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A Survey of Gastrointestinal Helminthes among Chickens in Bahir Dar Town, Ethiopia

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Abstract: Parasitic diseases are among the major constraints of poultry production. The common internal parasitic infections that occur in poultry include cestodes, nematodes and protozoa (*Eimeria* species). A cross sectional study was conducted in Bahir Dar town between October 2013 and April 2014 to determine the prevalence of gastrointestinal helminthes of chickens kept under different management systems and to assess the effect of sex, age and breed on the occurrence of gastrointestinal helminthes. Three hundred eighty four faecal and sixty mucosal scrapping samples collected from randomly selected chickens were examined using floatation and direct smear techniques respectively. In this study, the overall prevalence of gastrointestinal helminthes was found to be 84.6% (325/384) out of which 53.9%, 40.6% and 24.2% were nematodes, *Eimeria* species and cestodes respectively. The species of gastrointestinal helminthes identified in this study were *Ascaridia galli* (31.5%), *Heterakis gallinarum* (27.6%), Capillaria species (7.3%), *Subulura brumpti* (6.2%), *Raillietina cesticillus* (14.3%), *Davainea proglottina* (6.8%), *Choanotaenia infundibulum* (3.9%) and *Raillietinae chinobothrida* (3.6%). Out of the total of 195 and 189 village and small scale commercial chickens examined for gastrointestinal helminthes, 89.2% and 79.9% chickens respectively were found to be positive and the difference in prevalence of gastrointestinal helminthes between management systems was statistically significant ($P<0.05$). The overall prevalence of nematodes and cestodes were significantly higher ($P<0.05$) in male, adult, local and village chickens than female, young, exotic and small scale commercial chickens. The overall prevalence of *Eimeria* species was significantly higher ($P<0.05$) in young, exotic and small scale commercial chickens than adult, local and village chickens. There was no statistically significant difference ($P>0.05$) in the overall prevalence of *Eimeria* species between male and female chickens. The high prevalence of gastrointestinal helminthes among chickens in the study area may be due to low level of management and health care services. This suggests the need to implement awareness creation among chicken producers on management and health care services of chickens; improvement of management practices and set up of prevention and control strategies so as to harvest the diverse products that may be generated from the poultry production sector.

Key words: Prevalence · Gastrointestinal Helminthes · Chickens · Management System · Bahir Dar Town · Ethiopia

INTRODUCTION

The Poultry industry occupies an important position in the provision of animal protein (meat and egg) to man and generally plays a vital role in the national economy as a revenue provider. Poultry production in Africa and parts of Asia is still distinctively divided into commercialized and village enterprise subsector [1].

Disease is among the major constraints of poultry production. The common internal parasitic infections occur in poultry include cestodes, nematodes and *Eimeria* species that cause considerable damage and great economic losses to the poultry industry due to malnutrition, decreased feed conversion ratio, weight loss, lowered egg production and death in young birds. Furthermore, helminthes can make the flock less

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resistant to diseases and exacerbate existing disease conditions [2].

In Ethiopia, many researches had been conducted both on gastrointestinal helminthes [3] and on coccidian helminthes [4], but many of them focused on village chicken production and studied on helminthes or coccidian helminthes separately. Studies on the occurrence of multiple helminthes of chickens are limited and little has been done on the prevalence of gastrointestinal helminthes of chickens in Bahir Dar town. Therefore, this study was geared with the objectives to determine the prevalence of gastrointestinal helminthes of chickens that are kept under different management systems and assess the influence of host related risk factors such as sex, age and breed on the occurrence of gastrointestinal helminthes.

MATERIALS AND METHODS

Study Area: The study was conducted from October 2013 to April 2014in Bahir Dar town which is located in the North Western part of Ethiopia at a physical distance of 565 kilometers from Addis Ababa, the capital city of Ethiopia. The study area is located at 11°29'-11°41' N latitude and 37°16'-37°27'E longitude. The average elevation in the town is about 1795 m.a.s.l with 'Weina Dega' type of agro-ecological zone. The town covers an area of about 16,000 hectares. The mean annual precipitation depth recorded at Bahir dar Station in 37 years period from 1962 to 1999 is about 1437 mm. The study area experiences average annual rainfall that ranges from 1200-1600 mm and it has mean annual temperature of 26°C [5].

Study Animals: Two groups of chickens based on management practice which included; 195 (50.8%) chickens under village and 189 (49.2%) chickens under small scale commercial, management systems were considered. The chickens' demographic characteristics (age, sex and breed) were considered important. The ages of chickens were determined using criteria as used by Bachaya *et al.,* [6] and Amare *et al.,* [4].Those chickens less than 6 months of age were classified as young (n=168) and those of the chickens greater than 6 months of age were categorized as adults (n=216). Chickens of 139 (36.2%) and 245 (63.8%) males and females respectively were sampled. Breed of the chickens was also another important factor considered and thus, about 197 and 187 local and exotic chickens respectively were sampled.

Study Design: A cross-sectional study was conductedfromOctober2013 to April 2014in Bahir Dar town. Sampling was carried out repeatedly from apparently healthy chickens under different management systems (with their varying sex, age and breed) on local markets, merchants, households and poultry farms in the town and parasitological examination of faecal and mucosal scraping samples from selected chickens were examined for the presence of helminthes.

Sampling Method and Sample Size Determination: Multistage random sampling technique was employed to select individual and/or farm chickens so as to determine the prevalence of gastrointestinal helminthes of chickens and assess the potential risk factors for infection by employing simple floatation and direct smear techniques for faecal samples and intestinal mucosa scrapings respectively. Thus, chickens in Bahir Dar town were grouped in to two groups (chickens under village production systems and small scale commercial production systems). Then after, successive simple random sampling was undertaken to the levels of the markets, farms, households and individual chickens.

To calculate the total sample size, the following parameters were used: 95% level of confidence interval (CL), 5% desired level of precision; and with the assumption of 50% expected prevalence of gastrointestinal helminthes among chickens in the study area, the sample size was determined using the formula given in Thrusfield [7].

$$n = \frac{1.96^{2} * P_{exp} * (1 - P_{exp})}{d^{2}}$$

Where, n=required sample size, P_{exp}=expected prevalence, d^2=desired absolute precision. By using this formula, the sample size was calculated to be 384.

Sample Collection and Study Methodology: Chickens were grouped in to two groups based management systems; and repeated random samplings by lottery system were carried out to select local markets, sites of merchants, households and farms. Faecal samples from chickens were collected directly from the vent of the chickens, by using swab and from top layers of fresh voided litter whereas scrapings from intestinal mucousa were collected, from the intact gastrointestinal tracts of sacrificed chickens, by using scissors and scalpel blades. All samples were placed in air and water tight sample vials (universal bottle containing 10% formaldehyde solution), labeled

accordingly and then transported to Bahir Dar Animal Health Investigation and Diagnostic Laboratory where they were analyzed for Helminthes' ova and *Eimeria* oocysts. The presences of gastrointestinal helminthes infections were confirmed by floatation and direct smear techniques for faecal and intestinal mucousal scrapings respectively. The results obtained in either of the techniques were considered as positive when at least one parasite egg or oocyst was observed in one of the techniques employed. Common salt (NaCl) floatation solution was prepared in the laboratory and used as a floatation solution. Mucousal scrapings from sixty (60) sacrificed chickens were examined by mucosal scraping examination procedures as decribed byLobago *et al*. [8]. Identification of gastrointestinal helminths (cestodes and nematodes) eggs and *Eimeriaoocysts* were carried out using a light microscope with x10 and x40 objectives. Identification of characterstic eggs and oocysts were done by using identification keys mentioned in Jordan and Pattison [9] for helminthes eggs and *Eimmeria* oocysts.

Age Estimation: Ages of the chickens examined were classified into two categories as young (0-6 months) and adult (>6 months) as used by Bachaya *et al.,* [6] and Amare, *et al.,* [4].

Statistical Analysis: Computation of descriptive statistics was conducted using SPSS version 16.0. Descriptive statistics such as percentages, proportions and frequency distributions were applied to compute some of the data. The prevalence of the helminthes was calculated by dividing the number of chickens harboring a given parasite by the number of chickens examined (i.e. the proportion of positive results among tested chickens). Pearson's chi-square (χ^2) to measure association between prevalence of the gastrointestinal helminthes with the age, sex, breed and management systems of chickens was used as the statistical tool. Confidence level was held at 95% and statistical analysis for the difference in prevalence of gastrointestinal helminthes among risk factors were considered significant when the p-value was less than 0.05 ($P<0.05$).

RESULTS

Overall Prevalence of Gastrointestinal Helminthes among Chickens: A total of three hundred eighty four (384) chickens, i.e. 195 from village and 189 from small scale commercial management systems, were examined out of which 139 (36.2%) and 245 (63.8%) were males and females respectively. Three hundred twenty five (84.6%) of the chickens were positive for one or another of the gastrointestinal parasite eggs and *Eimeriaoocysts* that imply to the different parasite species i.e. 93 (24.2%) Cestodes [*R. cesticillus*55 (14.3%)*, R. echinobothrida*14 (3.6%)*, D. proglottina*26 (6.8%)*, C. Infundibulum* 15 (3.9%)], 207 (53.9%)], Nematodes [*A. galli* 121 (31.5%)*, H. gallinarum*106 (27.6%)*, Capillaria species* 28 (7.3%), *Subulurabrumpti* 24 (6.2%)] and 156 (40.6%) *Eimeria* species. Eight (4 nematodes and 4 cestodes) species of gastrointestinal helminthes were identified but *Eimeria* species were not characterized to the species level (Table 1).

Table 1: Overall prevalence of gastrointestinal helminthes among chickens

Species of GIT parasite	Number of positive (N=384)	Prevalence (%)
Nematodes	207	53.9
Ascaridiagalli	121	31.5
Heterakisgallinarum	106	27.6
Capillaria species	28	7.3
Subulurabrumpti	24	6.2
Cestodes	93	24.2
Raillietinacesticillus	55	14.3
Raillietinaechinobothrida	14	3.6
Davaineaproglottina	26	6.8
Choanotaenia infundibulum	15	3.9
Protozoa		
Eimeria species	156	40.6

Among the Nematodes, the most prevalent species found was *Ascaridia galli* (31.5%) followed by *Heterakis gallinarum* (27.6%) while least prevalent recorded was due to *Subulura brumpti* (6.2%). *Raillietina cesticillus* (14.3%) was found the most prevalent among Cestodes; whereas *Raillietinae chinobothrida* (3.6 %) and *Choanotaenia infundibulum* (3.9%) were recorded least prevalent respectively (Table 1).

Prevalence of Single and Mixed Infections of Gastrointestinal Helminthes among Chickens: Of the total of 384 chickens examined for the presence of gastrointestinal helminthes, 97 (25.3%), 91 (23.7%) and 17 (4.4%) of the chickens were found to harbor single infections of *Eimeria*_species, nematodes and cestodes respectively. double mixed infections were also identified and about 62 (16.1%), 46 (12%) and 4 (1%) of the chickens were recorded to harbor mixed infection due to cestodes and nematodes, cestodes and *Eimeria* species and nematodes and *Eimeria* species respectively. but only 8 (2.1%) of the chickens were diagnosed to be infected by triple mixed infection of gastrointestinal helminthes (Figure 1).

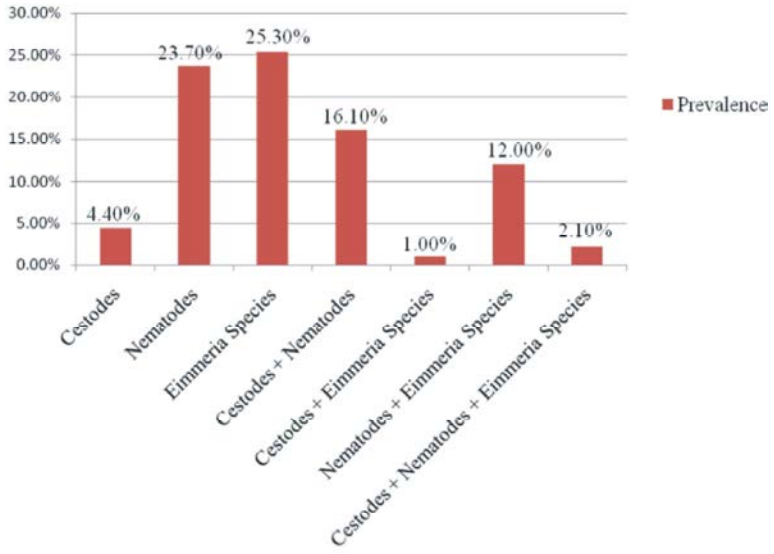

Fig. 1: Status of single and mixed infection of gastrointestinal helminthes among chickens.

Table 2: Prevalence of gastrointestinal helminthes among chickens between sexes

	Sex, Number of Positive (prevalence in %)				
GIT helminthes	Male (n=139)	Female (n=245)	Total (N=384)	χ^2	(P-value)
Cestodes	42 (30.2)	51 (20.8)	93 (24.2)	4.269	0.039
R. cesticillus	24 (17.3)	31 (12.7)	55 (14.3)	1.538	0.215
R. echinobothrida	8 (5.8)	6 (2.4)	14 (3.6)	2.760	0.097
D. proglottina	10 (7.2)	16 (6.5)	26 (6.8)	0.062	0.804
Ch. Infundibulum	7 (5.0)	8 (3.3)	15 (3.9)	0.741	0.389
Nematodes	86 (61.9)	121 (49.4)	207 (53.9)	5.561	0.018
A. galli	52 (37.4)	69 (28.2)	121 (31.5)	3.514	0.061
H. gallinarum	43 (30.9)	63 (25.7)	106 (27.6)	1.210	0.271
Capillaria species	12 (8.6)	16 (6.5)	28 (7.3)	0.580	0.446
S. brumpti	10 (7.2)	14 (5.7)	24 (6.2)	0.332	0.565
Protozoa					
Eimeria species	54 (38.8)	102 (41.6)	156 (40.6)	0.285	0.594
Overall	127 (91.4)	198 (80.8)	325 (84.6)	7.592	0.006

Table 3: Prevalence of gastrointestinal helminthes among Chickens between ages

	Age, Number of Positive (prevalence in %)				
GIT helminthes	Young (n=168)	Adult (n=216)	Total (N=384)	χ^2	(P-value)
Cestodes	16 (9.5)	77 (35.6)	93 (24.2)	35.141	0.000
R. cesticillus	8 (4.8)	47 (21.8)	55 (14.3)	22.248	0.000
R. echinobothrida	6 (3.6)	8 (3.8)	14 (3.6)	0.005	0.945
D. proglottina	1 (0.6)	25 (11.6)	26 (6.8)	18.045	0.000
Ch. Infundibulum	4 (2.4)	11 (5.1)	15 (3.9)	1.851	0.174
Nematodes	63 (37.5)	144 (66.7)	207 (53.9)	32.354	0.000
A. galli	26 (15.5)	95 (44.0)	121 (31.5)	35.580	0.000
H. gallinarum	24 (14.3)	82 (38.0)	106 (27.6)	26.510	0.000
Capillaria species	4 (2.4)	24 (11.1)	28 (7.3)	10.654	0.001
S. brumpti	19 (11.3)	5 (2.3)	24 (6.2)	13.048	0.000
Protozoa					
Eimeria species	101 (60.1)	55 (25.5)	156 (40.6)	40.054	0.000
Overall	142 (84.5)	183 (84.7)	325 (84.6)	0.003	0.0957

Table 4: Prevalence of gastrointestinal helminthes among chickens between breeds

	Breed, Number of Positive (prevalence in %)				
GIT helminthes	Local (197)	Exotic (187)	Total (N=384)	χ^2	(P-value)
Cestodes	74 (37.6)	19 (10.2)	93 (24.2)	39.252	0.000
R. cesticillus	40 (20.3)	15 (8.0)	55 (14.3)	11.795	0.001
R. echinobothrida	13 (6.6)	1 (0.5)	14 (3.6)	10.043	0.002
D. proglottina	21 (10.7)	5 (2.5)	26 (6.8)	9.693	0.002
Ch. infundibulum	15 (7.6)	0 (0.0)	15 (3.9)	14.817	0.000
Nematodes	139 (70.6)	68 (36.4)	207 (53.9)	45.145	0.000
A. galli	82 (41.6)	39 (20.9)	121 (31.5)	19.174	0.000
H. gallinarum	74 (37.6)	32 (17.1)	106 (27.6)	20.078	0.000
Capillaria species	23 (11.7)	5 (2.7)	28 (7.3)	11.499	0.001
S. brumpti	17 (8.6)	7 (3.7)	24 (6.2)	3.909	0.048
Protozoa					
Eimeria species	49 (24.9)	107 (57.2)	156 (40.6)	41.613	0.000
Overall	175 (88.8)	150 (80.2)	325 (84.6)	5.480	0.019

Table 5: Prevalence of Gastrointestinal Helminthes among chickens between management

	Management, Number of Positive (prevalence in %)				
GIT helminthes	Village (n=195)	SSC (n=189)	Total (N=384)	χ^2	(P-value)
Cestodes	73 (37.4 %)	20 (10.6 %)	93 (24.2 %)	37.711	0.000
R. cesticillus	39 (20.0 %)	16 (8.5 %)	55 (14.3 %)	10.405	0.001
R. echinobothrida	13 (6.7 %)	1 (0.5 %)	14 (3.6 %)	10.292	0.001
D. proglottina	21 (10.8 %)	5 (2.6 %)	26 (6.8 %)	10.034	0.002
C. infundibulum	15 (7.7 %)	0 (0.0 %)	15 (3.9 %)	15.129	0.000
Nematodes	138 (70.8 %)	69 (36.5 %)	207 (53.9 %)	45.341	0.000
A. galli	82 (42.1 %)	39 (20.6 %)	121 (31.5 %)	20.398	0.000
H. gallinarum	72 (36.9 %)	34 (18.0 %)	106 (27.6 %)	17.217	0.000
Capillaria species	23 (11.8 %)	5 (2.6 %)	28 (7.3 %)	11.885	0.001
S. brumpti	17 (8.7 %)	7 (3.7 %)	24 (6.2 %)	4.118	0.042
Protozoa					
Eimmeria species	50 (25.6 %)	106 (56.1 %)	156 (40.6)	36.877	0.000
Overall	174 (89.2)	151 (79.9)	325 (84.6)	6.434	0.011

Prevalence of Gastrointestinal Helminthes among Chickens Between Sexes: Out of 139 male and 245 female chickens examined for the presence of eggs of different gastrointestinal helminthes species, 127 (91.4 %) and 198 (80.8 %) males and females respectively were found infected by one or another of the gastrointestinal helminthes identified. Statistical analysis of data showed the presence of significant variation ($P<0.05$) on the overall prevalence of gastrointestinal helminthes and on the prevalence of cestodes and nematodes between sex groups of chickens; but a statically insignificant ($P>0.05$) difference in prevalence of *Eimeria* species was observed between the sexes (Table 2).

Prevalence of Gastrointestinal Helminthes among Chickens Between Ages: In the study, although the overall prevalence (84.5% in young and 84.7% in adult) of gastrointestinal helminthes between age groups were nearly equal; higher prevalence in adult (35.6% and 66.7%) than in young (9.5% and 37.5%) for cestodes and nematodes infections respectively were recorded and the differences were statistically significant ($P<0.05$) between the two age groups; but the prevalence of *Eimeria* species was found higher in young (60.1%) than in adult (25.5%) with a statistically significant ($P<0.05$) difference of the prevalence between age groups (Table 3).

Prevalence of Gastrointestinal Helminthes among Chickens Between Breeds: A total of 197 local and 187 exotic breeds of chickens were examined for gastrointestinal helminthes out of which 175 (88.8%) and 150 (80.2%) of the local and exotic chickens respectively were found to host one or more of the different gastrointestinal helminthes and the difference in the overall prevalence of gastrointestinal helminthes was statistically significant ($P<0.05$) between breeds (Table 4).

Prevalence of Gastrointestinal Helminthes among Chickens Between Management Systems: Of the 195 and 189 chickens examined from village and small scale

commercial management systems respectively, overall prevalence of 89.2% in village and 79.9% in small scale commercial chickens were recorded and the difference in prevalence of gastrointestinal helminthes was statistically significant (P<0.05) between the management systems (Table 5).

Based on personal observations, it was identified that most of the people producing chickens were not having animal production or veterinary basis of education but carry out production based on their traditional knowledge, experiences and because they are beneficiaries with the income generated from poultry production. Most of the local chickens are fed grain and spend most of the times by scavenging. In addition to this, chicken owners do not seek treatments for chickens and taking sick chickens to Veterinary Clinics is not common in Bahir Dar town. But in the small scale commercial production systems, even though feeding of some rations (to which coccidiostats are included) was found common, but the housing, drinking and bio security practices were identified not to be set as recommended. Small scale commercial farms were found to have private Veterinarians who attend the health of the chickens. However, symptomatic and prophylactic treatments without laboratory diagnoses were found common practices.

DISCUSSION

The overall prevalence of gastrointestinal helminthes among chickens in this study (84.6%) was higher than that reported by Nnadi and George [1], in South-Eastern Nigeria and Ohaeriand Okwum [10], in Abia State Nigeria who reported the prevalence of gastrointestinal helminthes to be 71.3% and 62.7% respectively. The difference in the prevalence of gastrointestinal helminthes infections could be explained by the differences in climatic factors required for the biology of the helminthes, Veterinary facilities and public awareness to diseases.

The prevalence of Nematodes in this study (53.9%) was found to be in line with a report by Hussen *et al.,* [11] who reported the prevalence of Nematodes to be 58.0% at Eastern Shewa zone, Ethiopia. But the overall prevalence of Nematodes in Bahir Dar town was found much higher than a report by Tesfaheywet, *et al*., [12] and Vandanaa *et al.,* [13] who reported prevalence of 19.01% and 5.5% in South Eastern Ethiopia and Trinidad West Indies respectively. Differences in management systems of chickens, breed of chickens considered in the studies and health care service may be responsible for the variation in prevalence of Nematodes among chickens in Bahir Dar town and studies carried out in different areas.

The prevalence of Cestodes in the present study (24.2%) was lower than the reports by Hussen *et al.,* [11] who reported prevalence of 86.32% and 83.0% from Kenya. The lower prevalence of gastrointestinal cestodes among chickens in Bahir Dar town could be attributed to the different techniques used in the studies and differences in the origin of the samples or by geographical differences. The present study was found to be higher than previous study from Ethiopia by Tesfaheywet *et al*., [12] who reported a cestodes prevalence of 1.56% in Haramaya Woreda, South Eastern Ethiopia. The difference in prevalence between the two study areas might be possibly due to the management systems of chickens and breeds of chickens considered by the two studies (i.e. all were exotic and under small scale commercial management systems in case of Tesfaheywet, *et al.,* [12] but different breeds from different management systems in case of the present research) and also the variation in agro-ecology and other factors would have value.

The prevalence of *Eimeria* species among chickens in Bahir Dar town (40.6%) confirmed in this study was lower than the findings of Comfort and Rita [14] who reported 69% in Nigeria. But the present finding was comparable to the reports by Nnadi and George [1] and Mwale and Masika [15] who reported prevalence of 35.5% and 41.43% in chickens from Nigeria and South Africa respectively. In contrary to these, the present finding had shown higher prevalence than the findings of Amare *et al*., [4] and Ohaeri and Okwum [10] who reported overall prevalence of 25.24% and 8.9% in central Ethiopia and Abia state Nigeria respectively. The differences in prevalence of *Eimmeria* species among the findings from different countries and different places of Ethiopia could be attributed to differences in agro-ecology, management systems, the breeds and age groups of chickens, diagnostic methods used, public awareness about gastrointestinal helminthes of chickens, health care management and prevention and control strategies set among chicken producing countries and/or communities.

In the current study, the predominant species identified among Nematodes was *Ascaridia galli* (31.5%). This result was lower than the result of Molla *et al.,* [3] in North administrative zone, Ethiopia and Vandanaa *et al.,* [13] in Trinidad who reported 39.47% and 35.5% respectively. The differences in prevalence can be explained by variations in management systems and breeds of chickens considered during the study periods together with the variation in agro-ecology among the different countries.

Heterakis gallinarum (27.6%) was the second predominant Nematode species recorded in the current

research. The result was found to be in line with the findings of Ogbaje *et al.,* [16] who reported prevalence of 27.8% respectively.

The study showed the overall prevalence of Capillaria species to be 7.3% among chickens in Bahir Dar town. The result was higher than the findings of Ogbaje *et al.,* [16] who reported prevalence of 0.3% in Trinidad.

The result in the current study for *R.cesticillus* (14.3%) was lower than the report by Hussen *et al.* [11] who reported a prevalence of 40.3%, in Eastern Shewa zone, Ethiopia. However, the result was in line with the report of Ashenafi and Eshetu [17] who reported prevalence of 14.45%, in Golestan Province (North of Iran).

The prevalence of *Davainea.proglottina(*6.8%)in this study was comparable to the report by Hussen *et al.,* [11] who found 8.1% prevalence in central Ethiopia while it was higher than the 1.43% prevalence report from South Africa by Mwale and Masika [15].

The prevailing result for the prevalence of *C. infundibulum* (3.9%) was known to be lower than the findings from Ethiopia and South Africa reported by Hussen *et al.,* [11] and Faizullah *et al.,* (2013) who reported prevalence of 13.7% and 20% respectively. However, the result was found to be comparable/almost similar to the respective prevalence of 3.2%, 4.41% and 3.3% reported by Ashenafi and Eshetu [17] but it was slightly higher than the 0% and/or 1.43% prevalence reports from villages in South Africa by Mamashly *et al.,* [18].

In this study, statistically significant ($P<0.05$) differences in the overall prevalence of gastrointestinal helminthes infections of chickens between sex, breed and management systems were confirmed with the overall gastrointestinal helminthes prevalence higher in male (91.4%), local (88.8%) and village (89.2%) chickens than female (88.8%), exotic (80.2%) and small scale commercial (79.9%)] chickens respectively. But the overall prevalence of gastrointestinal helminthes was found to be insignificant ($P>0.05$) between young (84.5%) and adult (84.7%) age groups. The results were congruent with the previous reports of Tesfaheywet *et al.*, [12] that reported statistically significant ($P<0.05$) difference in prevalence of gastrointestinal helminthes between breeds and management groups respectively.

There was a significant difference ($P<0.05$) in the prevalence of *Eimeria* species between the different age, breed and management system groups. The higher infection prevalence of *Eimeria* species was observed in the young, exotic and small scale commercial than in adult, local and village chickens. This can be supported by the justifications of different findings that discuss *Eimeria* species to be more common in young and that reared under intensive management systems [4] and Bachaya *et al.,* [6].

CONCLUSION

Gastrointestinal helminthes were more prevalent in village than small scale commercial chickens which may be due to the scavenging behavior of village chickens in the areas where intermediate hosts are more common which lead to ease exposure of chickens for helminthes; but *Eimeria* species were proofed to occur frequently in small scale commercial than village chickens which may be an implication to wet litter and other suitable conditions for sporulation of oocysts in the confined systems of management. In this study, Sex, age, breed and management systems were identified to be important in influencing the prevalence of gastrointestinal helminthes among chickens. Gastrointestinal helminthes were more prevalent in male, adult and local chickens with a significant difference ($P<0.05$) of infection between sex, age and breed groups respectively; however, *Eimmeria* species were more common in young and exotic chickens with the prevalence differences between age and breed groups having statistical significance ($P<0.05$). The high prevalence of helminthes and *Eimmeria* species in the study area together with the low awareness of chicken producers about the health care of chickens may pose devastating health problems to the chickens and economic losses to poultry production sector.

Conflict of Interests: The authors have not declared any conflict of interests.

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