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Research Article

# Prevalence of Coccidiosis in Poultry That Raises Extensive Farm System Hargeisa Somaliland

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## Abstract

The poultry was important in developing country, and contribute production and economy in Africa and worldwide in million metric tons of meat and egg per annum. The gastro intestinal parasite have impact on poultry industry for production and economy loss of worldwide and mostly for Africa. These gastro intestinal parasites include coccidiosis was enteric parasitic disease caused by multiple species of protozoan disease, the genus Eimeria is one of the important poultry diseases worldwide. The aim of this study to investigate the prevalence of the coccidiosis in poultry that can be raised under extensive system in selected districts Hargeisa Somaliland and associated risk factors. Purposively selected area in correctional study by design in simple random sampling. A total 100 local chickens were used in Hargeisa Somaliland. Fecal samples were taken 100 local chickens were examined by floatation technique. The overall prevalence was 30% of this study, indicated out of 100 local chickens examined 23 positives for coccidia Eimeria, while 77 local chicken were negative of this coccidia in study design. According to the sex this study shows that female 70% higher than male 30%, also, this study indicated the sex was statistically significance

(P = 0.01). The prevalence of the age was 86% and 14% of adult and young respectively, in term of statistical significance the age was no statistically significance association of poultry coccidiosis (P = 0.31). For categories the ages one year were most prevalence 61%, subsequently 20%, 7%, 7% respectively were second 3 months of age, third 2 years of age, 9 months of age. The lowest prevalent age was Were the lowest prevalence 5% being 3 years of age. Therefore, further comprehensive study that all risk factors should be concerned. Should be made awareness and intervention of coccidiosis in farmers and veterinarians.

## Introduction

The poultry industry has great effects for enteric diseases that concern loss in production in addition the enteric diseases cause high mortality and have negative impact the welfare of the animal as well as the chickens, also, increased risk of transmission of the diseases through poultry products and through human for consumption of poultry products that contaminated and increased risk of human through zoonotic diseases. The protozoan parasite of the genus Eimeria is enteric parasite disease that caused by multiple species of avian coccidiosis. The avian coccidiosis is one the most common enteric disease and cause huge economic loss of poultry worldwide and most important disease of the chickens [1,2].

The coccidiosis on avian causes huge economic loss and impact of industry of the poultry worldwide [3] the coccidiosis has significance loss of parameters of production and cost in terms of treatment and prevention of this enteric disease. Shirley *et al.* (2005) [2]. The genus of Eimeria is single-celled protozoan parasites which are commonly referred to as coccidian and is important of the disease [4]. The clinical disease manifested when infected host species by malabsorption, intestinal hemorrhage, diarrhea, reduction of body weight gain, the feed utilized were insufficient, this leads impaired growth rate in broilers and caused reduction egg production in chicken layers [5,6].

The India of poultry industry hampered by various factors by various poultry disease, the coccidian disease was main concern declined growth of poultry industry, this various parasitic disease is concern coccidiosis and important related in poultry sector, and located intestinal mucosa by multiple species of parasites of the genus Eimeria and multiplies the intestinal mucosa of poultry which resides of intestinal mucosa. Hadipour *et al*. (2011) [7]. There is very little information that published and available in coccidiosis in Jammu and Kashmir and is prevalent widely. India, Jammu region there is various prevalence of coccidiosis, the management styles of Jammu and Kashmir state their managment different under management conditions styles India, Hadipour *et al*. (2011) [7].

Tunisia, the coccidiosis is a common for free range chickens and is enteric important disease commercial in Tunisia. Vaccination is measurements on chemoprevention and increase immune status and prevention of the diseases, also, include the hygienic measure of this diseases. The prevention measures reduce mortality and morbidity as well as the disease is characterized high mortality and morbidity for reduction feed intake and altered (feed conversion), also reduce body weight and performances of production of the poultry. Coccidiosis is major disease that cause mortality in birds particularly in free-range flocks, the coccidiosis disease no preventive measures because they raise in free range system. In Tunisia is no clear how much loss in their economy toward poultry industry in Tunisia, not yet know the role of the coccidiosis in economy of the country, in contrast there is scientific studies published in coccidiosis in free range chickens,

in their epidemiological distribution in coccidiosis in chicken with free range systems in Tunisia, Kaboudi *et al*. (2016) [8].

16.2 billion has been estimated worldwide in the population, while 71.6% of this population in poultry industry has been raised in developing country, this poultry distributed worldwide and produce annually meat and eggs, 67, 718, 544 metric tons, 57, 861, 747 metric tons of chicken meat and hen eggs respectively [9]. Over 70% of poultry products contributes in the village chickens in Africa, and the animal protein intake was 20% in the village chickens in Africa. Over 75% of the households keeps indigenous chickens in East Africa, while over 80% of its population live in rural areas and raised chickens, though Ethiopia is similar situation in East Africa [10].

The poultry population has been increased from 2.039 million in 2003 to 3.48 million in 2007, and there is no more exception in Jammu and Kashmir state (Livestock Census, 2007). In Tunisia the poultry sector has a vital role in their economy by increase income of households and creation of employment for generation, in addition poultry is source of protein in Tunisia, Kaboudi *et al.* (2016) [8].

The types of chickens found in Ethiopia with native chickens include non-descriptive breed, hybrid of chickens and exotic breed of chickens, in Ethiopia they have large of population of chickens and can be estimated to be 48.89 million, these chickens mainly kept in urban representing 96.6% and peri-urban areas representing 0.55% and 2.8% according [11]. According methods raised in chicken from the total population of chicken in Ethiopia were 99% raised in traditional back yard method in the management systems of the poultry in Ethiopia while remaining 1% of population raised under intensive management system. Tadelle *et al*. (2003) [12].

The people prefer from raising chicken than other animal, in their production have given an opportunity for feeding and their fast-growing human population and they provide rapid retain and is source of income for poor farmers and households [13]. In addition, poultry considered as chief source of income and food, also cheaper protein from animal origin as well as is source of high-quality human food and health, Jordal *et al*. (2002) [14].

Three types of poultry production systems are identified in Ethiopia [15]. The identified poultry production system includes small scale, large-scale and backyard poultry production system, the purpose of this chicken reared farmers to get opportunities with egg and meat production and productivity in all production systems to generate income and home consumption [16]. The production methods include small scale poultry production system, commercial poultry production systems, large scale poultry production and village or backyard poultry production system, Most poultry raising way is traditional kept in village production systems are exposed to a wide range of potential pathogens, the most studies on epidemiological have not focused whole pathogens influenced int the poultry production instead of study of single organism and infection [17,18].

There is no previous studies and report that did not published about the production systems in Somaliland, there is no studies related in the prevalence of coccidiosis and their impact of the production of poultry, and local householders of small village backyard of local chickens in Somaliland. The main objective of this study is to investigate prevalence of coccidiosis in local chicken under extensive system and risk factors.

## Methods and Materials

The present study was conducted in three purposively selected districts. The study population consists of poultry kept under both intensive and semi-tensive management system in three purposively selected districts in Hargeisa.

The present study was conducted by a cross-sectional from my 2016-Augost 2017 to investigate the prevalence of poultry Coccidiosis among the local poultry kept under intensive and semi-intensive management system in and around Hargeisa and to investigate the potential risk factors associated the occurrence of the disease in the study area. By using simple random sampling methods and 95% confidence interval with required 5% precision, Fecal samples were collected from poultry. And screened floatation methods. The data entering with Microsoft excel 2010 the SPSS software version 20. The present study was descriptive statistics and summarized analyzed in Chi-square test to determine and assess the prevalence of *coccidiosis* in poultry to find there is statistically significance in other word is there is relationship and no relationship or difference in poultry coccidiosis infection according risk factors such as management systems, age, sex and so on.

## Results

The Prevalence of Coccidiosis Out of 100 chicken examined 23 were positive. The prevalence of coccidiosis by age group of young and adult poultry was recorded as 20% and 19.8%, respectively and there is no statistical significance difference in prevalence of the disease between age groups (Table 2) ($p > 0.05$) The result that was obtained sex in the local chicken 30% and 70% male and female respectively are shown in (Table 3) and the result revealed statistical significance difference ($p > 0.05$).

***Table 1:*** *The prevalence of Coccidiosis in the local chickens*

| Prevalence | Frequency | Percent % |
|---|---|---|
| Positive | 23 | 22.8% |
| Negative | 77 | 77.2% |
| Total | 100 | 100% |

This Table (1), indicate prevalence out 100 local chickens examined 23 positives for coccidia *Eimeria*, while 77 local chicken were negative of this disease.

***Table 2:*** *This table shows the frequency of age under different categories*

| Age of Categories | Frequency | Percent | Chi square | P-Value |
|---|---|---|---|---|
| 3 months | 7 | 7% | 36.3 | 0.31 |
| 9 months | 7 | 7% | | |
| 1 year | 61 | 61% | | |
| 2 year | 20 | 20% | | |
| 3 year | 5 | 5% | | |
| Total | 100 | 100% | | |

This table the gave the prevalence of the Coccidiosis in local breeds in the extensive systems in the Hargeisa, this indicate that less than one year the prevalence of the disease was 61% but the highest peak of the disease or the most affected age of Coccidiosis was the in one year of the age exceeds more than two thirds at 61%. Beyond or the greater than one age the prevalence was decreased 20% and 7%, 7%, respectively. were second 3 months of age, third 2 years of age, 9 months of age. Were the lowest prevalence being 3 years of age. Since this there was no statistical significance of the age.

***Table 3:*** *Percentage of positive and negative poultry every by sex*

| SEX | Frequency | Percentage | Chi Square | P- Value |
|---|---|---|---|---|
| Male | 30 | 30% | 47.23 | |
| Female | 70 | 70% | | 0.01 |
| Total | 100 | 100% | | |

Table (3), shows that the prevalence according sex, the male of chickens was 30 (30%) local chickens, while 70 (70%) of female of local chickens in this study. And there was statistical significance difference of the sex.

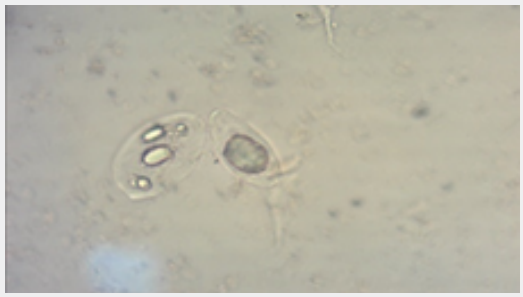

***Figure 1:*** *egg*

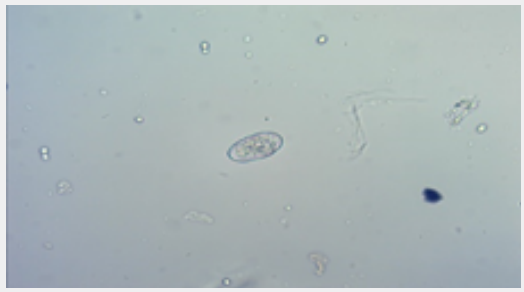

***Figure 2:*** *egg*

The figure 1 & 2 are shown egg that diagnosed the poultry that positive from the Coccidiosis, this eggs is clear under process of egg count procedure as clear above.

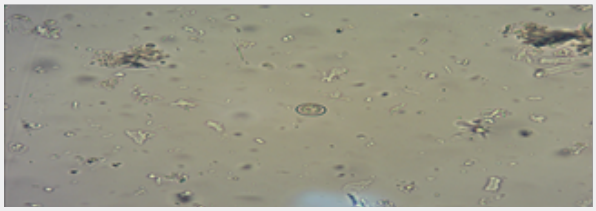

***Figure 3***

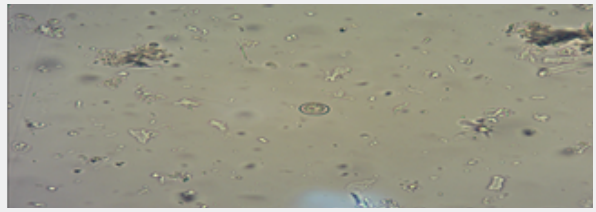

***Figure 4***

This are similar to the one who mentioned above and have tentative diagnosis

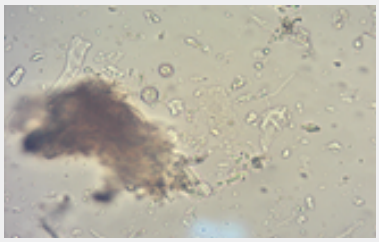

***Figure 5***

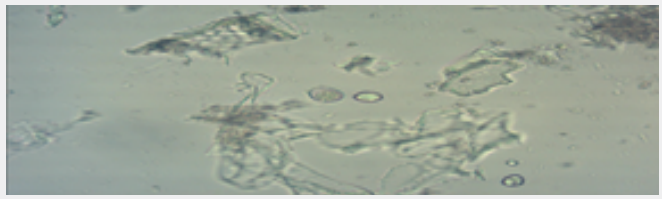

***Figure 6***

This picture are the oocytes of Emeria species that diagnosis of poultry

## Discussion

This study investigates the prevalence of coccidiosis in poultry that raises in extensive farm systems in Hargeisa, Somaliland. It also tries to assess the possible risk factor that contribute the occurrence of coccidiosis of poultry in extensive farming systems.

The overall prevalence was 30%. In the present study, was lower than finding of Mwale and Masika (2011) [19] who reported prevalence of 41.43% in Centane district, South Africa; and [20] who reported a prevalence of 38.5% in Kombolcha, Ethiopia. Also, the present study different the finding of [21]. Risk factors such as climatic conditions and differences in management systems within the farms brings variation of the disease and occurrence and prevalence of coccidia infection [21].

The prevalence of coccidiosis was slightly higher in male (54.9%) than female (52.9%) chicken; this difference was not statistically significant which indicates that there was no significant natural resistance variation in relation to sex [21]. The present study indicate is different in the degree of infection, so female was higher 70% than male 30%, also, this present was different in the above study at significance, this present study there is statistically significance in relation to sex.

The prevalence of the age was 86% and 14% of adult and young respectively, the present study was different in the finding [21] who reported young 66.1% higher than adult 43.3%. this finding statistically no significance association of the age [21], this present study has agreement with no statistically significance of the age [22].

## Conclusion and Recommendations

Parasitic disease has challenged the production and economy of the world, the coccidiosis is one gastrointestinal of poultry production worldwide and have significance loss of economy. The coccidia was distributed and prevalent in the world and has been studies and reviewed in different finding or studies according different production parameters or methods. The prevalence of this present study was 30% of coccidiosis poultry in

local chickens under extensive farming systems in Hargeisa Somaliland. The risk factors that was contribution the significance and the prevalence of coccidiosis in local chickens under extensive farming systems include sex and age important risk factors contribution for occurrence of the coccidiosis in poultry in Hargeisa Somaliland.

Based on the above findings the following recommendations are forwarded:

- To reduce prevalence of coccidiosis in the endemic countries
- Also control, prevention of coccidiosis and hygienic measurement was important to reduce the prevalence of the disease.
- Management procedure to reduce the contamination equipment, fence, feed and others.
- Using ant coccidiosis and to vaccine poultry was possible reduction of coccidiosis.

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## Conflict of Interest Statement

There is no any conflict about this manuscript all authors are accepted

## Bibliography

1. Olanrewaju, C. A. & Agbor, R. Y. (2014). Prevalence of coccidiosis among poultry birds slaughtered at gwagwalada main market, Abuja, FCT, Nigeria. *The International Journal of Engineering and Science, 3*(1), 41-45.

2. Shirley, M. W., Smith, A. L. & Tomley, F. M. (2005). The biology of avian Eimeria with an emphasis on their control by vaccination. *Advances in Parasitology, 60,* 285-330.

3. Allen, P. C. & Fetterer, R. H. (2002). Recent advances in biology and immunobiology of Eimeria species and in diagnosis and control of infection with these coccidian parasites of poultry. *Clinical Microbiology Reviews, 15*(1), 58-65.

4. McDougald, L. R. & Reid, W. M. (1997). Coccidiosis in Diseases of Poultry (10th ed.) (pp.865-883). Ames, IA: B. W. Calnek, ed. Iowa State University Press.

5. Lillehoj, H. S. & Lillehoj, E. P. (2000). Avian coccidiosis. A review of acquired intestinal immunity and vaccination strategies. *Avian Disease, 44*(2), 408-425.

6. Lillehoj, H. S., Min, W. & Dalloul, R. A. (2004). Recent progress on the cytokine regulation of intestinal immune responses to Eimeria. *Poultry Science, 83,* 611-662.

7. Hadipour, M. M., Olyaie. A., Naderi, M., Azad, F. & Nekouie, O. (2011). Prevalence of Eimeria species in scavenging native chickens of Shiraz, Iran. *African Journal Microbiology Research, 5,* 3296-3299.

8. Kaboudi, K., Umar, S. & Munir, M. T. (2016). Prevalence of Coccidiosis in Free-Range Chicken in Sidi Thabet, Tunisia. *Scientifica, 2016*(7075195).

9. Gueye, E. F. (2005). Gender aspects in family poultry management systems in developing countries. In: XXII World's Poultry Congress, 8 - 13 Jan 2004, Istanbul (Turkey). *World's Poultry Science Journal, 61*(1), 39-46.

10. Kitalyi, A. J. (1998). *Village chicken production systems in rural Africa, Household food security and gender issue*. FAO Animal Production and Health Paper No. 142. Food and Agricultural Organization of the United Nations, Rome, Italy. (Pp: 81).

11. CSA, (2011). *Agricultural sample survey report on livestock and livestock characteristics*. Addis Ababa, Ethiopia, (Pp: 99-132).

12. Tadelle, D., Million, T., Alemu, Y. & Peters, K. J. (2003). Village Chicken Production System in Ethiopia: use patterns and performance evaluation and chicken products and socio- economic functions of chicken. DebreZeit Agricultural Research Centre, DebreZeit, Ethiopia. Livestock Research and Rural Development 15(1).

13. CSA, (2004). *Agriculture sample enumeration statistical abstract, central statistical authority, federal democratic republic of Ethiopi*a. (Pp: 13-48).

14. Jordan, F., Pattison, M., Alexander, D. & Faragher, T. (2002). *Parasitic diseases.* In: Poultry Disease (5thed.) Hong Kong: W. B. Saunders. (Pp: 405-420).

15. Yami, A. & Tadelle, D. (1997). The status of poultry research and development in Ethiopia. *Research Bulletin, 4,* 40-46.

16. Nasser, M. (1998). *Oral New castle disease vaccination trials and studies on new castle disease in Ethiopia.* Addis Ababa University/Free University of Berlin, Debre Zeit/Berlin. M.Sc. Thesis.

17. Pullan, R. & Brooker, S. (2008). The health impact of polyparasitism inhumans: are we under-estimating the burden of parasitic diseases. *Parasitology, 135*(7), 783-794.

18. Nacher, M. (2011). Interactions between worms and malaria: good worms or bad worms? *Malar Journal, 10*(259), 1-6.

19. Mwale, M. & Masika, P. (2011). Point prevalence study of gastro-intestinal parasites in village chickens of Centane district, South Africa. *African Journal of Agricultural Research, 6*(9), 2033-2038.

20. Netsanet, W. (2003). *Poultry coccidiosis: its prevalence and distribution of Eimeria species in Kombolcha*, South Wollo, Ethiopia. DVM thesis, Faculty of Veterinary Medicine, Addis Ababa University, Debreziet, Ethiopia.

21. Belaynew, A., Wudu, T., Mengestie, A., Ayalew, N., Kassa, D., Mebrie, Z. & Genene, G. (2016). Study on the Prevalence, Species Identification and Risk Factors Associated with Poultry Coccidiosis in Gondar Town, North Ethiopia. *National Science, 14*(9), 35-40.

22. Shirley, M., W. & smith, A. (2006). *Eimeria maxima:* the influence of host genotype on parasite reproduction as revealed by quantitative real-time PCR. *International Journal for Parasitology, 36*(1), 97-105.