

Prevalence and Epidemiology of Gastrointestinal Parasites in Cattle in Different Zones of Tehsil Chakwal, Punjab, Pakistan

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ABSTRACT

The study was conducted from March 2015 to February 2016 in different zones of Tehsil Chakwal in different breeds of cattle to detect the prevalence of gastrointestinal parasites. A total of the 1039 faecal samples were randomly collected from cattle in the study area and standard laboratory procedures were followed to determine the prevalence of gastrointestinal parasites. The study revealed that the overall prevalence of gastrointestinal parasites of cattle was 58.13% with maximum prevalence for trematodes (21.56%) following 18.48% for nematodes and 18.09% for cestodes. Highest prevalence was observed during the months of July and August. Exotic breeds were affected more than local breeds by the helminthes. Prevalence was higher in case of young and male animals as compared to adult and female animals respectively. Higher prevalence rates in the study showed the neglect of better management practices targeted at control of gastrointestinal parasites. It was concluded that age, gender, breed and season are the important factors which influence the epidemiology of gastrointestinal parasites.

Keywords: Gastrointestinal parasites; Cattle; Chakwal; Trematodes

INTRODUCTION

Gastrointestinal tract of cattle harbours wide range of parasites which are responsible for huge economic and production losses because of clinical and sub clinical parasitism. Globally, considerable economic losses are caused by gastrointestinal parasites in terms of digestive problems, reduced milk and meat production, impaired reproductive performance, anemia and high mortality rate in infected animals. Important pre-disposing factors for gastrointestinal parasites include grazing habits, immune status, climate, and nutritional status, availability of vector and intermediate host and suitable environmental conditions [1]. Gastrointestinal parasitism is responsible for increased metabolic rate of gastrointestinal tissue protein and net movement of amino acid nitrogen from muscles to gut. As a result it decreases availability of nitrogen for milk and meat production. Gastrointestinal parasites release toxins in the blood and cause anemia in animals. Under lying tissues are damaged by the migration of these parasites, as a result it opens the gate way for secondary infections caused by bacteria.

Prevalence of gastrointestinal parasites is associated with multiple pre disposing factors. There are numerous reports on prevalence of gastrointestinal parasites around the globe as well as in Pakistan. However, on the prevalence of gastrointestinal parasites limited or outdated data is available in study area. So for designing future control strategies, it is necessary to obtain information regarding type, species and burden of gastrointestinal parasites in the study area and to suggest proper management practices, control strategies and prophylactic measures for gastrointestinal parasites [2].

MATERIALS AND METHODS

Study area

The study was designed in three zones including zone I (villages located on Jhelum road), zone II (villages located on Rawalpindi road) and zone III (villages located on Talang road) of Tehsil Chakwal located in Pothohar region of Punjab province, Pakistan. Chakwal is situated in north of Punjab, Pakistan, (32°54/N, 72°55/E) about 120 km in south of Islamabad. There

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is average annual rain fall of 1000 millimeters in Chakwal as its climate is humid to sub humid. The present study was undertaken during March, 2015 to February, 2016 [3].

Collection and preservation of faecal samples

A total of the 1039 faecal samples were collected at random from both sexes of cattle of different age groups and breeds. The fecal samples were collected from house-hold animals as well as commercial and non-commercial cattle farms. Faecal sample (10 grams) was directly collected from the rectum of animals and preserved in polyethylene bags containing 10% formalin as preservative.

Parasitological techniques

Standard faecal examination techniques i.e. direct smear method, floatation method and sedimentation method were used to examine the faecal samples. In direct smear method small amount of faeces were mixed with equal amount of water on slide and examined under microscope. In floatation technique, 2 g of faecal sample was added in 10 ml of floatation solution (NaCl) and centrifuged at 3000 rpm for 5 minutes. Due to difference in specific gravity eggs floated on surface and were examined under microscope. In sedimentation technique, 3 g of faeces were mixed in sedimentation solution (water), filtered and centrifuged at 3000 rpm for 5 minutes. Eggs of helminthes settled at the bottom due to higher specific gravity. Eggs of gastrointestinal parasites were identified using identification keys [4].

RESULTS

Over all prevalence of gastrointestinal parasites in cattle of Tehsil Chakwal

The findings of this study showed that 58.13% of the cattle screened were positive for the eggs of gastrointestinal parasites, thus providing valuable information regarding burden of gastrointestinal parasites in the area. In cattle of study area, the prevalence of trematodes was highest as compared to nematodes and cestodes. The overall prevalence of trematodes, cestodes and nematodes is shown (Table 1).

Type parasite	of Samples examined	Positive samples	Prevalence (%)
Trematodes	1039	224	21.56
Cestodes	1039	188	18.09
Nematodes	1039	192	18.48
Total	1039	604	58.13

Table 1: Overall Prevalence of gastrointestinal parasites in cattle of tehsil Chakwal.

The detail about the prevalence of different nematodes, trematodes and cestodes is shown in Tables 2 and 3.

Parasite	Samples examined	Positive samples	Prevalence (%)
<i>Haemonchus controtus</i>	1039	31	2.98
<i>Toxocara vitulorum</i>	1039	28	2.69
<i>Ostertagia</i> Spp.	1039	25	2.4
<i>Trichurus</i> Spp.	1039	38	3.66
<i>Trichostrongylus</i> Spp	1039	33	3.18
<i>Cooperia</i> spp.	1039	14	1.35
<i>Oesophagostomum</i> Spp.	1039	23	2.21

Table 2: Prevalence of nematodes in Tehsil Chakwal.

Parasite	Samples examined	Positive samples	Prevalence (%)
<i>Fasciola hepatica</i>	1039	86	8.28
<i>Fasciolagigantica</i>	1039	54	5.2
<i>Paramphistomum</i>	1039	37	3.56
<i>Schistosomamansoni</i>	1039	19	1.83
<i>Dicrocoelium dendriticum</i>	1039	28	2.69

Table 3: Prevalence of trematodes in cattle of tehsil Chakwal.

Breed, age and sex wise prevalence of GI parasites in cattle of Tehsil Chakwal

Prevalence of gastrointestinal parasites in different breeds of cattle was determined in study area. Exotic breeds were affected more than local breeds by the helminthes. Prevalence was higher in case of young animals as compared to adult animals respectively [5]. Higher parasitic infestation was found in male animals as compared to female animals. The prevalence in male host was 60% while in case of female animals the prevalence was 58.05%. The results are shown (Figures 1-3).

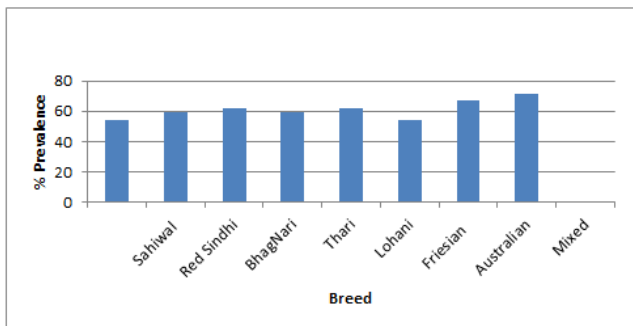


Figure 1: Breed-wise prevalence GI parasites in cattle of Tehsil Chakwal.

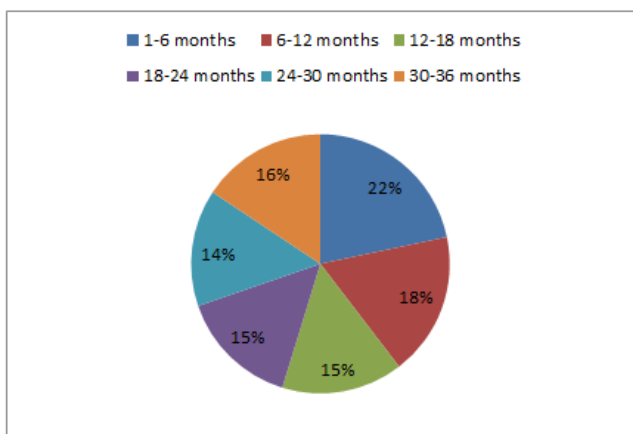


Figure 2: Age-wise prevalence of GI parasites in cattle of Tehsil Chakwal.

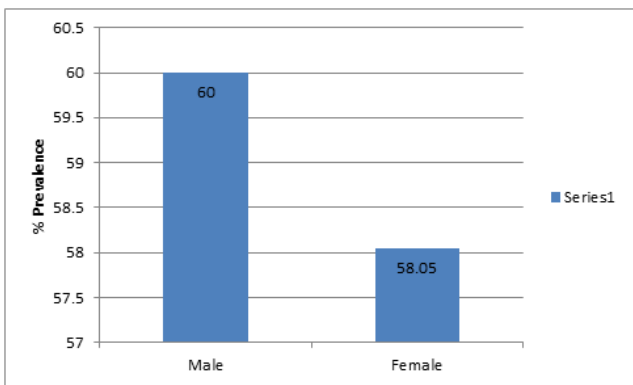


Figure 3: Sex-wise prevalence of GI parasites in cattle of Tehsil Chakwal.

Season and area-wise prevalence of GI parasites in cattle of Tehsil Chakwal

Prevalence of gastrointestinal parasites in different months of year was checked. Highest prevalence was observed during the months of July and August (Figure 4). In the three different zones of Tehsil Chakwal, prevalence of gastrointestinal parasite was almost similar which is shown in (Figure 5).

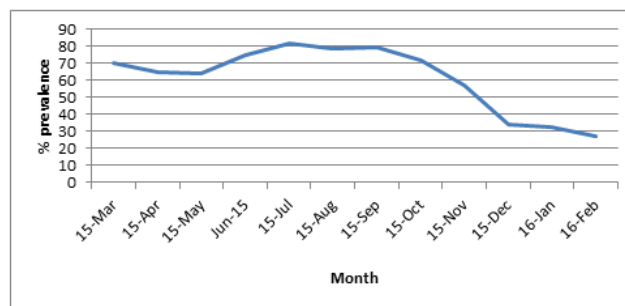


Figure 4: Month-wise prevalence of gastrointestinal parasites in cattle of Tehsil Chakwal.

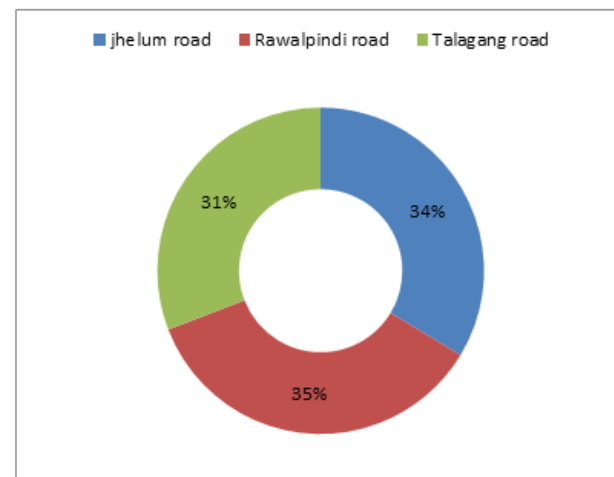


Figure 5: Area-wise prevalence of GI parasites in cattle of Tehsil Chakwal.

DISCUSSION

For the control of gastrointestinal parasites, use of wide range of anti helmenthic drugs has become dominant strategy. Still there are zones where burden of gastrointestinal parasites is very high. This may be due to unwise use of anti parasitic drugs, poor pasture management, suitable climatic conditions and poor farming practices. Over all prevalence of gastrointestinal parasites reported in this study (58.13%) is similar to results reported. Prevalence was not in line with the results of many researchers i.e. 41.6%, 15.41%, 41.6% [6]. This difference in the prevalence of gastrointestinal parasites might be due to different environmental conditions, different farming systems, dewormers used and different farming practices. Maximum prevalence was found in case of trematodes as compared to nematodes and cestodes in this study which is different from the findings. This might be due to different environmental conditions, difference in anthelmintic drugs used and variable management practices [7].

The prevalence of nematode reported in this study is different from the findings. Variations in nematodes infestation might be due to difference in physiological status, age, animal spp, climatic conditions, grazing pattern and the existing managerial practices. In case of nematodes maximum prevalence was found for Trichuris spp. in this study. Similar results are also reported. It may be due to the fact that climatic

conditions suited *Trichuris* more as compared to the other nematodes.

Trematode parasites are the major helminthes which are distributed throughout the world and even have zoonotic importance. According to findings of this study maximum prevalence was shown for *Fasciola hepatica* (8.28%) which is similar to findings. The reason for more occurrence of *Fasciola hepatica* was favorable climatic conditions and plenty of intermediate host [8].

The prevalence of *Monezia* is similar to findings. The prevalence of *Monezia* was found much higher in this study than reported. Reason for high rates of prevalence may include mixed pattern of grazing i.e. all animals including buffalo, goat, sheep and cows are used to graze all together. Proglottids of these are widely spread in grasses of meadows and are big reason for higher prevalence.

Almost an equal incidence of gastrointestinal parasite was observed in three zones of study area. The difference among prevalence of three zones was not much significant. Similar prevalence in all the zones might be due to same climatic conditions of area, similar feeding system and husbandry practices.

According to results of present study maximum prevalence of gastrointestinal parasites was found during month of July and August. Similar findings were also reported by different workers. This could be attributed that rainy season favors the growth of gastrointestinal parasites more than dry season. During rainy season temperature and high humidity favour the growth and development of larvae on meadow resulting in greater contact between the parasite and the host.

Prevalence of gastrointestinal parasites was found more in case of male animals as compared to female animals in this study which is similar to the results. According to this prevalence was more in female animals as compared to male animals. The variation in occurrence of GI parasites due to sex might have been attributed to the negligence and improper care of male animals as compared to female animals.

Maximum prevalence was found in exotic breeds i.e. Australian and Friesian as compared to local breeds i.e. Dhanni, Sahiwal

and Red Sindhi. This higher rate of prevalence may be due to their exotic origin and little adoption to local climate and husbandry practices.

CONCLUSION

According to the findings of current study animals less than six months of age had greater prevalence as compared to the adult animals. These findings are in harmony with the results of previous research. According to this, prevalence of GIT parasites was more in adult animals as compared to young animals. The higher prevalence rate of GI parasites in calves may be ascribed to calves due to habits of licking other animals, dung, mud and poorly developed immune system.

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