

Prevalence of Visceral Schistosomosis in Buffaloes Slaughtered at Mumbai

Mukta G. Kubade, Hirachand Y. Palampalle, Riddhi P. Pednekar*

ABSTRACT

In all 592 mesenteries and 368 intestinal contents were randomly screened to record the prevalence of visceral schistosomes and gastrointestinal (GI) parasites, respectively, in buffaloes slaughtered at Mumbai abattoir from March 2022 to February 2023. Out of 592 mesenteries, 95 (16.05%) were positive for *Schistosoma* spp., while intestinal contents of 38 out of 368 (10.32%) animals were positive for gastrointestinal parasites. The prevalence of schistosomes was highest in winter followed by summer and monsoon. Mild intensity of infection was predominant in 36.84% buffaloes, while 5.26% buffaloes showed moderate infection. Schistosomes recovered from the mesenteries were identified as *Schistosoma spindale* based on their morphometry with male flukes predominating the females. In slaughtered buffaloes, the highest incidence was from Thane followed by Mumbai and Satara districts of Maharashtra. Highest prevalence of GI parasites was recorded in summer followed by winter and monsoon. Considering the prevalence rate of visceral schistosomosis, it is concluded that animals and human in these regions are sub-clinically at risk, and therefore effective control strategies need to be implemented.

Key words: Buffaloes, GI parasites, Incidence of *Schistosoma* spp., Maharashtra, Mesenteries.

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INTRODUCTION

Schistosomes are blood-dwelling, elongate, unisexual, dimorphic trematodes present in the portal and mesenteric veins. In the livestock sector, schistosomosis is an economically important disease caused by different species of schistosomes which reside in the vascular system of final hosts (Lefevre *et al.*, 2010). Although being a neglected disease, it is well-recognized as the fifth major helminthic disease of domestic animals of the Indian subcontinent with high mortality and morbidity (Sumanth *et al.*, 2004). *Schistosoma* spp. that causes a significant impact on livestock and domestic animals includes *Schistosoma spindale*, *Schistosoma nasalis*, *Schistosoma indicum* and *Schistosoma incognitum*. Animals and humans infected with schistosomosis do not exhibit classical clinical signs, and therefore the disease is often misdiagnosed or neglected

The routine diagnosis of visceral schistosomosis is based primarily on clinical symptoms and faecal sample investigation for detection of parasitic eggs. These methodologies drastically underestimate the prevalence and consequently impede the development of effective treatment and control strategies. The aim of the present study was to assess prevalence of visceral schistosomosis based on the slaughter house survey from Western India.

MATERIALS AND METHODS

In all, 592 mesenteries and 368 intestinal contents collected randomly from buffaloes slaughtered at Deonar abattoir, Mumbai from March 2022 to February 2023 were screened

Department of Veterinary Parasitology, Mumbai Veterinary College, Parel, Mumbai-400 012, Maharashtra Animal and Fisheries Sciences University (MAFSU), Nagpur, India

Corresponding Author: Pednekar Riddhi P., Assistant Professor, Department of Veterinary Parasitology, Mumbai Veterinary College, Parel, Mumbai-400 012, MAFSU, India, e-mail: riddhipednekar@mafsu.in

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for the presence of adult parasites in the mesenteric veins and for the presence of helminthic eggs/ protozoan oocysts in the intestinal contents. The source of these animals (Thane, Mumbai or Satara districts) was also recorded to find out the regional prevalence of these parasites.

The mesenteries and the intestinal contents of slaughtered buffaloes were brought to the laboratory for further processing. Protective-wear was used while screening the mesenteries for the presence of worms. The mesenteries were held against the source of light/torch to find out the veins showing the presence of adult parasites (Fig. 1), which were clamped at the two cut ends and kept in a petri dishes containing normal saline solution for at least 10 to 15 min for worms to wriggle out (Fig. 2), or the veins were flushed with the help a syringe or dissected longitudinally and worms

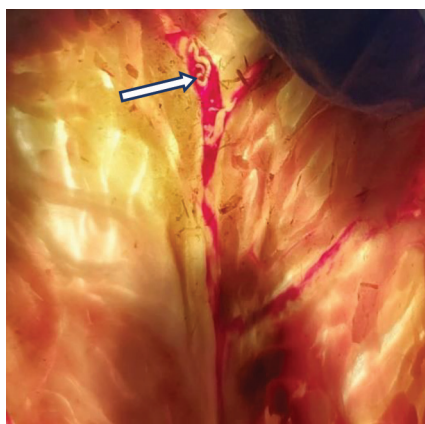


Fig. 1: Presence of blood flukes in the mesenteric vein of slaughtered buffalo

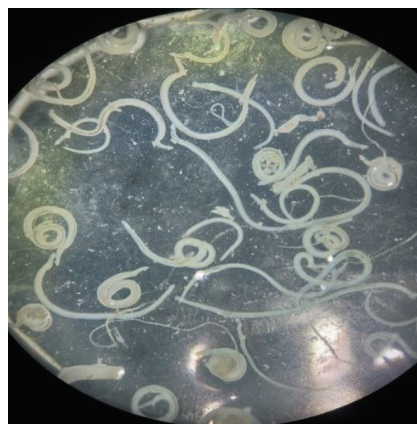


Fig 2: Recovered blood flukes from the mesenteric blood vessels in buffalo



Fig. 3: Male *Schistosoma spindale* showing gynaecophoric canal (arrow) (10X)



Fig.4: Spindale shaped eggs in the uterus of female (10X)

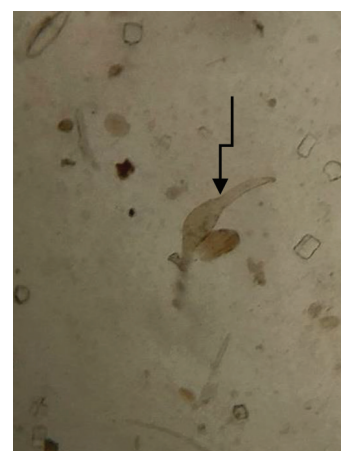


Fig. 5: Eggs of *S. Spindale* in the GI contents

were recovered in saline (Sumanth *et al.*, 2004). The intestinal contents were also screened for the presence of eggs of the adult flukes found in the mesenteric veins, and it was further subjected to sedimentation techniques to detect different helminthic eggs/protozoan oocysts. The findings were expressed in percent frequency for the season and district-wise prevalence of blood flukes and GI parasites. Based on the numbers of paired worms recovered, intensity of infection was calculated as per the method of Sumanth *et al.* (2004).

RESULTS AND DISCUSSION

Prevalence of Visceral Schistosomes

Out of 592 mesenteries examined, 95 animals (16.04%) were positive for *Schistosoma* spp. which were identified based on the cuticular morphology and testicular lobes, gynaecophoric canal (Fig. 3) and spindle shaped eggs in the gravid uterus of the female schistosomes (Fig. 4). Similar trend was observed by Jeyathilakan *et al.* (2008) and Lakshmanan *et al.* (2011) in buffaloes slaughtered at Chennai and Thrissur, respectively, while Agrawal *et al.* (2013), Ravindran *et al.* (2007) and Sumanth *et al.* (2004) reported higher prevalence of *S. spindale* namely 41.00%,

50.00% and 68.00% in Madhya Pradesh, Kerala and Karnataka, respectively. The prevalence of blood fluke was high in summer (16.58%) followed by winter (16.23%) and monsoon (14.84%)(Table 1). However, Rashid *et al.* (2022) and Jeyathilakan *et al.* (2008) reported higher prevalence in summer followed by winter in buffaloes from Bangladesh, and Tamil Nadu. Higher prevalence of schistosomosis in buffaloes was observed from Thane followed by Mumbai and Satara district with the prevalence rate of 20.48%, 16.47% and 11.30%, respectively (Table 2). However, no significant difference ($p>0.05$) was observed among those areas.

In the present study mild infection of schistosomosis was predominant (36.64%) followed by moderate (5.26%) infection. No heavy infection was observed (Table 3). Our observations corroborate with Jeyathilakan *et al.* (2008) in Tamil Nadu.

Prevalence of GI Parasites

In the present study, overall prevalence of GI parasites in the intestinal content was recorded to be 10.32% (38/368). The highest prevalence of gastrointestinal parasites was

Table 1: Season-wise prevalence of blood flukes in mesenteric veins and intestinal content of buffaloes

Season	No. of mesenteries			Prevalence (%)	No. of intestinal content		Prevalence (%)
	Examined	Positive			Examined	Positive	
Monsoon	128	19		14.84	103	14	13.59
Summer	199	33		16.58	175	17	9.71
Winter	265	43		16.23	90	7	7.78
Total	592	95		16.05	368	38	10.32
X² value			0.3344		X² value		1.9053
P value			0.996		P value		0.862

Table 2: District-wise prevalence of visceral schistosomosis

District	No. of mesenteries examined	No. of positive mesenteries	Prevalence (%)	X ² value	P value
Thane	166	34	20.48		
Mumbai	249	41	16.47		
Satara	177	20	11.30	5.4178	0.367
Total	592	95	16.04		

Table 3: Intensity of infection with *S. spindale* in buffaloes

Intensity of infection	Worm pairs	No. of buffaloes infected
Mild	1-20 pairs	35 (36.84 %)
Moderate	20-100 pairs	05 (5.26 %)
Heavy	>100 pairs	00

recorded in summer (45.94%) followed by monsoon (37.83%) and winter (18.91%). Though there was a variation in seasonal prevalence, no significant difference ($p > 0.05$) was observed (Table 1). This finding was in accordance with the report of Dappawar *et al.* (2020) from Udgir, Maharashtra. Amphistomes eggs (75.67%, 28/38) were predominant in the buffaloes slaughtered at Deonar abattoir followed by Strongyles (5.40%), Coccidian oocyst (5.40%), *Capillaria* spp. (2.70%), *S. spindale* (2.70%, Fig. 5), *Fasciola* spp. (2.70%) and *Trichuris* spp. (2.70%) in the intestinal content. Mixed infection was reported in 5.04 % animals with amphistome eggs co-existing with *Strongyle* spp. and *Capillaria* spp. A low incidence of *Schistosoma spindale* eggs (2.70%) encountered in the intestinal content of the buffaloes concurred with the reports published by Sree *et al.* (2021), Singh and Agrawal (2007) and Biswas *et al.* (2014) from Andhra Pradesh, Madhya Pradesh and Bangladesh, respectively. The low prevalence of schistosomes in coprological examination could be due to low fecundity rate and the faecal samples of animals are often coated with mucous which helps in hatching of the eggs and hence the infection is often under-diagnosed (Sumanth *et al.*, 2004).

Considering the prevalence rate of visceral schistosomosis, we can conclude that animals and human in these regions are sub-clinically at risk and conventional diagnostic method fails to detect the active infection in animals and human.

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