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Research Article

**EPIDEMIOLOGICAL PREVALENCE AND ROLE OF RISK
FACTORS IN THE MAJOR GASTROINTESTINAL PARASITES
IN THE WORKING EQUINES.**

Asmatullah Khan¹, Muhammad Rizwan², Abdul Samad², Farah Sabeen Bugti^{2*},
Muhammad Akram Khan³, Safiullah Khan Achakzai², Muhammad Naeem⁴,
Hafsah Sanya⁴, Waseem Akhtar², Sania Ashraf⁵, Nazia Irum⁴, Gulmakia Shakoor⁴

¹MPhil scholar, University of Agriculture, Faisalabad

²Center for advanced studies in vaccinology and biotechnology, University of Balochistan
Quetta.

³Department of Pathobiology FVS, PMAS-Arid Agriculture University, Rawalpindi

⁴Balochistan University of Information Technology, Engineering and Management Sciences.

Abstract:

*A study was conducted in 2015 to assess prevalence of common gastrointestinal parasites in 186 working horses and donkeys in Lahore, Gujranwala, Multan and Peshawar Districts of Pakistan. Fresh faecal samples were collected from the ground and examined for gastrointestinal worms using McMaster Technique. Prevalence of gastrointestinal parasites was non-significant higher in Peshawar (95%) followed by Gujranwala (85.7%), Lahore (84.3 %) and Multan (51.3%) respectively. There was a significant difference ($p < 0.05$) in the prevalence of *Parascaris equorum* among the four districts whereas no significant difference was observed in *Strongylus* and *Oxyuris equi* infection among the four districts. A significant difference ($p < 0.05$) was observed in *Strongylus* spp and *Parascaris equorum* between horses and donkeys. Donkeys have significantly ($p < 0.05$) higher prevalence (92.8%) of GIT parasitic infection than horses (78.3%). Among age groups, younger animals (1-5 years) have the highest significant prevalence 93.7% followed by 76% and 84.6% for 10-15 and 15-20 years old animals respectively. It is concluded that working equine in Pakistan has highest gastrointestinal parasitic load of *Strongylus* spp and *Parascaris equorum*. Raising awareness regarding gastrointestinal parasites and improved management practices are recommended to control GIT parasites.*

Key Words: Working equine, Prevalence, Parasites.

Corresponding author:

Farah Sabeen Bugti,

Center for advanced studies in vaccinology and biotechnology,
University of Balochistan,
Quetta.

QR code



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INTRODUCTION:

Equine population is estimated to be about 124 million in the world [1]. In Pakistan, the number of donkeys is 5.2 million, horses 0.4 million and mules 0.2 million [2]. These animals face health and management related welfare issues like work related injuries, overloading, firing, slit nostrils, lameness, worm infestation, colic and other equine management related problems. Equines get number of health issues although they are considered as hardy and resistant animals [3, 4]. Gastrointestinal parasites are the most common inhabitant of the gastrointestinal tract (GIT) of equines and cause infections with clinical signs ranging from ill thrift to sudden death [5]. Parasitism has greater economic losses in equines as it decrease fertility, reduces capacity to work, and increases cost of treatment [6].

Working equines in Pakistan include both horses and donkeys but assumption regarding epidemiology and pathogenicity of various gastrointestinal worms species in donkey have been guessed from what is known in horses [7]. Earlier reports of Saeed *et al.*, 2010 and Khan *et al.*, 2010 [8, 9] explored that most common gastrointestinal parasites of equine in Pakistan were *Stongylus spp*, *Parascaris equorum*, and *Oxyuris equi*.

The prevalence of common GIT parasites had been conducted at the particular area and mostly in one species of equine (either horse or donkey). To investigate the prevalence of gastrointestinal parasites in three species of equine (horse and donkey), a study was designed in four district of Pakistan

MATERIAL AND METHOD:**Study area and animals**

Study was conducted in four district of Pakistan i.e Lahore, Gujranwala, Multan, Peshawar. A total of 186 animals (74 Horse and 112 Donkeys) were included in the study. The number of animals examined in Lahore Gujranwala, Multan, and Peshawar are 51, 35, 39, and 61 respectively.

Collection of fecal samples:

Samples were collected from freshly voided faeces (less than three hours) from the ground level and not per rectum so as not to compromise the welfare of the animal. Samples were collected from three different portions of the faeces pile. A sterile plastic bag was used to collect the sample. Faecal samples were freshly prepared and examined in the lab within an hour of collection

McMaster egg counting technique:

Two gram of faeces was weighed from each sample and placed in separate container. About 28ml of saturated sodium chloride solution were added and mixed with spatula. Sieve was used to strain the mixed faecal sample into another clean container. McMaster counting chambers were filled by using pipette. Eggs were counted in both chambers. EPG (egg per gram) was calculated for *Strongylus spp*, *Oxyuris equi* and *Parascaris equorum* separately [10] $EPG = \text{Total number of eggs under the two grids multiplied by } 50$

RESULTS AND DISCUSSION:

The prevalence of gastrointestinal parasites was non-significantly higher in Peshawar i.e. 95 % followed by Gujranwala 85.7 %, Lahore 84.3% and Multan 79.4 % (Table-1). There were no significant difference in prevalence of *strongylus spp* among four districts, however Peshawar has non-significantly highest prevalence (88.5%) followed by Multan (82%), Gujranwala (80%), Lahore (76.4%). A significant difference ($p < 0.001$) was observed in *Parascaris equorum* infection where in Peshawar has the highest prevalence (68.8%) and Gujranwala has the least prevalence (11.4%). Over all prevalence of gastrointestinal parasites in Lahore was 84.3% which was in complete agreement with Hassan *et al.*, (2005) [11] who reported 89.29% in horse but contradicted the result of Goraya *et al.*, (2013) [12] who observed 35.3 % prevalence in the working equine of Lahore. Grazing pattern of animals, number of animals examined and environmental factors might be the cause of this incidence difference.

Table 1: Percentage prevalence of individual parasites among four districts of Pakistan

Overall Prevalence		Equine Screened	Infected	Prevalence %
	Gujranwala	35	30	85.7
	Lahore	51	43	84.3
	Multan	39	31	79.4
	Peshawar	61	58	95
p value				0.1175
<i>Strongylus spp</i>				
	Gujranwala	35	28	80
	Lahore	51	39	76.4
	Multan	39	32	82
	Peshawar	61	54	88.5
p value				0.4017
<i>Parascaris equorum</i>				
	Gujranwala	35	4	11.4
	Lahore	51	12	23.5
	Multan	39	15	38.4
	Peshawar	61	42	68.8
p value				0.0001
<i>Oxyuris equi</i>				
	Gujranwala	35	5	14.2
	Lahore	51	3	5.8
	Multan	39	5	12.8
	Peshawar	61	9	14.75
p value				0.4809

In current study, *Strongylus spp* and *Parascaris equorum* were the most prevalent parasite in equine and there was a significant difference ($p < 0.001$) among three reported gastrointestinal parasites. The prevalence of *Strongylus spp* in equine (82.2%) (Table-2) which was supported by the recent studies; 92.8% in Ethiopia (Fikru *et al.*, 2005) [13], 88.2% In Lesotho (Upjohn *et al.*, 2010) [14] and 91% in Mexico (Valdez-Cruz *et al.*, (2006) [15]. In Kashmir, Pandit *et al.*, (2008) [16] reported 81.19% *Strongylus spp* prevalence in equine.

Table 2: Prevalence of gastrointestinal parasite in equine.

Overall Prevalence		Equine Screened	Infected	Prevalence %
	<i>Strongylus spp</i>	186	153	82.2
	<i>Parascaris equorum</i>	186	73	39.25
	<i>Oxyuris equi</i>	186	22	11.23
p value				0.0001
<i>Strongylus spp</i>				
	Horse	74	56	75.6
	Donkey	112	97	86.6
p value				0.0865
<i>Parascaris equorum</i>				
	Horse	74	22	29.7
	Donkey	112	51	45.5
p value				0.0447
<i>Oxyuris equi</i>				
	Horse	74	10	13.5
	Donkey	112	12	10.7
p value				0.7288

This study is in complete agreement with the Khan *et al.*, (2010) [17] who reported the prevalence of *Parascaris equorum* 36% in horse and 31% in donkey. Morariu *et al.*, (2012) [reported 73.21% stongyle infection and 28% *Parascaris equorum* infection in horse. Mezgebu *et al.*, (2013) [18] observed 43.29% *Parascaris equorum* infection in horse and 42.29% in donkey. Our result regarding prevalence of *Parascaris equorum* in horse showed disagreement with Tolossa *et al.*, (2013) [19] in Oromiya region and Uslu *et al.*, (2007) [20] in turkey who observed 11.7% and 10.81% respectively. *Oxyuris equi* (2%) has least prevalent GIT parasite in working equine. Belete and Derso, (2015) [20] reported 8.8 % *oxyuris equi* in equine whereas Umur *et al.*, 2009 [5] estimated *Oxyuris equi* prevalence (6%) in donkeys.

Our study indicated that donkeys have significantly ($p < 0.05$) higher incidence 92.8% of GIT parasitic infection than horses 78.3% (Table-3) which was supported by Sultan *et al.*, (2014) [21] who also mentioned the higher infection rate in donkeys than horses. The reason of higher infection in donkeys might be less attention from owner (Alemayehu and Etaferahu 2013) [1].

Among age groups, younger animals (1-5 years) have the highest significant prevalence 93.7% than 76% and 84.6% for 10-15 and 15 -20 years old animals respectively. This result could be attributed to the fact

that younger animals have less immunity than older one as immunity develops after the exposure of parasites (Belete and Derso, 2015).

The prevalence of GIT parasites infection was significant higher ($p < 0.05$) in female than male equine. Singh *et al.*, (2010) also observed higher incidence in female 75.73% than male 72.3 equine. Gestation and lactation might be the causes of lower immunity (Sultan *et al.*, 2014). There was a significant difference ($p < 0.05$) in the GIT parasitic infection among the Body condition scores (BCS).

A significantly higher infection 95.8% was reported in BCS 1 followed by 75%, 50% in BCS 2 and BCS 3 respectively. Belete and Derso, (2015) also observed significant difference in the prevalence of GIT parasites i.e. 87%, 70.1 and 37.1% in good, medium and poor BCS respectively.

Among the work type, significant highest parasitic infection 95.4% was observed in the animals who transport goods from one place to other place (TGC: transport of goods by cart from one place to other) followed by 86.3% in TPC (transport of people by cart). BKC equine (those who transport bricks by cart from brick kiln) has 75% whereas BKP equine (those who transport bricks by packing) has 73.9%. TGC and TPC equine were more exposed than the BKC and BKP equine that why they are more susceptible to parasitic infection.

Table 3: Prevalence of gastrointestinal parasite in relation to risk factors

Species	No of sample examined	No of positive sample	Prevalence %
Horse	74	58	78.3
Donkey	112	104	92.8
p value			0.0078
Age			
1-5 year	32	30	93.7
5-10 year	91	83	91.2
10-15 year	50	38	76
15-20 year	13	11	84.6
p value			0.0424
Gender			
Male	80	64	80
Female	106	98	92.4
p value			0.0222
Body condition score			
Body condition score 1	120	115	95.8
Body condition score 2	56	42	75
Body condition score 3	10	5	50
p value			0.0001
Work Type			
BKC	32	24	75
BKP	23	17	73.9
TGC	87	83	95.4
TPC	44	38	86.3
p value			0.0173

CONCLUSION AND RECOMMENDATION:

The study revealed that *Strongylus spp* infestation in working equine was the most prevalent one followed by *Parascaris equorum*. Peshawar has the highest prevalence of GIT parasites in the working equine followed by Gujranwala, Lahore and Multan. Prevalence of GIT parasites in working equines is also affected by species, gender, age, body condition and work types. Hence it is concluded that working equine are also susceptible for the gastrointestinal parasites infection.

Based on above conclusion following recommendations are suggested.

- Management of working equine should be improved.
- Owner of working equine should be educated about the parasites and their harmful effect on animal health.
- Strategic timed deworming should be advised to owner for their equine.

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