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Prevalence of Paramphistomosis in Bovine in and around Gondar town

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Abstract: A cross sectional study was carried out from February 2022 to May 2022 in Gondar Elfora Abattoir to determine the prevalence of paramphistomosis in cattle (local, cross) breeds which were came from highland, mid highland and lowland areas. Three hundred (300) cattle were included for routine ante-mortem and postmortem examination for the presence of paraphistomum. The parasite was examined grossly to appreciate the morphology of adult paraphistomum. Out of 300 cattle examined, 122 (40.7%) were found to be positive for paramphistomosis. From 199 infected cattle fluke burden at organ level 100(81.96%) was in rumen, 9(7.4%) was in reticulum and 13(10.7%) was found mixed (rumen and reticulum). The existence of paraphistomum in respect to organ and origin, 59(65.6%) was in rumen and 2(22.7%) was found in reticulum predominantly in Gondar and dembia respectively. However, there is statistical significance variation ($p < 0.05$) between the prevalence of paraphistomum and that of origin, breed, and age groups of the animals. Integrated control approach using selected anthelmintic therapy and snail control to reduce the magnitude of the problem was suggested as a recommendation.
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1. INTRODUCTION

Parasitism represents a major obstacle to the development of sub-sector and bovine paramphistomosis is one of the most important parasitic diseases of cattle causing mortality and production losses in various parts of Ethiopia. Paramphistomosis is the priority disease in the highland as well as in lowland areas of Amhara regional state (csa, 2010). Paramphistomosis is distributed all around the world, but the highest prevalence has been reported in tropical and sub-tropical regions, particularly in Africa, Asia, Australia, Eastern Europe and Russia. The epidemiology of paraphistomum is determined by several factors governed by parasite-host-environment interactions. The major epidemiological variable influencing worm burdens of animals is the infection rate from pastures. It is also influenced by the climatic requirement for egg hatching, development and survival of the larvae in pasture (ozdal *et al*., 2010).

The adult paramphistomum is found in the rumen and reticulum but the immature parasite is found in the duodenum. Adult paraphistomum are mainly parasitic in the fore stomachs of ruminants, although a few species occur in the intestine of ruminants, pigs and horses. Their shape is not typical of the trematodes, being conical rather than flat. All require a water snail as an intermediate host (Taylor *et al*., 2007). Paramphistomosis causes a great economic loss in terms of decrease in milk and meat production, loss of weight treatment cost of diseased animals and additional labor required for handling such animals.

Mortality rate in young animals is very high (javed, 2008). It is caused by *paraphistomum Cervi. Paramphistomum Epiclitum*, paramphistomum *Microbothriodes* (chowdhry and tada, 1994; kassai, 1999; rinaldi *et al.*, 2005; shanila and hafeez, 2005; sripalwit *et al*., 2007). This disease is accompanied by fatal diarrhea, weakness, dehydration and decreased milk yield, sub maxillary edema and death thereby causing great economic loss to the livestock industry (javed, 2008; Georgi *et al*., 1999; Mclaren *et al*., 2006; Merianos, 2007; Bianchin *et al*., 2007). Heavy infections with immature flukes in the upper small intestine can cause serious ill health and death (Panda, 1985; Urquhart *et al*., 2000).

Outbreaks of disease generally occur in the drier months of the year when the receding water uncovers herbage contaminated with encysted metacercariae in these areas. Dispersal of snails by flooding events and changes in farm-management practices may be responsible for the apparent emergence of the parasite (Foster *et al*., 2008). In spite of the aforementioned prevailing situation and the presence of a number of problems due to gastrointestinal parasites there is scarcity of well-

documented information on the occurrence of Paramphistomum in ruminants in Ethiopia, Therefore the objectives of this study were: To assess the prevalence of paramphistomum in Bovine slaughtered in Gondar Elfora Abattoir.

2. MATERIALS AND METHODS

2.1. Study area

The study was conducted from February, 2023 to May, 2023 in Gondar town, Ethiopia which is located 12°36'N and 33°28'E at altitude of 2300 meter above sea level and the study was performed in and around Gondar, in Amhara National Regional State, located in the northwestern part of Ethiopia. The cattle population of Gondar zone was estimated 376,841 (CSA, 2016). The present study were carried out in cattle which were coming to Gondar Elfora abattoir, for those animals coming from Gondar Zuria woreda of cattle with history of good management and overloading of animals in study area were selected for further diagnoses.

2.2. Study population

The study animals were cattle breeds of different ages and body conditions brought from Gondar, Dembia and Azezo areas to the abattoir for the purpose of meat production. Bovine breeds were categorized in to local and exotic.

2.3. Sampling technique

Systematic random sampling technique was used to select the study units i.e. the animals were selected in a way that the first was taken randomly and the rest were selected in 5th round.

2.4. Study design

A cross sectional study was conducted to determine the prevalence of Paraphistomum infection in cattle from February 2023 to May 2023 in Gondar Elfora Abattoir.

2.5. Sample size determination

The desired sample size was determined by the formula given in (Thrusfield, 2007) with 95% of confidence interval and 5% desired precision with expected prevalence of 50%.

N = (1.96)2 x pep (1-pexp) / d 2

Where N=number of sample size,
Pexp=expected prevalence,
d2 =Absolute precision.

But due to shortage of time 300 Bovine were included in the study.

2.6. METHODOLOGY

2.6.1. Ante mortem examination

Ante mortem inspection was carried out on the animals before slaughter to assess their general health status. During ante mortem examination, detail records about the species, breed, sex, age, origin and body condition of the animals was recorded. General physical examinations of animals were conducted.

2.6.2. Post mortem examination

During postmortem examination rumen and reticulum was systematically inspected for the presence or absence of adult paramphistomum and fluke burden using the routine meat inspection procedures if evidence of paramphistomum were found they are recorded separately. The primary examinations of visualization and palpation were performed (Urquhart *et al*. (1996).

2.7. Data analysis

All the data collected during the study from the abattoir were recorded in the format developed for these purpose and later on entered into Microsoft excel spreadsheet. Statistical analysis for categorical variables such as, age, origin and organ infected, was expressed in percentages by using Intercooled STATA 11.0 software.

3. RESULTS

3.1. Overall prevalence

In this study, a cross-sectional investigation on the occurrence of bovine paramphistomosis was carried out between February 2023 and May 2023. A total number of 300 Bovine were included to check the presence of paramphistomum in Gondar Elfora Abattoir. Out of 300 slaughtered Bovine, 122 (40.7%) were found to harbor paramphistomum parasites. The highest and lowest percentage of paramphistomosis from different potential risk factors of bovine was recorded.

Table 1. Overall prevalence of bovine Paramphistomosis in Gondar Elfora Abattoir.

	Examined animals	Prevalence in %	X^2	p-value
Negative	178	59.33	300	.00
Positive	122	40.7		
Total	300	100		

Out of 300 cattle breeds that were slaughtered at Gondar Elfora Abattoir 122 animals were found infected with paramphistomosis. Statistically significant difference ($P < 0.05$) in the prevalence of bovine paramphistomosis three different origins (locations) was observed. The prevalence of paramphistomosis was highest in Gondar town (71.7%) and the lowest in Dembia district (9.9%).

Table 2. Prevalence of bovine paramphistomosis based on origin of the animals.

Origin	No. of cattle	Number positive	Prevalence (%)	X^2	p-value
Gondar	99	71	71.7	79.2	.00
Dembia	101	10	9.9		
Azezo	100	41	41		
Total	300	122	40.7		

The total of 300 Bovines examined, prevalence of paramphistomosis was higher in Adult bovine (41.3%) than young (40.2%). There was a statistically significant difference (P<0.05) in the prevalence of paramphistomosis between adult and young.

Table 3. Prevalence of bovine paramphistomosis based on age groups.

Age	No. of cattle	Number positive	Prevalence (%)	X^2	p-value
young	179	72	40.2	301.0	.00
Adult	121	50	41.3		
Total	300	122	40.7		

It shows the proportion of Paramphistomosis in organs which were inspected. A total of 122 organs were infected either in mixed form or in single. In this study, it was found that two and both organs have been affected at various levels. Among these organs examined, the highest proportion of the paramphistomosis was recovered in the rumen (82%) followed by both rumen and reticulum (40.7%), and reticulum (7.4%).

Table 4: Prevalence of bovine paramphistomosis on the basis of organs.

Organ infected	No. of organs infected	Prevalence (%)	X^2	p-value
Rumen	100	82	249.8	.00
Reticulum	9	7.4		
Both (rumen and reticulum	13	10.6		
Total	122	40.7		

Table 5. Prevalence of Paramphistomosis with respect to organ and origin.

Organ infected	Gondar	prevalence%	Dembia	Prevalence%	Azezo	Prevalence%	Total	prevalence%	X^2	p-value
Rumen	59	65.6	33	33	8	8	100	100	65.7	.000
Reticulum	5	55.6	2	22.2	2	22.2	9	100		
Both	7	53.8	4	30.7	2	15.4	13	100		
Total	71	58.2	10	8.2	41	33.6	122	100		

4. DISCUSSION

The study found that the overall prevalence of paramphistomosis in bovine was 40.7% (122/300). This finding is lower than the prevalence rate 51.82% (Getnet *et al*,.2016) but higher than the prevalence rate 20% found by (Haridy *et al*. 2006) from Egypt, 16.6% (Jithendran 2000) from India, 23.8% by (Juyal *et al*.2003) and 5.94% by Hafeez 2005) from India, 13.6% in Turkey by (Sevimli *et al*.2005), 17.1% by Phiri *et al*.2006) from Zambia, 28% from Thailand by (Morakot and Sakchai 2006). The difference may be due to difference in geographical regions and varied environmental conditions. The occurrence of paramphistomosis in an area is influenced by a multifactorial system that is composed of hosts, parasitic agents, transmission

process and environmental effects (Radostits *et al.*, 2000).

The current study indicated that the fore stomach can be infected with paramphistomosis at different infection rates. In this study the predominant predilection site of paramphistomosis was found to be the Rumen (82%). (Keyyu *et al.*2006), which is 42.1% from Tanzania; (Chingwena *et al.* (2002). Which is 37.6% from Zimbabwe and (Phiri *et al.* 2006), which was 51.6% in Zambia. However, this finding and (Keyyu *et al.* 2006).The percentage of infection was higher in the Rumen (82%) than in the Reticulum (7.4%) and both Rumen and reticulum (10.6%). This difference in the infection rate of paramphistomosis in the fore stomach was statistically significant (P < 0.05%), reportedly 70%. The prevalence variation between studies District showed the highest and the lowest were 71.7% and 9.9% in Gondar and Dembia respectively. The main reason is due to variation in the rate of prevalence may be attributed to environmental conditions, managemental conditions, parasites and use of anti paraphistomum drug agents, local climatic conditions presence or absence of water reservoirs, lakes, rivers and availability of suitable intermediate hosts. (Maqbool *et al.* 2002, 2003, Narcis *et al.* 2004 and Diaz *et al.* 2007). Reported that irrigation canals have a role in distribution of paramphistomosis eggs. Lower incidence of paramphistomosis in adult cattle has been reported in the present study.

Prevalence in adults' 41.3% and 40.2% prevalence in young animals. The finding agreed with the reports of (Keyyu *et al.* 2006).These results lower than (Getnet *et al.*2016) 75.2% and 47.2% (Juyal et *al.* 2003). But higher than 23.8% and Shanila and Hafeez 2005 , 5.94%. The relatively high frequencies could be associated with nutritional and climatic stress, such as altitude, rainfall and temperature and livestock management system. As different herds of animals come in close contact at available communal watering and grazing sites (contact points) because of the feed scarcity, the establishment and spread of Paramphistomosis were favored.

Furthermore, adult animals were significantly more frequently affected than young regarding paramphistomosis because less exposure of the young animals to the parasite than adult. During the dry periods, breeding of the snails and development of the larval flukes slow down or stop completely and snails undergo a state of aestivation (FAO, 1994; Souls by, 1982; Urquhart reports of Keyyu *et al.*2006) and (Urquhart *et al.*1986). Although a decreasing trend was observed along with the advancement of the dry season, (Radostits *et al.*, 2000).

5. CONCLUSION AND RECOMMENDATIONS

In general, Paramphistomosis is one of the major obstacles for livestock development in Ethiopia by causing remarkable production losses at different parts of the country. This is due to the fact that the area of origin of the animals is suitable for the survival of the snail intermediate host and the parasite. Paramphistomum burdens varied seasonally and were dependent upon the number of infected host snails. Peak fluke burdens and clinical paramphistomosis occurred in late summer and early winter. Based on the aforementioned conclusion, the following points were forwarded as recommendations: Integrated control approach using selected anthelmintic therapy and snail control should be implemented to reduce the magnitude of the problem, In addition, Awareness of the producers about the disease should be raised to enable them actively participate in the control programs and Finally, further information on the epidemiology, ecology and biology of the intermediate host snail should be gathered to help in proposing and implementation of disease control programs.

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7. ANNEXES

Annex-1-Ante-mortem and post mortem examination data recording format for the routine abattoir inspection activity.

Region————City———— Name of abattoir———— Date————

The name of investigator————Number of slaughter cattle per day————

Type of abattoir: Private ———— Municipal———— Export————

A/ Ante-mortem examination format

		Type animation						
Date	ID.No	Age(year)		Breed		Body conditions		
		<5	>5	Local	Cross	Poor	Medium	Good

B/ post mortem examination format

Type of parasites	Organ infected
paramphistomosis	

Annex -2 -Age determination based on dentation

Age (year)	Characteristics change
1.5-2	I_1 erupt
2-2.5	I_2erupt
3	I_3 erupt
3.5-4	I_4 erupt
5	All incisors and canine are in wear
6	I_2 is level and the neck has emerged from gum

10/12/2024 GC