PREVALENCE OF THE GASTROINTESTINAL HELMINTHS IN BOVINE POPULATION IN DIFFERENT ZONES OF RAWALPINDI DISTRICT OF PUNJAB, PAKISTAN

M. Shoaib, M. A. A. Shah, M. U. Hassan, A. Shamim*, M. A. Zafar, A. Riaz and M. A. Khan

Faculty of Veterinary and Animal Sciences, Pir Maher Ali Shah-Arid Agriculture University Rawalpindi.
*Faculty of Veterinary and Animal Sciences, University of Poonch, Rawalakot, Azad Jammu and Kashmir, Pakistan.
Corresponding author e-mail: murtazhassan@yahoo.com

ABSTRACT: Gastrointestinal parasites are responsible for heavy economic and production losses in bovines. The present study was conducted to determine the prevalence of gastrointestinal (GI) helminths of bovine in different zones of Rawalpindi district. Study area was divided into four different zones. Feacal samples (n=670) were collected and examined through coprological examination techniques. Out of examined samples, 158 were found to be positive for the GI helminths. The overall prevalence of GI helminths recorded was 23.58 %. In cattle the prevalence was 25.87 % whereas, in buffaloes it was 20.83 %. The prevalence percentages of nematodes, trematodes and cestodes was 17.46, 4.78 and 1.34%, respectively. Maximum prevalence was observed during summer and was the highest in the month of June. Prevalence was higher in adult and females as compared to young and males. It was concluded that specie, age and season are important factors which influence the prevalence of GI helminths in bovine.

Key words: Gastrointestinal Helminths, Coprological examination, Bovine, Nematodes, Cestodes and Trematodes.

(Received 02-09-2016 accepted13-12-2016)

INTRODUCTION

A diverse range of parasites is present in the gastrointestinal (GI) tract of different animal species. Among these parasites, GI helminthes are the major cause of clinical and sub clinical parasitism leading to huge economic and production losses (Afridi *et al*., 2007). GI helminths cause considerable milk losses, affect reproductive performance, digestive disturbances, loss in body weight and reduced product quality (Kanwal *et al*., 2014 and Iqbal *et al*., 2004). Parasites compete for utilization of nutrients in the host body and may release toxins which destroy red blood cells causing anemic condition (Emmanuel *et al.,* 2016 and Rafiullah *et al*., 2011). Migration of GI helminth damage underlying tissues and open the way for secondary infections caused by bacteria and fungi. The parasitism is a great threat for livestock farming communities globally (Iqbal *et al.,* 2014 and Awaris *et al*., 2012), as some of them pose public health significance as zoonotic (Squire *et al*., 2013).

Prevalence of helminthes has been found associated with certain predisposing factors (Asif *et al*., 2008). There are numbers of published reports around the globe on prevalence of GI helminth parasites (Islam *et al*., 2015; Rashid *et al*., 2015; Bacha and Haftu, 2014; Ntonifor *et al*., 2013; Squire *et al*., 2013and Singh *et al*., 2012). However, scanty or outdated data is available on the prevalence of GI helminthes from study area. Therefore, it was important to have information on the type, species and burden of GI helminthes in bovine population of different zones of study area to devise future control strategies.

MATERIALS AND METHODS

Study area: Present study was conducted in four zones including zone I (Rawat), zone II (Chakri Road), zone III (Lehtrar Road) and zone IV (urban area) of Rawalpindi district located in the northern most part of the Punjab province Pakistan. The study area consisted on seven Tehsils. Rawalpindi's climate was sub humid to sub-tropical receiving average annual rainfall of about 1044 millimeters (mm). The mean maximum temperature ranged from 25.6^{o}C to 39.4^{o}C (78.1^{o}F to 103^{o}F) in June and the mean minimum temperature ranged from 3.2^{o}C to16.7^{o}C (37.8^{o}F to 62^{o}F) in January. According to Livestock Census the number of bovines and buffaloes in Rawalpindi district were 343664 and 247748 respectively (Livestock Censes, 2006).

Collection and processing of faecal samples: Faecal sample (n= 670) comprising of cattle (n= 406), buffaloes (n= 264) were collected from all four Zones of Rawalpindi. Five to ten grams feacal sample was directly collected from the rectums of animals and were stored in sterile plastic container having preservative. The collected faecal samples were properly labeled and transported to the laboratory of Parasitology section of Pathobiology Department, Faculty of Veterinary and Animal Sciences, Pir Maher Ali Shah Arid Agriculture University, Rawalpindi.

Parasitological procedures: Faecal samples were processed through standard faecal examination technique/procedures i.e. direct smear method, faecal floatation and sedimentation techniques (Zajac and Conboy, 2012). For the Direct smear method few drops of water and equal amount of faecal sample were mixed on glass slide and cover slip was placed over it. The slide was examined microscopically to detect the eggs. For the floatation method 2 g of faecal sample was added to 10 ml of floatation solution and centrifuged at 3000 rpm for 5 minutes. A cover slip was placed on top of surface of liquid and left standing for 10-15 minutes. The cover slip was removed vertically, placed on slide and examined under microscope for the presence of eggs. In the sedimentation technique 3g of faecal sample was mixed in water and filtered through a sieve. The solution was centrifuged at 3000 rpm for 5 minutes and allowed to stand for 30 minutes. Supernatant liquid was discarded and sediment was examined to detect the eggs. Eggs of GI helminth were identified using identification keys (Soulsby, 1986).

Statistical analysis: Data was recorded in separate excel spread sheet and analyzed for descriptive statistics using software Statistis (Version 8.1). Chi-square test was used to test the association between variables.

RESULTS AND DISCUSSION

Out of 670 samples examined, 158 samples (23.58%) were found positive for GI helminths. Amongst 158 positive samples, 117(17.46%) 32 (4.78%), 09 (1.34%) and 19 (2.84%) were positive for GI nematodes, trematodes, cestodes and mixed infection, respectively.

The overall prevalence wise the results of current study in bovine were found to be similar to the results of many researchers i.e 13.5% (Knawal *et al*. 2014), 15.42% (Sreedevi and Hafeez, 2014), 15.2% (Kakar *et al*., 2011) as per nematodes. A total of nine helminth species were found during the present investigation, where Nematodes were at the highest rate as compared to that of trematodes and cestodes. Among the nematodes the prevalence of *Trichuris* was maximum (5.22%), followed by *Trichostrongylus, Haemonchus, Ostertagia* and *Strongyloides* (2.39%) being the lowest. Similarly, among trematodes prevalence of *Fasciola* was found highest (2.09%) and *Paragonimus* was found to be the lowest (0.45%). Likewise, two cestodes i.e. *Moneizia* and *Taenia* were encountered during present study with 0.75% and 0.60% respectively. Swarnakar *et al* (2015) has reported comparable results. In that study the prevalence of *Moneizia* and *Taenia* in bovines was found to be 0.64% and 0.35% respectively (Swarnakar *et al*., 2015).

Same or different species of helminthes with variable prevalences have been reported infecting cattle and buffaloes in many parts of the world and Pakistan as well. Swarnakar *et al*. (2015) found the prevalence of *Strongyle* (35.41%), *Strongyloides* (0.49%), *Trichuris* (0%), *Toxocara* (0.099%), the *Fasciola* species (4.44%) *Amphistomes* species (11.06%) *Moniezia expansa* (0.64%) and *Teania* Species (0.35%), in bovines (Swarnakar *et al*., 2015). In a study on the prevalence of GIT parasites of bovines *Paramphistomum* Species infestation was found to be the highest (30%) followed by *Toxocara* (12%), *Fasciola*. (10%), *Oesophagostomum* (8%), *Moniezia* (6%) and *Trichostrongylus* (2%) respectively (Ahmed *et al*., 2015). In another study conducted by Bacha and Haftu, (2014), it was found that out of a total 184 positive samples for helminths, 57.97% were infested with single genera of gastro-intestinal nematodes and coccidian, which included: *ostertagia* (1.8%), *oesophagostomum* (1.3%), *strongloid* (2.6%), *Trychostrongylus* (3.6%), *hemonchus* (11.7%) and *Bunostomum* (4.4%). According to Afridi *et al*., (2007) out of total, 500 fecal samples examined, 233 (46.6%) were found positive for GIT nematode including *Trichostrongylus, Oesophagostomum,Haemonchus, Toxocara vitulorum, Ostertagia, Bunostomum, Strongyloides* and *Trichuris* showing prevalence of 21.03%, 18.02%, 16.30%, 13.14%, 9.44%, 8.15%, 7.72% and 3.86% respectively. Chavhan *et al*. (2008) also found different results as compared to the present study. According to that study Out of 615 animals examined 242 were positive (39.34%) for nematode infection. This variation in results might be due to difference in environment, climatic conditions and management practices followed in the study area. These factors have been found associated with prevalence of GI helminths parasites. During the present investigation prevalence of GI helminths parasites were found higher in cattles (25.37%) as compared to buffaloes (20.85%). This difference may be due to species and breeds of animals. The rate of prevalence is not found same in two different species and breeds of animals.

Present study was conducted during two seasons i.e. summer and spring. Season wise higher prevalence of GI helminths parasites were observed during summer than in spring. Whereas, month wise Prevalence of GI helminths parasites was observed higher (33.86%) during June and it was lowest during the March (14.04%) (Fig.-1). Similar results have been shown by Alim *et al*., 2012. According to that study the occurrence of GIT parasites (*Haemonchus* 5.56% and *Moniezia* 4.16%) was more in June as compared to that of the other months. This Higher and lower prevalence during month of June and January may be due to favorable environmental factors like temperature and humidity required for development of parasites. Shirale *et al*., (2008) has shown that the prevalence of GIT parasitism was higher in rainy season (91.20%), followed by winter (69.5%) and summer (40.91%). This variation in the result was mignt be due to

difference in the farming practices, deworming schedule and the health status of the animals. Afridi *et al*. (2007) reported that no definite pattern was observed for month wise variation of prevalence of GI parasites.

Age and gender wise prevalence was observed during the present study. Higher Prevalence was found in adult female hosts (24.8%), while lower prevalence was observed in younger (10.53%). Age and gender are two intrinsic factors that have been found associated with higher and lower prevalence of GI helminthiasis. Results of present investigation were similar to the finding of Bacha and Haftu, (2014) whose work showed that the prevalence of GIT parasites was 23.6% in young animals and 52.2% in adult animlas.

The highest prevalence was found in zone III (31.86%) and the lowest in zone I (18.43%). It was also found that similar helminths species were infecting bovines of all four zones. This may be due to similar climatic conditions, which may be the reason behind finding the similar helminthes species infecting bovines of different zones under study.

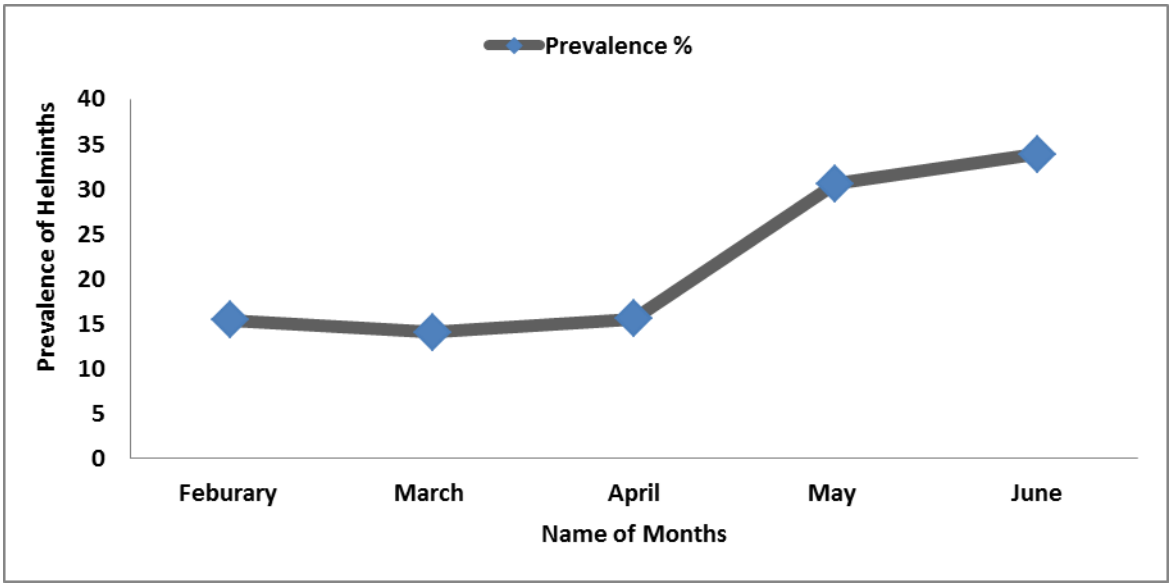

Fig-1: Monthly Prevalence of Helminth Parasites of Bovine in different Zones of Rawalpindi district of Punjab, Pakistan.

Conclusion: On the basis of finding of present study it is concluded that pattern of helminths infection was 25.37% in cows and 20.85% in buffaloes in Rawalpindi district of Punjab, Pakistan. It was also found that the environment of the study area was suitable for the development of species of GI helminths parasites, infecting bovines of the area. This study also provides important information regarding the type, species and burden of GI helminthes parasites in bovine population of different zones of Rawalpindi, which provides basis for devising future control strategies against GI helminth parasites to minimize economic and production losses. This study paves the way for timely eradication and control of parasitic diseases ultimately improving the living status of livestock holders.

REFERENCES

Afridi, Z. K., K. Khan, G. Zaman, S. Ullah, and Q. Habib (2007). Prevalence of Gastro-Intestinal Nematode Parasites of Economic Importance in Dairy Buffaloes in Peshawar. Sarhad *J. Agric*., 23(3): 787-792.

Ahmed R., P. K. Biswas, M. Barua, M. B. Alim, K. Islam, and M.Z. Islam (2015). Prevalence of gastrointestinal parasitism of cattle in Banskhaliupazilla, Chittagong, Bangladesh. J. *Adv. Vet. Anim. Res.*, 2(4): 484-488.

Alim M. A., S. Das, K. Roy, S. M. Sikder, M. Massuduzzaman andM. Hossain (2012). Prevalence of Gastrointestinal Parasitism in Cattle of Chittagong Division, Bangladesh. Wayamba *J. Anim. sci*., 247 -254.

Asif, M., S. Azeem, S. Asif and S. Nazir (2008). Prevalence of Gastrointestinal Parasites of Sheep and Goats in and around Rawalpindi and Islamabad, Pakistan. *J. Vet. Anim. Sci*., 1:14-17.

Awaris, T., B. Bogale and M. Chanie (2012). Occurrence of Gastro Intestinal Nematodes of Cattle in and Around Gondar Town, Amhara Regional State, Ethiopia. *Acta PARASITOL G*. 3 (2): 28-33.

Bacha A and B. Haftu (2014). Study on Prevalence of Gastrointestinal Nematodes and Coccidian

Parasites Affecting Cattle in West Arsi zone, Ormia Regional State, Ethiopia. *J. Vet. Sci Tech*., 5:5

Chavhan, P. B., L.A. Khan, P.A.Raut, D.K. Maske,S. Rehman, K.S.Podchalwar and M.F. Siddiqui (2008). Prevalence of Nematode Parasites of Ruminants at Nagpur. *Vet World*,1(5):140.

Emmaneul, M. A., B. Sayre and V. W. Temu (2016). Effects of dietary protein supplementation on the performance and non-carcass components of goats artificially infected with Haemonchuscontortus. *Sci. Lett*., 4(2): 124-130.

Iqbal, M. N., A. Muhammad., A. A. Anjum., K. A. Shahzad., M. A. Ali and S. Ali (2014). Epidemiology of *Gigantocotyle Explanatum* in Naturally Infected Buffaloes. Sci. Lett., 2(1): 15-18.

Iqbal, Z., M.N. Khan, M.Z. Kakar and A. Jabbar A (2004).A critical analysis of parasitic research on some domesticated animals of Pakistan. *J. App. Em. Sc*.1(1):1-14.

Islam, M., M.S. Islam., M.M.R. Howladerand., N.S. Lucky (2015). Prevalence of Gastrointestinal Nematodiasis and Comparative Efficacy of Anthelmintics on Body Weight of Cattle in Bangladesh. *Int. J. Sci. Res. Agric. Sci*., 2(3):61-75.

Kakar, M .N., M. I. Masood, K. H. Janbaz, M. I. Qadir, I. Masood and J. K. Kakarsulemankhe (2011). Prevalence of *Fascioliasis* cows and buffaloes in Quetta, Pakistan. *Pharma online*., 2(2) 974-978.

Kanwal, S., S. Wadood, S. Niaz, M. Jamil, M. Irshad, M. Ilyas, M. Irshad and I. Malook (2014). Prevalence of Gastrointestinal Parasite in Domestic Animals of District Buner, KPK, Pakistan. *Rev of Prog.*, 1 (44): 1-12.

Livestock Census, 2006. Special Report. Agricultural Census Organization, Statistics Division, Government of Pakistan, Lahore, Section II, p 22.

Ntonifor, H.N., S. J. Shei., N.W. Ndaleh and G.N. Mbunkur (2013).Epidemiological studies of gastrointestinal parasitic infections in ruminants in Jakiri, Bui Division, North West Region of Cameroon. *J. Vet. Med. Anim. Health*, 5(12):344-352.

Rafiullah, T. A., A. Sajjad, S.R. Shah, S. Ahmad and M. Shahid (2011).Prevalence of Gastrointestinal Tract Parasites In Cattle Of Khyber Pakhtunkhwa. *J. Agric. Biol. Sci*., 6(9): 9-15.

Rashid, M. M., M.A. Houqe, M.A. Alim, K.S. Houqe and A. K. F.H. Bhuiyan (2015). Prevalence of gastrointestinal parasites in Brahman crossbred cattle of Bangladesh. *Livestock Res Rural Dev*. 27 (7): 141.

Shirale, S. Y., D. Meshramand., K.P. Khillare (2008). Prevalence of Gastrointestinal Parasites in Cattle of Western Vidarbha Region. *Vet. World*. 1(2): 45.

Singh, N. K., H.S. Jyoti., M. Haqueand S.S. Rath (2012). Prevalence of parasitic infections in cattle of Ludhiana district, Punjab. *J. Parasit. Dis.*, 36 (2):256–259

Soulsby E.J.L., (1986). Helminths, Arthropods and Protozoa of Domestic Animals, seventh ed. Bailliere, Tindall, London, 807p.

Squire, F. A., H. Amafu-DeyandJ. Beyuo (2013). Epidemiology of gastrointestinal parasites of cattle from selected locations in Southern Ghana. *Livestock Res Rural Dev*. 25 (7): 117.

Sreedevi, C and M.Hafeez (2014). Prevalence of Gastrointestinal Parasites in Buffaloes (*Bubalus Bubalis*) in and Around Tirupati, India. *Buffalo Bulletin*. 33(3): 1-4.

Swarnakar, G., B. Bhardawaj., B. Sanger B and K. Roat (2015). Prevalence of gastrointestinal parasites in cow and buffalo of Udaipur district, India. *Int.J.Curr.Microbiol.App. Sci*., 4(6): 897-902.

Zajac, A.M and C.A. Conboy (2011). Veterinary Clinical Parasitology 8th Edition. Black Well Publishers. UK. Pp: 368.