

Original Article

Prevalence of gastrointestinal parasitic infection in cows and buffaloes in Lower Dir, Khyber Pakhtunkhwa, Pakistan

Prevalência de infecções parasitárias gastrointestinais em vacas e búfalos em Lower Dir, Khyber Pakhtunkhwa, Paquistão

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Abstract

Gastrointestinal (GI) Parasitic infection is a hot issue for cattle management. There is variation of GI parasites effects in sex, age of cattle, drinking water condition, nutrition, and severity of infection. Studies on prevalence of GI parasites among cattle population in Dir Lower are lacking. A total of 40 farms were selected randomly in six tehsil namely Tehsil Adenzai, Tehsil Timergara, Tehsil Balambat, Tehsil Munda, Tehsil Lalqala, Tehsil Khall. Freshly cattle fecal samples were collected randomly from the selected farms during March 2018 till December 2018. Out of 314 buffaloes and cattle examined 58.59% (184/314) were positive for eggs, cyst/oocyst of one or more species of GI Parasites. The prevalence of parasitic infection was higher in Buffaloes 63.55% (75/118) as compared to Cow 55.61% (109/196) but the difference was not significant ($p > 0.05$). *Entamoeba* spp, *Moniezia* spp, *Haemonchus* spp and *Coccidian* spp were found in this study. The non-treated animals indicated the highest percentage of infection in cow 57.71% (101/175) and buffalo 68.13% (62/91). GI parasite prevalence in female animal were higher female cow 62.58% (87/139) and female buffalo 77.33% (58/75) as compared to male. But the difference is non-significant ($p > 0.05$). Yearling calves had the lower rate of GI parasitic infection than adults. Future investigations are necessary to evaluate the economic loss due to GI parasites in cattle's.

Keywords: cattle, buffalo, prevalence, gastrointestinal parasites, *Entamoeba* spp.

Resumo

A infecção gastrointestinal (GI) parasitária é um assunto importante para o manejo do gado. Existem variações nos efeitos dos parasitas GI quanto a sexo, idade do gado, condição da água potável, nutrição e gravidade da infecção. Faltam estudos sobre a prevalência de parasitas GI entre a população de gado em Lower Dir. Um total de 40 fazendas foi selecionado aleatoriamente em seis tehsil, nomeadamente Tehsil Adenzai, Tehsil Timergara, Tehsil Balambat, Tehsil Munda, Tehsil Lalqala, Tehsil Khall. Amostras fecais de gado fresco foram coletadas aleatoriamente das fazendas selecionadas de março de 2018 até dezembro de 2018. Dos 314 búfalos e bovinos examinados, 58,59% (184/314) foram positivos para ovos, cisto/oocisto de uma ou mais espécies de parasitas GI. A prevalência de infecção parasitária foi maior em Buffaloes 63,55% (75/118) em comparação com vaca 55,61% (109/196), mas a diferença não foi significativa ($p > 0,05$). *Entamoeba* spp, *Moniezia* spp, *Haemonchus* spp e *Coccidian* spp foram encontrados neste estudo. Os animais não tratados indicaram a maior porcentagem de infecção em vacas 57,71% (101/175) e búfalos 68,13% (62/91). A prevalência do parasita GI em fêmeas foi maior em vacas fêmeas 62,58% (87/139) e búfalas 77,33% (58/75) em comparação ao masculino. Mas a diferença não é significativa ($p > 0,05$). A modelagem linear geral mostrou que o tratamento do animal estava significativamente relacionado com a prevalência de parasitas GI. Bezerros de um ano tiveram a maior taxa de infecção parasitária gastrointestinal. Futuras investigações são necessárias para avaliar a perda econômica devido aos parasitas GI em bovinos.

Palavras-chave: bovinos, búfalos, prevalência, parasitas gastrointestinais, *Entamoeba* spp.

1. Introduction

The agriculture sector is has a key role in developing the economy of a country. Pakistan is considered an agricultural country, but with repaid decline in the performance of

agriculture sector due to various reasons like social political condition, climate and environmental issues. Today it is considered the second largest sector in economy of

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Pakistan. About 20 percent GDP and 46 percent of labor are engaged in this sector to earn live hood. About 62 percent of people of Pakistan live in rural areas who are directly or indirectly linked with agriculture (Raza et al., 2012).

The role of parasitism is very much significant in most of the agro-ecological regions and a major threat to worldwide livestock economy (Vercruysse and Claerebout, 2001). Helminths infection are considered one of the chief restraint to the production of livestock all over the subtropics and tropic region (Githiori et al., 2004). It reduces the efficiency and productivity cause of high economic losses (Sykes, 1994) and increase mortality which effect the income of farming communities.

An efficient, effective and good strategy is necessary for fruitful implementation and formulation of gastrointestinal parasitic infection control. A periodic surveillance is required for the frequency of gastrointestinal parasitic infections in a particular environment and their association to risk factors which effect the transmission of parasites. From various parts in the world about 0.72 to 84.1% gastrointestinal parasites prevalence has been reported (Bundy et al., 1983; Khan et al., 2010).

Pastoral grazing system is the main cause of gastrointestinal parasitic infections. Many Gastrointestinal parasitic species have developed resistance to anti-gastrointestinal parasitic drugs (Waller, 1994; Min et al., 2005). Due to Gastrointestinal parasitic infection the productivity of animals has reduced and affected the animal performance also (Waller, 1999). Lower growth rate, impaired tissue deposition, productivity and feed intake depress is caused by subclinical gastrointestinal parasitic infections (Sykes, 1994). In young animals mortality may exceed 40% while losses in weight occur 6-13 kilogram per year in per animal (Waller, 1999; Hawkins, 1993).

Buffaloes and cows are not only the sources of animal proteins, but other products which are made from their fetch are very much important for the use of man. Trematode parasites cause secondary infections as well as weakness, watery diarrhea, weight loss, reduced product quality and decrease in milk production also (Solusby, 1982; Gupta et al., 1978). Enormous economic losses occur due to gastrointestinal parasitic infections. Abdominal vermin are parasites which can damage the gastrointestinal walls of human as well as other animals (Loukopoulos et al., 2007). The gastrointestinal parasites are majour health problems to the health of small ruminants in Upper Dir district, Pakistan (Ruhollah et al., 2023). Similarly gastro-intestinal parasites are a serous problem in cattle and buffaloes in the Loer Dir, Pakistan (Khan et al., 2021).

They live through all the physique, but favour the abdominal wall (Coop and Holmes, 1996). Protozoans have the ability that can directly infect if they out from the abdomen into the environment hence the helminthic needed the period of maturation in the soil while other have some extant of intermediate host for the (Arcari et al., 2000). The most constructive places for abdominal parasites are the small part of stomach, ileum, cecum and big intestine (Cuomo et al., 2009). For the endure or replicate in the intestinal tract the vermin have to familiarise with incessant physical changes comparative to the nourishing

homes of the host (Cuomo et al., 2009). Large ruminants are pretentious with dissimilar types of vermin (Coop and Kyriazakis, 1999), while in some case are deadly because of the parasites types.

Because of unhygienic environment, improper care, close interaction with septic animals and extreme climate sheep and goat become infected with large variability of gastrointestinal parasites (Gadahi et al., 2009.). Most of ruminants badly are affected by helminthiasis, which cause biochemical and hematological disturbance, anorexia, poor reproductive performance, weight loss and decreased animal confrontation to diseases that can lead to death or even become the cause of lots of mortality among the ruminant and lead to a great economic loss (Ngagegize et al., 1993). It is reported that reduction occurred in farmer profit up to 16% and decrease in weight up to 50% is because of gastrointestinal parasitic infections. The current study was conducted to investigate the prevalence of gastrointestinal parasitic infection as to find out which parasites might be harboured by the large ruminants in Lower Dir district, Pakistan.

2. Methodology

2.1. Study Area

This study was conducted at District Dir lower Khyber PukhtunKhwā, Pakistan. The district lies in the northern highlands of KP at a latitude 34.35, longitude 71.85 and altitude of 823. The average annual temperature is 16°C and average annual rainfall is 1186 mm recorded. The relative humidity varies from 70 to 81% in rainy season and in dry season from 40 to 50% humidity is recorded.

2.2. Study Population

The study population consisted of all buffaloes and cows in the study area.

2.3. Sample collection and examination procedures

2.3.1. Collection

Fecal samples were collected directly from the rectum of buffaloes and cows randomly, using gloved fingers, put in clean sampling plastic bottles containing 10% formalin and giving sampling number. A questionnaire was also designed which included the following parameters: animal category, date, gender, area, age, season, grazing system, health status, condition of farm/household, treatment, socio-economic status of the farmer and source of drinking water. Samples were brought to the Laboratory of Parasitology in the Department of Zoology, University of Malakand for further analysis.

2.3.2. Laboratory tools

Normal saline (0.85%), formalin, sugar, cotton, refrigerator, cover slip, centrifuge machine, slides, beaker, cello tape, glass rod, stick, measuring cylinder, needle,

volumetric flask, gloves, Electronic weigh machine, mask, tea strainer, microscope, questioner, Pasteur pipette, rack, motor and pestle were the laboratory tool.

2.4. Laboratory methods

In the laboratory the samples were examined for the detection of gastrointestinal parasites eggs or cyst on the basis of morphology using the following methods.

2.4.1. Direct smear methods (wet mount techniques)

2.4.1.1. Normal saline solution

A solution of saline wet mount was made in which a 2 gram of faces were mixed within drop of saline upon a glass slide. Microscope was used for smear examination.

2.4.2. Concentration techniques

2.4.2.1. Flootation and centrifugation

This procedure is very popular and widely used for spotting eggs of nematodes and cestodes. As their eggs are lighter and small, they can float in the flotation liquid. Almost 3 gm of stool sample was taken in a beaker and 42ml of water was added with the help of motor and pestle, sample was grinded lightly and clarified with a tea filter.

The samples which were filtered and poured into plastic tube of 15ml and were centrifuged at 1000 rpm for 5 minutes. The plastic tube was taken out from the centrifuge and with the help of pipette the upper part of water was poured. Then again the tube was filled with NaCl solution and centrifuged at 1000 rpm for 5-7 minutes. NaCl solution was added so that the tube may filled to the tip of the tube. Cover slip was put on top of the tube, so that the Sedum chloride trace the cover slip for few minutes and after few minutes cover slip will be put on a slide and was examined at 10X (Khan et al., 2018).

2.4.2.2. Sedimentation technique

This procedure is mostly used for spotting trematodes eggs because the trematodes eggs are bit denser than the other eggs. Havier egg settle down in bottom of test tube when its was centrifuged with sodium chloride solution.

With the help of pipette, a drop of deposited material was took on the slide. On it, a drop sodium chloride (NaCl) was added and examined under a microscope at 4X and 10X (Solusby, 1982).

2.5. Statistical analysis

Data was analyzed by used of Graph Pad version 5. Comparative prevalence of various gastrointestinal (GI) parasites group or species was calculated by following formula.

Prevalence (%) = (Number of positive samples / Total number of samples examined) x 100

3. Results

The overall prevalence of GI parasites of study area was found 58.59% (184/314) with 55.61% (109/196) in cows and 63.55% (75/118) buffaloes with the occurrence of *Entamoeba* spp 17.43% (19/109), *Moniezia* spp 24.77% (27/109), *Haemunchus* spp 40.36% (44/109) and *Coccidia* spp 17.43% (19/109) in cows while the prevalence of *Entamoeba* spp 25.33% (19/75), *Moniezia* spp 14.66% (11/75), *Haemunchus* spp 53.33% (40/75) and *Coccidia* spp 6.66% (5/75) in buffaloes were found. The relationship between the examined samples and positive samples was significant (Table 1).

Prevalence in male cows was 38% (22/57) and female cows 62.58% (87/139) as well as, in male buffalo the occurrence was found 39.53% (17/43) while in female buffalo 77.33% (58/75). The relationship between the examined sample and the positive sample was significant (Table 2).

Prevalence in young cows was 53.65% (22/41) and adult cows 56.12% (87/155) as well as, in young buffaloes the occurrence was found young buffaloes 38.23% (13/34) while in adult buffaloes 73.8% (62/84). The relationship between the sample examined and that of infected was significant (Table 3).

Prevalence in treated cows was 38.09% (8/21) and untreated cows 57.71% (101/175) as well as, in treated buffaloes the occurrence was found 48.14% (13/27) while in untreated buffaloes 68.13% (62/91) Table 4.

Table 1. Overall prevalence of Intestinal parasites in cows and buffaloes in Lower Dir, Pakistan.

Parasites	Cows (n=196)		Buffaloes (n=118)		Overall (%)
	Positive Samples	Infection (%)	Positive Samples	Infection (%)	
<i>Entamoeba</i> spp	19	17.43	19	25.33	20.65
<i>Moniezia</i> spp	27	24.77	11	14.66	20.65
<i>Haemunchus</i> spp	44	40.36	40	53.33	45.65
<i>Coccidia</i> spp	19	17.43	5	6.66	13.04
Total	109	55.61	75	63.55	58.59
P value		0.04		0.02	

Table 2. Gender wise prevalence of GI parasites in cows and buffalos in district Lower Dir Pakistan.

Animal Category	Variables	No. Examined (n)	Positive Samples (n)	Infection (%)
Cow	Male	57	22	38
	Female	139	87	62.58
Overall	Total	196	109	55.61
Buffalo	Male	43	17	39.53
	Female	75	58	77.33
Overall	Total	118	75	63.55
Overall Animals	Total Gender	314	184	58.59

Table 3. Age wise prevalence of Intestinal parasites in cows and buffalos in district Lower Dir Pakistan.

Animal Category	Age	No. Examined (n)	Positive Samples (n)	Infection (%)
Cow	Young (2years)	41	22	53.65
	Adult (5years)	155	87	56.12
Overall	Total	196	109	55.61
Buffalo	Young (2years)	34	13	38.23
	Adult (5years)	84	62	73.8
Overall	Total	118	75	63.55
Overall Animals	Total Gender	314	184	58.59

Table 4. Treatment wise prevalence of GI parasites in cows and buffalos in District Lower Dir, Pakistan.

Animal Category	Variables	No. Examined (n)	Positive Samples (n)	Infection (%)
cows	treated	21	8	38.09
	untreated	175	101	57.71
Overall	total	196	109	55.61
buffaloes	treated	27	13	48.14
	untreated	91	62	68.13
Overall	total	118	75	63.55
Overall animals	total treatment	314	184	58.59

4. Discussion

Cows and buffaloes play an important role in the economy of Pakistan in view of elevation of poverty, production of milk owl, leather, and meat. But the gastrointestinal parasites cause huge morbidity and mortality in these animals, affect the economic condition of the country. A handsome amount of money is also spent on the treatment of gastrointestinal parasites of these animals. The current study was conducted in district Lower Dir to find out the gastrointestinal parasites of Cows and buffalos because less attention has been paid to the screening of cows and buffalo parasites.

In present study the overall prevalence occurred 58.59% with cows 55.61% and buffalos 63.55%. Our finding is nearly similar and in line with the result of (Raza et al., 2012 (51%) and buffaloes (47%) (Jittapalpong et al., 2011) cows 46.6% Dula, 2018 cows 40% but our result are less from the finding

of (Marskole et al., 2016) Buffaloes 73.33% and Cows 75% were found. It may be due to differences in environmental status of the study area and methodology.

High prevalence was observed in female cows 62.58% while more occurrence also in female buffaloes 77.33%. in this regard our finding is nearly similar in line with the result of Dula, 2018 found 39.9% in male cows and 41.6% prevalence found in female cows but our result are less from the finding of (Raza et al., 2007) which may be during samples collection it was observed that more peoples keep female cows and buffalos for their daily life requirement like milk, and other dairy products. It may be due sensitive immune system of females animals during pregnancy and hormonal differences.

Regarding age, adult cows were highly affected by GI parasites 56.12% while more occurrence where also occurred in adult buffaloes 73.8%. Our finding is nearly

similar and in line with the result of Dula, 2018 cows young 38.3% while adult cows 41.9% but our result are less from the finding of Marskole et al., 2016 adult cows 77.50% and Adult Buffaloes 75% as compared to young which are 56% in cattle and 62.59% in young Buffaloes. The increase in the prevalence of GI parasites with the age has also been reported by Qureshi and Tanveer (2009); Telila et al. (2014). On the contrary, Ahmed et al. (2017) stated that the younger animals are more susceptible than adult animals. The more occurrence in adult animals maybe due to the weakness of immune system, and regular exposure to infected animals and contact with infected other animals.

Prevalence in treated cows was 38.09% and untreated cows 57.71% as well as, in treated buffaloes the occurrence was found 48.14% while in untreated buffalo 68.13%. Our finding is closely similar and in line with the result of Gunathilaka et al. (2018) cows untreated 46.67% and treated cows 15% and untreated Buffaloes 48.56% and treated Buffaloes 17.78%, but our results are different from the finding of Githiori et al. (2004). The high occurrence in untreated cows and buffaloes were noted as compared to treated animals. The high prevalence rates in untreated animals may be due to untreated and lacking the use of medicine, un awareness in farmers about the use of anti-helminthic drugs to control GI parasites in animals.

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