

Prevalence and Associated Risk Factors of Ascaris in Poultry in and Around Bahir Dar Zuria District; Northwest Ethiopia

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Abstract

A cross sectional study was conducted from April 2019 to June 2019 to investigate ascaris in chickens in and around Bahir Dar Zuria District, Northwest Ethiopia. A total of 351 chickens comprising of 168 exotic and 182 local were examined for ascaris infections. Out of these, 55 (15.67%) were found to be infected with ascaris. There was a statistically significant difference ($p < 0.05$) in the prevalence between breeds of chickens in which higher infection rate was observed in local breed chickens (22.53%) than exotic breeds (8.88%). In addition, there was higher statistically significant difference ($p < 0.05$) in the prevalence between body condition of chicken. Among this group poor body conditions chicken was higher (50%) than good body condition (4.56%). In addition, there was a statistically significant association ($p < 0.05$) in prevalence between the different management systems where there was higher infection rate was recorded in extensive farming system (21.46%) compared to semi intensive (6.82%). There was also higher statistically significant difference among hygienic practice of chicken house in which the prevalence of the infection was 39.05% and 6.12% in poor and good hygiene. There was also high statistically significant difference among availability of dewormer, in which the prevalence of infection was 15.76% and 0% in non-available and available of dewormers. In conclusion the management system should be improved especially the housing and hygienic practice. Veterinarian think about deworming of parasites when supervise poultry farms to enhance productivity in addition to antibiotics. Since there are lack of access for dewormer for smallholder farmers veterinarian should be search alternate; easily accessible and affordable drug for poultry internal parasite.

Keywords: Ascaris, Chicken, Prevalence, Risk Factor

Introduction

Poultry are domesticated birds kept by human for the purpose of obtaining meat, eggs and sometimes feathers. They include birds like chicken, duck, goose and turkey. Poultry are kept in backyards or commercial production systems in most areas of the world. It is one of the most important sources of protein and farm manure (Jegade et al., 2015). The most commonly kept poultry are chickens (*Gallus spp.*), ducks (*Carina spp.*) Geese (*Anser spp.*) and turkeys (*meleagris spp.*). In Ethiopia among these domestic chickens (*Gallus domesticus*) are the most important and clearly domesticated. In this country, approximately 99% of birds is raised under the traditional back yard system [1].

Total chicken population in Ethiopia is estimated to be 56.5 million with native chicken representing 96.9%, hybrid chicken 0.54% and exotic breeds 2.56% [2]. Major cause of mortality in scavenging chickens kept under traditional system of management in Ethiopia includes viral, protozoan and bacterial disease. However, the traditional poultry production system is characterized by low input, low output and periodic destruction of a large portion of the flock due to gastro-intestinal parasites.

Domestic birds are highly susceptible to infection with large number of internal parasites specially helminthes one. In heavily parasitized young birds, the common manifestation are stunted growth, emaciation, weakness and death in young, while in laying hens the egg production was lowered or entirely stopped [3]. *Ascaridia galli* was the great cause of losses due to reduction in weight of chicken [4].

Keeping poultry for commercial use has increased from time to time. But due to poor management practices, poor sanitation, less biosecurity measures, miss disinfection procedure, and poor awareness of disease decrease the production system [5]. There is starting of using antibiotics with commercial poultry farming in Ethiopia but they do not consider dew arming. Among internal parasitic poultry disease one is ascaris; that considered being the most important problem of local chicken as major causes of ill, loss of productivity and indicator of parasite infestation [6]. Prevalence of ascaris parasite in poultry farm became higher. For example 64% in Denmark, 67-88% in Germany, 84% in England and 97% in Netherlands [7-10]. In Africa also increase the

prevalence of infection for example 48.4% from Nigeria, 95.2% of from Zambia and 25.63% in Kenya [11-13]. *Ascaris galli* also reported from different parts of Ethiopia for example 35.6% from central Ethiopia [1].

But the prevalence of ascaris not estimated in our study area. In our preliminary survey, there was no deworming activity performed in commercial and back yard poultry farming despite production loss due to parasite is high. Hence, surveying prevalence of ascaris and monitoring of the risk factors in poultry is of paramount importance in order to provide useful data regarding to the parasite status in and around Bahir Dar Zuria district. This work result helps to plan the right management methods against poultry parasite risks. Detailed knowledge on the burden and management practice is required to apply prevention management methods against poultry ascaris. Besides, this study can serve as baseline information for future work of intervention measures on poultry ascaris. Therefore, the objective of this study was to assess the prevalence of ascaris and its associated risk factors in poultry in and around Bahir Dar Zuria District, Northwest Ethiopia

Material and Methods

Description of Study Area

The study was conducted in Bahir Dar zuria District North west Ethiopia. Bahir Dar is the capital city of Amhara regional state that is found 565 km distance from the capital city of Ethiopia (Addis Ababa). Bahir Dar zuria District is geographically located at about 110, 37, N latitude and 370,28E longitude at an altitude of 1912 m.a.s.l. The annual temperature is 290c and annual rainfall ranges from 1428-1521mm (CAES, 2015). The sampled peasant associations were tenta peasant association, Sebatamit peasant association, robit Peasant association and woreb Peasant association. Out of the total population 1086 people are participate in poultry production (1025 male and 61 female). 70% of the land is covered by plain platues, various bush types, low weeds mainly evergreen landmasses planted with major agricultural products on some semi humid highlands. Goats, equines, and poultry (Amhara Regional Administration Livestock Development Agency records, 2017). The total population of poultry in Zenzelma are 4345, from this, 1320 are exotic and 3025 are local breeds.

Study Population and Study Design

The study population was all-exotic and local breed poultry found in and around Zenzeima. The study units were those poultry that included in the study by chance and the investigator sampled them.

Community based cross sectional quantitative study design was conducted in poultries to estimate the prevalence and risk factors of poultry ascaris in Bahir Dar zuria District from January 2019 to June 2019.

Sample Size Determination and Sampling Method

Sample Size Determination

Sample size for the study was calculated using the formula given by Thrusfield (2005) with precision level of 5%, confidence in-

terval of 95% and considering of previous study of 35.6% from central Ethiopia (Ashenafi and Eshetu, 2004).

$$n = \frac{z^2 \times P \exp (1 - P_{\exp})}{d^2}$$

Where; n=sample size, P exp=expected prevalence, d=absolute precision, z=1.96

$$n = \frac{(1.96)^2 * 0.356(1-0.356)}{(0.05)^2}$$

$$n = 351$$

Over all of 351 chickens were sampled.

Sampling Method

Systematic random sampling method was implemented for sampling of chicken. Close-ended questioner was used to identify the managmental-associated risk factors. Fecal samples were collected per cloaca from selected study units. The information regards to age, sex, breed, body condition and different management systems was recorded.

Sample Collection and Coprological Examination

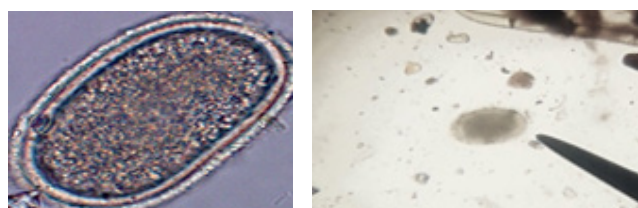
One hundred twenty fecal samples comprising of 44 local and 76 exotic breeds of chickens were collected per cloaca. All samples were put in clean sample bottles containing 10% formalin as preservative and identified appropriately. The sample was processed in Bahir Dar university; Veterinary Parasitology Laboratory. Laboratory examination was also involved faecal examination in household chickens. The samples were later processed in the veterinary Parasitology laboratory using the salt floatation technique (Kassa, 2005). Identification of ascaris galli eggs was done using a standard microscope under ×10 objective magnification (fig).

It is the largest nematode in birds, with females measuring 72 to 112 mm long (Figure 2.1.). The body is semitransparent, creamy-white, and cylindrical. The anterior end is characterized by a prominent mouth, which is surrounded by three large, trilobed lips. The edges of the lips bear teeth-like denticles. Whereas males are relatively shorter and smaller (measuring 50 to 76 mm long), with a distinct pointed and curved tail (Ashour, 1994). The body is entirely covered with a thick proteinaceous structure called cuticle. The cuticle is striated transversely through the length of the body and cuticularae are poorly developed. Two conspicuous papillae are situated on the dorsal lip and one on each of the sub lips (Lalchhandama et al., 2009).



Figure 2.1a: Adult *A.galli* (Tarbiat et al., 2015).

Ascaridia eggs are ovoid in shape, about 50x80 micrometers, and have thick, albuminous shells (Tarbiet et al., 2015).



A) microscopic egg B) our microscopic finding

Figure 2.1b: Eggs of Ascaris galli

Data Analysis and Management

The information obtained from laboratory test and observation was entered on the spreadsheet of Microsoft excel work sheet 2007 and STATA version 12 was used to coded and analyzed the sampled data. Chi-square test was used to assess whether there is a statistically significant difference in ascaris galli infection between host and management factors. A statistically significant association between variables was considered to exist if the calculated p-value is less than 0.05 with 95% confidence level.

Result and Discussion

Out of 351 examined chicken 55 of them were found to be positive. The overall prevalence ascaris in poultry in our study area was 15.67%.

Table 3.1: Prevalence of Ascaris In Poultry In Relation To Host Factors In Bahir Dar Zuria District, 2019.

| Variables | Categories | No-examined | No-positive | X ² | P-value |
|----------------|------------|-------------|-------------|----------------|---------|
| Breed | Local | 182 | 41(22.53%) | 4.3822 | 0.036 |
| | Exotic | 169 | 15(8.88%) | | |
| Sex | Male | 52 | 14(26.92%) | 2.2671 | 0.132 |
| | Female | 299 | 41(13.71%) | | |
| Age | Grower | 166 | 32(19.28%) | 0.9781 | 0.323 |
| | Adult | 184 | 23(12.50%) | | |
| Body condition | Poor | 88 | 44(50%) | 35.0391 | 0.000 |
| | Good | 263 | 12(4.56%) | | |

Table 3.2: Prevalence Of Ascaris In Poultry In Relation To Different Management Factors In Bahir Dar Zuria District In 2019.

| Management variables | Categories | No-examined | No-ascaris-+Ve (%) | X ² | P-value |
|------------------------------------|-----------------|-------------|--------------------|----------------|---------|
| Farming system | Extensive | 219 | 47(21.46%) | 4.5399 | 0.033 |
| | Semi- intensive | 132 | 9(6.82%) | | |
| Feeding | Scavenging | 239 | 44(18.41%) | 1.1753 | 0.278 |
| | Additional | 112 | 12(10.71%) | | |
| Hygiene | Poor | 105 | 41(39.05%) | 20.5137 | 0.000 |
| | Good | 245 | 15(6.12%) | | |
| Availability of deworming in owner | Available | 2 | 0 | 16.23 | 0.001 |
| | Unavailable | 349 | 55(15.76%) | | |

This finding was in lined with the previous report of with a prevalence of 15.1% from Bahir Dar. However, our finding prevalence of ascaris was much lower than the previous reported works in central Ethiopia by with prevalence of 55.26% and from Haramaya 38% by [17, 18]. This might be due to difference in management system, deworming practice and agro-ecological conditions of the study area [1].

In the present study the prevalence of infection in local breed (22.58%) was significantly higher ($P < 0.05$) than the exotic breed (8.62%). This result agreed with the previous studies conducted in Addis Ababa by [19]. He reports a high prevalence rate of ascaris (80%) in local chicken. This is not uncommon because of their free-range mode of management practice which allows them free access to virtually all types of environment and hence, predisposing them to various forms of infections [20].

In addition, domestic chickens feed widely which makes them more predisposed to infection. The duration for the local breed to reach table size is much longer compared to the exotic breeds, which fed usually on artificial diets [21].

In our study, there is no association in prevalence between ascaris galli and the risk factors (Age and Sex) of the ascaris positive chicken ($p > 0.05$). This result agrees with the previous studies conducted in [14, 15] and Morocco by [22]. There was no natural affinity of ascaris to either sex and age of the host of chickens. But this study contrary with another work of Sonaiya (1990) and Matur and his colleagues [20] those reported females and grower chickens were more infected with ascaris parasite than males and adult in both local and exotic breeds [23].

In our study, management system have higher statistically sig-

nificance especially housing system, hygienic practice and free range strategies ($p < 0.05$) with ascaris in poultry [24, 25]. Because more management system in this area was extensive, the chickens seek there feed from the soil and contaminated with infective stage of parasite and living organisms, which serve as intermediate host this, leads to higher chance of infection with ascaris. In addition, there is higher statistically significant ($p < 0.05$) in related to body condition with prevalence 50% and 4.44% in poor and good body condition chickens [26-30].

Conclusion and Recommendations

Generally, ascaris infection is one of the non-negligible problem and prevalent in this study area especially in local breed, poor body condition and poor managed chickens. In addition to other factors, ascaris is one of the causes of lowering chicken production in this area. Based on the above conclusions the following recommendations were forwarded: The management system should be improved especially the housing and hygienic practice [31-43]. In addition regular deworming and treatment of sick chicken should be done. Since there are lack of access for dewormer for smallholder farmers veterinarian should be search alternate; easily accessible and affordable drug for poultry internal parasite by considering ascaris like other disease.

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