.000
	Medium	2 1.6%	81 62.8%	38 29.5%	3 2.3%	1 0.8%	1 0.8%	2 1.6%	1 0.8%	0 0.0%	129 100.0%		
	Good	8 6.6%	75 62.0%	26 21.5%	6 5.0%	1 0.8%	2 1.7%	1 0.8%	2 1.7%	0 0.0%	121 100.0%		
	Total	10 2.6%	216 56.2%	92 24.0%	12 3.1%	2 0.5%	4 1.0%	20 5.2%	27 7.0%	1 0.3%	384 100.0%		

Table 4: *The prevalence of each gastrointestinal parasite with respective categories of the risk factors in the study area was shown on the following tables.*

Proportion of Each Parasite with Risk Factors

The highest prevalence of all the isolated parasites was observed in donkey except anapelocephala species in which case a relatively higher percentage of infestation was observed in horse. The prevalence in donkeys and horses were 57.1% and 54.8% for strongyles, 21.4% and 28.0% for Parascaris quorum, 4.2% and 1.4% for Oxyuris equi and 0.4% and 0.7% for strongyloides westeri, 0.4% and2.0% for anapelocephala species, 4.2% and 6.8% for strongyles and Parascaris quorum, 9.7% and 2.7% strongyles and Oxyurisequi, and 0.4%and 0% strongyles and strongyloides westeri, respectively.

Accordingly, statistical analysis with SPSS 20 revealed that, the prevalence of each gastrointestinal parasite with respective categories of the risk factors in the study area had not significant difference except body conditions ($P<0.05$) as it was seen in the above tables (3).

Discussion

The microscopic fecal examination showed that helminthosis was an important health disease in the study area. The overall over prevalence of helminthiosis in equine was 97.4% currently in and

around chole district. This was more or less in harmony with the work of the earlier reported by Yoseph, et al., (2001) Ibrahim et al., (2011), Ayele, (2006) with 100%, ,96.9% and 98.2% in Wonchi Awraja, around Hawassa Town, Dugda Bora District and Awi Zone respectively. The difference among these findings from different areas might be due to variation in management system, sample size and sampling method differences (Ibrahim, et al, 2011). Mixed infections were detected in 12.5% of the equine which were more important in loss of body condition than the single infection. When prevalence between the species was compared, the lower prevalence was in horses (96.6%) might be due feeding and deworming practices in the study area and relating with the most number of horses examined were cart horses. In this study, however, relatively higher overall prevalence of GIT parasites was recorded in donkey (97.9%) than in horse (96.6%) occurrence of the most identified parasites except anapelocephala species, there was no significant difference($p>0.05$). This also was reported similar finding that there was higher occurrence of GIT parasitism in donkeys could be attributed to the fact that less attention is given to these animals that is by far lower than their workload (Mezgebu et al., 2013).

The relative percentage of equine GIT parasitism reported in this study indicated that strongyles was observed to have higher occurrence rate Strongyles (57.75%, 216/374) than other GIT parasites, even though; no significant difference($p>0.05$) among parasites and helminthiasis which is in line with the previous works (Mezgebu. et al., 2013 and Ayele, et al., 2006).

The prevalence of Strongyles type eggs in horses was 64.3% in the current study which is in close agreement with 58.50% (Saeed.et al., 2010). The current result was lower than work reported by Fikru et al., (2005) that was 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 Strongyles infestation was 44.2% in donkeys. Similar studies conducted in different parts Ethiopia indicated higher prevalence than the current study with an overall prevalence of 99%, 100%, 100%, 98.2% and 100% in Ada, Akaki Boset Getachew et al., (2010). The lower prevalence in the present study could be due to season causes egg desiccation, management or/and sample size (Soulsby, 1982).

The prevalence of *Parascaris equorum* was 29.2%. This was in agreement with reported 33.8% in south and north Wollo provinces (Mulate.et al., 2005) whereas 15.7% and 17.3% had been reported respectively (Yoseph et al., 2001 and Fikru et al., 2005). These finding are relatively lower than the present finding. This could be because of the smaller sample size used in their study. Level of Parascaris equorum infestation had no significant difference for the different seasons of the year. This might be due to the high resistance of the eggs of Parascaris equorum to desiccation. Parascaris equorum eggs are very resistant to adverse conditions, like drying or freezing and the larvae rarely hatch and infection usually takes place through ingestion of the eggs (Soulsby, 1982).

Oxyurisequi was detected on 13.9%, and 4.1% of the donkeys and horses in the study areas, respectively and this prevalence were less than from previous reported with detected on 25.4% and 22.05% of the donkeys and horses respectively (mulatie, 2005). The low prevalence in this study might be the effect of relative higher temperature in the present study area which desiccates the highly susceptible O. equi eggs. Oxyuriasis is not a serious disease, but intense irritation of the perianal region is annoying and may cause disfigurement of valuable animals (Radostits, et al., 1994).

The prevalence of Anaplocephala species was 0.4% and 2% in donkey and horse respectively. This low prevalence could be due to the seasonality of Orbited mites vectors (Soulsby 1982). The prevalence of anoplocephala species was low and that might be related to the fact that anoplocephalid eggs occur as a result of the disintegration of segments outside the host and very rarely inside (Gebreab, et al., 1990). Similar results have been reported in the survey of helminthosis conducted in the central high lands of Ethiopia (Yoseph et al., 2001 and mulatie, 2005).

The prevalence of srongyloideswesteri was 0.8% and 0.7% in donkey and horse respectively. In some cases, lowest prevalence of the GIT parasites may be recorded when there is relatively higher temperature in the area, which can result in the desiccation of their eggs. Furthermore, the effect of treatment can result in the lower occurrence of these parasites when there is deworming activities.

Regarding the risk factor analysis, higher prevalence the observed higher parasitism in donkeys could be was observed in male equines than in females. This could regarding the risk factor analysis, higher prevalence was observed in male equines than in females. This could be associated with the more workload in males than females, which could create stress and consequent immuno-suppration in male and this may facilitate the parasitism. In this study area, females usually have more cares as they use for breeding purpose

due to management activities and deworming of cart horses. Our study also showed the occurrence of parasitism in all age equines all most had similar prevalence, however; this could be attributed to the earlier explanation by Radostits et al., (2011) that were reported that young ones do not have well organized immune system which can result in the higher chance parasitism than in older equine. Likewise, equine with poor body condition had higher chance of harboring the parasites. This could be due to the fact that animals with poor body condition might be immuno-compromised probably due to malnourishment and higher workload and as a result be exposed to parasitism. On the other hand, poor body condition score could also be due to the parasitism and in such case, body condition score is considered as a dependent factor not as a risk factor. However, in the current study we consider it as a risk factor for the parasitism under consideration. More prevalent helminthes parasites were in animals with poor body condition than well condition ones and similar work was reported by Ayele et al. (2006)

Concerning the purposes for which the animals were kept, equine that was used for packing and transport was found to be with higher prevalence of parasitism than animals used for cart pulling and this might be confounded by the difference in the management (care) given to these groups of animals. There is a habit of giving especial care (for the equines used for cart pulling) such as deworming and supplementary feed. Moreover, the chance of grazing for these animals was less as they are on work, which actually reduce the chance of getting infection and cart-pulling equines feeding system was cut and carry while grazing was the less practice in the current study areas. Gebreab (1998) and Regassa et al. [9] also reported similarly higher occurrence of parasitism in 'younger animals', where as Getachew et al. (2010) and Melissa et al. (2010) reported the absence of associations between P. equorum infection and age in both horses and donkeys.

Conclusion and Recommendation

In conclusion, the study was conducted on equines helminthosis for six months in and around Chole district in East Arsi zone of Oromia Regional State, southern east Ethiopia showed that helminthosis of equines was the most prevalent disease in the area affecting the well-being of the animals. The study revealed the importance of equine GIT parasites in and around in and around Chole district in donkeys and horses with the overall prevalence of 97.4%. The prevalence was found to be 97.9% and 96.6% in donkeys and horses respectively. The common equine GIT parasites recorded in the current study area were Strongyles, Parascaris equorum, Oxyuris equi, srongyloides westeri and anapelocephala species. Among the identified GIT parasites, the highest relative percentage was recorded for Strongyles while less occurrence rate was observed for Parascaris equorum followed by Oxyuris equi, anapelocephala species and srongyloides westerii. It was also observed that species, age, and body condition scores were found to be the important risk factors for the occurrence of GIT parasite in equine, which was assessed by their prevalence. However, the attention given to the disease so far has not been sufficient in that there were little attempts made to study the epidemiology of the parasitic helminthes and Even though, equines are paramount important animals in farming system of the country, the existing livestock extension package programme of the region and the country is saying nothing about the management and health aspect of equines. Based on the above conclusion, the following recommendations were forwarded.

- Strategic treatment with appropriate, effective and broad spectrum anthelminthic should be practice at the beginning and after the end of rainy seasons. Such treatment regime is targeted to get rid of the parasites burden of the host animals and minimize pasture contamination by dropping feacal egg output.
- The government should formulate an appropriate policy regarding equines' management and health aspects without delay, and this should be hold in the livestock extension package programme.
- Additionally, the field veterinarians and stockowners should be aware of the importance and burden of helminthosis in equines.

Acknowledgments

Next to the Almighty God and my parents, my deepest acknowledgment with regard to the success of this paper goes to my advisor, Prof Adem Hiko for sharing his time and knowledge to guide, correct and harmonious this manuscript paper and his fatherly approach and who set up the program and the success of the paper.

As research advisor, I hereby certify that I have read and evaluated this research prepared under my guidance by Hussein Mohammed Roba entitled, Study on Prevalence of Gastrointestinal Tract of Helminthiasis in Equine in and Around Chole District East Arsi Zone, Oromia Regional State, I recommend that it can be submitted as fulfilling the requirement for the Degree of Doctor of Veterinary Medicine.

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