International Journal of Advanced Research in Biological Sciences
ISSN: 2348-8069
www.ijarbs.com
DOI: 10.22192/ijarbs Coden: IJARQG(USA) Volume 4, Issue 4 - 2017

Research Article

DOI: http://dx.doi.org/10.22192/ijarbs.2017.04.04.009

The Prevalence of Poultry Coccidiosis in Intensive Farm and Indivdual Small Holder Poultry Farm in Hawassa Town District

Muluken Gebeyeh and Liuel Yizengaw
Hawassa University, School of Veterinary Medicine, DVM Thesis, Hawassa, Ethiopia
*Corresponding author: *like2001dvm@gmail.com*

Abstract

A cross sectional study was conducted from November 2011 to may 2012 to determine the prevalence of coccidial infection and to identify the potential risk factors associated with the infection in intensive poultry farms and individual small holders poultry farms in Hawassa towns. Regarding the methodology, floatation and McMaster techniques were employed on the faeces collected from randomly selected 384 study chickens and examined for presence of coccidial oocysts. According to the study 250 (65.10%) of chickens were found to be positive for coccidial oocysts and 134 (34.89%) of chickens were negative. Among the potential risk factors assessed, age of chicken ($P < 0.05$), Breed of chickens (local, Koekoak) ($P< 0.05$), study site (Wukuro, chefe, korem) ($P< 0.05$) and management systems of chickens (P= 0.000) were significantly associated with the risk of coccidial infection when analyzed by univarate logistic regression. But age of chickens did not show significance association with the risk of coccidial infection when analyzed by multivariate logistic regression analysis and also management systems of chickens and sex of chickens did not show significance. But breed of chickens (Bovanse (P= 0.010) and local chicken (P= 0.001) reveals significance, study site (wukero, chefe and korem) show significance association with the risk of coccidial infection ($P < 0.05$) when analyzed by multivariate logistic regression. The mean oocyst count analyzed by analysis of variance indicated the existence of significance difference in the mean of oocyst count among the age categories (F=65.50, P=0.00), study site (F=14.48, P= 0.000). Bonferroni multiple comparasion test indicated that the mean oocyst count is significantly greater in chicken of age 6-12 months (P= 0.000) and age less than 6 months of old chickens (P= 0.004). Other two comparasion of mean between age group of 6-12 and age greater than 12 months did not show significance difference (P= 0.059).

Keywords: Coccidiosis, Farm, Hawassa, Poultry, Prevalence, Small holder

Introduction

Poultry refers to domestic birds such as chickens, turkeys, ducks, Guinea fowl, peasants, geese kept for meat or egg production. It is believed that the modern fowl probably originated from four wild species; the Ceylon jungle fowl (*Gallus variant).* It is likely that the *Gallus Gallus* is the main ancestor (Kennedy and Hanson 2007). Approximately 20 billion poultry existing worldwide (Food and Agriculture Organization (FAO 2007) and of this, about 75% are in developing countries. Village chickens (*Gallus Gallus)* are the predominant species in the rural poultry sector in Africa and in South Africa. The majority of male farmers are mainly responsible for cattle, sheep and goats, while female farmers are responsible for pigs and poultry production. (WWW.rightdiagnosis.com/medical/coccidosis.htm 2012). Poultry breeding in Ethiopia has along traditional practice, which is mainly used as immediate cash income for the rural communities. For a country with poor quarantine system like Ethiopia the concurrent introduction of new disease with exotic poultry breed are the major constraints of poultries production (Mazengia et al 2009).

The poultry sector in Ethiopia can be characterized into three major production system based on the selected parameters. Such as breed, flock size, housing pattern, feeding system, health technology and bio-security. Back yard production system is the most predominant system in Ethiopia and accounts for nearly 99% of the population consisting mainly local chicken breed under individual farmer household management and it is common to find a few exotic breeds distributed through extension program (Dawit et al 2008). The total poultry production of Ethiopia is estimated at 56.5 million of which about 99% are raised under the traditional backyard system of management, while 1% are exotic breeds maintained under intensive management system (Ashenafi and Eshetu 2004).

Gastro-intestinal parasites are, however, the most prevalent and most devastating parasites affecting village chicken productivity (WWW.rightdiagnosis.com/medical/coccidosis.htm 2012). Intestinal parasite cases significant morbidity and mortality throughout the world, particularly under developed countries (Copry et al 2004). The major problem in poultry production is gastrointestinal parasite and protozoan parasite. Among the protozoan disease, coccidiosis is the most important one, others are only occasionally seen. The protozoan diseases of poultry are; coccidiosis: Caecal and intestinal, histomoniasis .trichmoniasis, hexamitiasis, avian malaria and toxoplasmosis.

Coccidiosis is one of the most important diseases of poultry. Coccidia are found in almost all the chickens. The disease coccidiosis caused by protozoa of the phylum Apicomplexa with few exceptions, the organisms is intracellular parasites of intestinal epithelium (Chuhan and Roy 2007). The largest subgroup of the phylum is the suborder Eimeriorina, which contains organisms collectively referred to as the coccidia. Predominantly intestinal parasites, coccidia infect most phyla of invertebrates and all vertebrate classes. The disease they cause, coccidiosis, was recognized as the major health hazard in domestic animal husbandry, in zoo environments, and in wild animal populations when habitat is overcrowded (Duszynsk et al 1970).

Coccidiosis caused by parasites of the genus Eimeria is an infection known to damage poultry. It is a ubiquitous disease of almost universal importance in poultry production. The disease may strike any type of poultry in any type of facility and causes large economic losses (Elmushafar and Beyene 2007). It is also a realistic problem and one of the most important diseases of poultry worldwide that invade the cells of the poultry intestine.

There are two forms of coccidiosis: caecal coccidiosis, which is caused by *Eimeria tenella*, and intestinal coccidiosis this form of coccidiosis may be caused by several species of Eimeria such as *E. necatrix*, *E. acervulina*, *E. maxima*, *E. brunetti*, *E. preacox*, *E.mitis*, *E. hagani and E. mivati*. Although each species has specific development sites in the intestine, sometimes it is difficult to identify them during multiple infections. Leeuwenhoek discovered the coccidian in 1674 when he described bodies, which were undoubtedly the oocysts of Eimeria stiedae, in the bile ducts of rabbits (Kinung’hi et al 2004).

The major characteristics of members of the Eimeria are: The structure of sporulated oocyst, which always contains four sporocyts, each contains two sporozities. Marked host specific, there being very few exceptions to the general rule that species from one animal do not develop in closely related hosts and marked species specificity in which host resistance acquired to one species does not protect against infection with another (Soulsby E J et al 1982)

Species of Eimeria have been distinguished and classified according to their oocyst characters, but it is now considered best to have additional details including life history, host specificity, cross immunity between other species occurring in the same host, location and type of lesion produced. Coccidia cause disease in one species in chicken, turkey, geese and ducks where they develop in the intestinal tissues. One species occurring in geese (*E.truncata*) completes its life cycle in the epithelial cells of the kidney.

The immune responses of the body against coccidiosis are complex because *Eimeria* species exhibit a complex life cycle, which includes stages inside and outside the birds and the inside-stage, comprises extracellular and intracellular stages (Elumshafar and Beyene 2007) it does not required an intermediate host, but a part of the life cycle consists of two phase of development; one phase occurs outside the host and involves development of the infective stages (oocyst) with no multiplication. The major phase occurs within the host and involves massive multiplication (schizogony) and sexual reproduction (gametogony) (Radostitis O M et al 2007)

Coccidiosis was identified as a cause of direct and indirect losses in all farms. Losses occurred in the form of mortalities, coccidiostat costs, reduced weight gains, reduced market value of affected birds, culling, delayed off take and reduced egg production. Average losses due to mortalities, culling and coccidiostat costs were estimated at Ethiopian Birr 898.80 and 5301.80 per farm or 0.55 and 0.53 Ethiopian Birr per chicken in small scale and large-scale poultry farms, respectively. This contributed to an average of 11.86% and 8.40% loss in enterprise profit per farm in small and large-scale farms, respectively. Proportional mortality rates due to coccidiosis were 14.5% and 13.3% in small scale and large-scale poultry farms, respectively. It was concluded that coccidiosis was a major cause of losses in surveyed farms (Kinung'hi et al 2004). But in this area there was no clear information on the economic importance of the coccidial infection in the poultry production. Therefore the study was conducted in to three different sites, two intensive poultry farm and one in individual smallholder back yard poultry farms with the objectives of:-

- To assess the prevalence of coccidosis in the intensive and individual farm household.
- To identify precipitated factors (risk factors) associated with coccidosis infection in these poultry farms.
- To investigate the economic impact (loss) due to coccidosis in the poultry farm.

.

Materials and Methods

Study Area

The study was conducted in Hawassa town, intensive poultry farm and individual farm household in Hawassa, the capital city of SNNPRS, is located in southern rift valley at about 275km south of A.A. the altitude range from 1650-2640 m.a.s.l. The area has an average annual rain fall of 997.6 mm[3.] The mean annual temperature is estimated to be round 25°c. The agro-climatic condition is weina dega. The production system is semi-intensive in which animals are kept for dairy production and fattening purpose (CSA 2004).

Study animals

The study animals included were poultry of different poultry farms (two intensive poultry farm and one individual small holder poultry farm).

Study design

A cross-sectional study involving a simple random sampling of intensive poultry farm and individual farm house hold were carried out to determine the prevalence and economic impact of coccidiosis in these poultry farms.

Sampling size and sampling procedure:

In this study simple random sampling technique were followed to select poultry used for the study of prevalence of coccidiosis in the intensive farm and individual farm household. The sample size was calculated by using the expected prevalence of coccidiosis was taken 50% and desired precision 5% by which it was calculated as follows.

$$n=1.96^2 P_{exp} (1-P_{exp})/d^2$$

Where, n=sample size
P_{exp}=expected prevalence
d=desired absolute precision

Thus the total numbers of poultry included in this study were 384 (Thrusfield M 2005)).

Study methodology

Faecal examination

Sample collection, faecal sample was collected directly from their house or fresh faeces were collected as soon as we see from randomly selected poultry and collected in a screw capped glass bottles (universal bottles) and packed in ice box and transported to the laboratory as much as it was in fresh state. While collecting of faecal samples; date, management system, sex, age group, breeds of each sampled poultry was recorded. Floatation and McMaster Technique were employed (Soulsby E J et al 1982). The faces were prepared for the examination techniques and examined under microscope in 40x magnification. The Examination of faecal contents shows oval, thick walled oocyte, large round multykaryotic scizonts, gametocytes in significant numbers were considered as coccidian egg (Chauhan and Roy 2007).

Data management and analysis

The result from faecal examination were properly recorded and entered in to computer (micro soft excel and analyzed using appropriate statistical method. The result from faecal examination were properly recorded and summarized by using descriptive statics and further analyzed with STATA version to see the relationship of prevalence of coccidiosis with different sexes, age groups, management system, breed and location. Ch-square analysis was used to compare the prevalence rate of coccidiosis between different sexes, age groups, management system and. Univarate and multivariate logistic regression statistical analysis also were used

Results

During the study period 384 faecal (dropping) were collected from the three study sites and examined for the presence of eimeria oocysts. Accordingly, 250 (65.10%) chickens are found to be positive for eimeria oocysts and 134 (34.9%) were found to be negative for eimeria oocysts. Out of 250 (65.10%) chickens infected with eimeria oocysts, 77 (30.8%) were white leg horn, 64 (25.6%) were bovanse, 13 (5.2%) were koekoak, and 71 (28.4%) were local, and 10% were exotic breeds. out of 250 positive Chickens 154 (61.6%) were in intensive management system and 96 (38.4%) in extensive or back yard poultry farm. out 0f 250 chickens 176 (70.4 %) were female chickens and 74 (29.6 %) were males. Out of 250 positive chickens 114 (45.6 %) were < 6 months, 70 (28%) were between 6 and 12 months and 66 (26.4 %) were > 12 months.

Table 1. The prevalence of eimeria infection based on different risk factors (breed, sex, age, management system and study sites).

Variables		No of tested chickens	No of positive	No_(%) positive
Breeds	white leg horn	96	77	30.8
	Bovanse	72	64	25.6
	Koekoak	22	13	5.2
	Local	163	71	28.4
Management system	Intensive	193	154	61.6
	Extensive	191	96	38.4
Sex	Male	116	74	29.6
	Female	268	176	70.4
Study site	HPF	96	77	30.8
	HCA	97	77	30.8
	Wukero	39	20	8.0
	Chefe	94	43	17.2
	Korem	34	15	6.0
	godeguada	24	18	7.2
Age	< 6 months	195	114	45.6
	6-12 months	107	70	28.0
	>12 months	82	66	26.4

The prevalence of coccidial infection in Bovanse, white leg horn, koekoak, exotic and local breeds were 25.6%, %, 30.8%, 5.3 % and 10 % and 28.4% respectively. the prevalence of coccidial infection in intensive and extensive management system were, 61% and 38.4 % respectively and the prevalence of coccidial infection in different study sites HPF, HCA, wukero, chefe, korem and godeguada were 30.8 %, 30.8 %, 8 %, 17.2 % and 6.0 % and 7.2% respectively and finally the prevalence according to age <6 months, age 6_12 and age >12 were 45.6%, 28 % and 26.4 % respectively.

Table 2. Univarate logistic regression analysis of the association between breed, age, sexes, management system and study sites within the risk of coccidial infection.

Risk factor		OR	SE	p-value	95%CI
Age	< 6 months	2.93	0.11	0.001	1.58-5.43
	6-12 months	2.18	0.17	0.024	1.11- 4.29
	>12 months	1	_	1	_
Breed	White leg horn	1	-	1	-
	Bovanse	1.43	0.59	0.38	0.63-3.23
	Koekoak	2.80	0.18	0.041	1.05-7.52
	Local	5.37	0.56	0.000	2.98-7.46
Sex	Female	1	-	1	-
	Male	1.09	0.24	0.72	0.69-1.71
Study site	HPF	1	-	1	-
	HCA	1.05	0.34	0.896	1.92-2.13
	Wukro	3.85	0.11	0.001	0.52-2.13
	Chefe	4.81	0.69	0.000	1.72-8.60
	Korem	5.13	0.08	0.000	2.52-9.17
	Godguada	1.35	0.39	0.58	0.47-3.87
Managemen t system	Intensive	1	-	1	-
	Extensive	3.91	0.21	0.000	2.49-6.14

Univarate logistic regression analysis of different risks factors with independent samples reveals that different age groups of chickens, koekoak and local breeds of chickens, wukero, korem and chefe study sites were significantly associated with the risk of coccidial infection ($p < 0.05$).in addition to this management system also significantly associated with coccidial infection (p=0.000). Bovanse breeds of chickens, sexes of chickens and study sites of ACA and godeguada were not significantly associated with the risk of coccidial infection ($p > 0.05$) when analyzed by univarate logistic regression on table 2 the above.

Table 3. Multivariate logistic regression analysis of the association between breed, age, sex management system and different study sites within the risk of coccidial infection.

Risk factors		OR	SE	P-value	95%CI
Age	< 6 months	1.03	0.79	0.97	0.22_4.72
	6-12 months	0.89	0.63	0.866	0.28-4.52
	>12 months	1	_	1	_
Breeds	White leg horn	1	-	1	-
	Bovanse	4.33	2.46	0.010	1.42-13.20
	Local	37.44	0.03	0.001	4.87-287.96
	Koekoak	1	-	1	-
Mag't system	Intensive	1	-	1	-
	Extensive	23.58	31.44	0.018	1.73-321.66
Sex	Male	1.13	0.31	0.673	0.65-1.93
	Female	1	-	1	-
Study site	HPF	1	-	1	-
	HCA	2.77	0.31	0.234	1.93-14.79
	Wukro	4.42	0.14	0.016	1.32-14.75
	Chefe	3.79	0.14	0.013	1.35-14.76
	Godguada	1	-	1	-
	Korem	4.09	0.15	0.021	1.15-13.50

Breeds of chickens, management systems of chickens in different poultry farms and study sites, except HCA were significance Associated with the risk of coccidial infection when analyzed by multivariate logistic regression ($p < 0.05$). But sexes of chickens were not significantly associated with the risk of coccidial infection ($p > 0.05$) as noticed in table 3 above.

Table 4. ANOVA test for association of oocysts OPG associated with different risk factors.

Risk factor	No -	Mean	SE	F	P-value	Bonfrrroni result	P-value
Age							
<6 months	195	2457.4925	3399.6815			Age <6 and 6_12	0.004
				16.70	0.000		
6_12months	107	3678.5047	4586.7843			Age < 6 and age > 12	0.000
>12 months	82	5744.2683	5768.5195			Age 6_12 and age >12	0.059
Breeds							
WLH	96	5348.2292	5456.4762			WLH and bovanse	1.000
Bovnase	75	5990.8	4844.0752	23.70	0.0000	WLH and koekoak	0.005
koekoak	22	1984.0909	3404.2825			WLH and exotic	1.00
Exotic	26	3940.3846	3913.3877			WLH and local	0.000
Local	165	1424.2485	2224.4249			Bovanse and koekoak	0.001
						Bovanse and exotic	0.269
						Bovanse and local	0.000
						Koekoak and exotic	0.968
						Koekoak and local	1.000
						Exotic and local	0.035
Mgts.							
Intensive	193	5214.456	5146.1612	65.50			
extensive	191	1766.7592	2874.7439		0.000		
Site							
HPF	96	5348.2292	5456.4762			HPF and ACA	1.000
ACA	97	5082.0619	4844.3009			HPF and chefe	0.000
Wukero	39	1915.3846	3588.0128			HPF and godeguada	1.000
Chefe	94	1282.8824	2055.7113	14.48	0.0000	HPF and korem	0.000
Godeguada	24	3650.00	2834.7993			ACA and wukero	0.0001
Korem	34	1605.8824	3456.346			ACA and chefe	0.000
						Wukero and chefe	1.000
						Wukero and korem	1.000
						Wukero and godeguada	1.000
						Chefe and korem	1.000
						Chefe and godeguada	0.199
						Korem and godeguada	0.992

The mean oocyst count analyzed by analysis of variance indicated the existence of significant difference in the mean of oocyst count among the age categories (F=16.70, P=0.000), Breeds of chickens (F= 23.70, P= 0.000), and site of study (F= 14.48, P= 0.000). While sex of chickens did not show significant differences (F = 1.53, P= 0.2165).
Further examination of post hoc Bonferroni multiple comparisons test indicated that the mean oocyst count is significantly greater in chickens of age 6-12 months (P= 0.000 and < 6 months old chickens mean between the age group of 6-12 and >12 months did not show significant difference (P= 0.059) similarly, regarding the breeds of chickens, WLH breeds shows significance (P= 0.000) oocyst mean count of 5348.2292 observed between the average oocyst count of local breeds (OPG= 1424.2485) and also compressions of Bovanse with Koekoak breeds, exotic breeds and Bovanse with local breeds shows significance between them. Whereas The other breeds did not show significant difference.(p> 0.05).

Management systems of chickens shows significance difference between Management systems (P= 0.000) but sex of chickens did not show significance variation. And finally study site HPF with chefe, korem shows significance comparison difference and also ACA with chefe and with wukuro shows significant difference between study sites but the rest study site comparisons of mean did not show significance association (P > 0.05).

Discussion

Generally, in traditional poultry production system the input required is minimal and is considered as secondary to other agricultural activity by the small holder farmers. Women and children are usually responsible to undertake poultry production around homestead. Since these social groups usually stay longer around the home, they are easily looking after the chicken. The income obtained from poultry production may also be most accessible source of income during need of cash for women and youths. thus, this point of view, poultry production may address the social and economic problems of gender issues and improve the income source and long term economic potential of women in the rural community. Indigenous knowledge of farmers on poultry coccidiosis might not be very specific. Nevertheless, they have been awareness regarding the risk factors for the occurrence of the disease and they describe the disease based on the clinical sign.

The overall prevalence of eimeria infection was 65.1%. The previous study of the prevalence of eimeria infection in local chickens is much Higher than the present study (Gari et al 2008) the study on coccidiosis in tiyo district, arsi 61.25%and 43.03% respectively. The study also shows that the prevalence of coccidial infection in male is less than the previous study (Gari, et al 2008). The present study reveals that the prevalence of coccidiosis infection was higher in bovanse breeds of chicken than other chicken breeds. This might be due to management, is that chickens were aggregate at a closed pen and feed and water might be contaminated with litters containing coccidial oocysts because litters were not regularly removed and during watering ,water might be poured to the floor and moist the ground which favors oocyst sporulation.breeds variation also other contribution of susceptibility of eimerial infection. Koekoak breed chickens were less infected with eimeria infections as compare to other breeds.

The prevalence of coccidial infection were higher in intensive poultry farms than extensive (61.6 %, 38.4 %) respectively. Similarly higher in female chickens than male (70.4 %) and (29.6 %) respectively. Chickens to compare the eimeria prevalence in different study sites, HPF and HCA were higher in prevalence (30.8%) while Korem study site was the least in prevalence of eimeria infection (6 %). Chickens less than 6 months of old were high in prevalence of coccidial infection (45.6%) but chickens > 12 months old were less (26.4%).

According to the study, different age categories of chickens, breeds of chickens (koekoak and local breeds), from study site (wukero, korem and chefe) were significantly associated with the risk of eimerial infection (P < 0.05). Similarly, management systems of chickens also significantly associated with eimerial infection (P=0.000). In the other hand bovanse and exotic chicken breeds, sexes of chickens and study site (ACA and godeguada) were not significantly associated with the risk of eimerial infection (P > 0.05) when analyzed by univarate logistic regression.
Unlike univarate logistic regression analysis, multivariate logistic regression analysis did not show significant associations with the risk of eimeria infection between different age groups, whereas breeds of chickens were significantly associated with the risk of eimeria infection when analyzed by multivariate logistic regression analysis. In similar manner sex of chickens did not show the significant association. Management systems of chickens and

study site (except HCA were significantly associated with eimera infection (P < 0.05).

The mean oocyst count analyzed by analysis of variance indicated the existence of significance difference in the mean of oocyst count among age categories (F= 65.50, P=0.000), site of study (F=14.48, P=0.000) but sex of chickens did not show significance difference (F=1.53, P=0.2165).

Further examination of post hoc Bonferroni multiple comparisons test indicated that the mean oocyst count is significantly greater in chickens of age 6-12 months old (P= 0.000 and < 6 months old chickens (P= 0.004) respectively. The other two comparisons of means between the age group of 6-12 and age >1 2 months did not show significance difference between them. (P= 0.059). Similarly, regarding of the breeds of chickens, WLH breeds show significance (P= 0.000) oocyst count observed between the average oocyst count of local breeds (OPG=5348.2292) and also Bovanse with koekoak breeds, bovanse with exotic breeds and Bovanse with local breeds shows that the oocyst count observed between the average oocyst count (OPG, 5990.8). Breed bovanse shows comparison significance with these breeds of chickens the other chicken breeds did not show significance difference between them. Management systems of chickens also show significance difference (P=0.000) but sex of chickens did not show significance differences.

Conclusions and Recommendations

The present study concludes the existence and wide spread distribution of eimeria spp in the poultry farms. The occurrence of eimeria infection is highly associated with age, Breeds of chickens, management system, sex of chickens and study sites. The study also revealed the high proportion of eimeria infection occurs in intensive poultry forms than back yards. This negatively influence poultry production and cause great economic losses due to poor feeding, efficiency slow weight gain loss of production increase to the susceptibility of chickens to other diseases.

Therefore, according to the study finding the following recommendations are for warded that might help in preventing losses of poultry associated with the individual small holders and thereby improving the productivity of the poultry.

Hygienic condition should be maintained at farms including frequent removal of litters, keep clean feeding and water utensils.

As aged chickens can serve as a source of infections (carriers) for young chickens, keeping of mixing different age groups of chickens are avoid.

The chickens should be attended regularly and those diarrheic chickens or any chickens manifest any clinical sign must be isolated from healthy one and treat with appropriate treatment.

Since the present study was a cross sectional one that provides only momentary picture of the infection status of the chickens, so further longitudinal studies with repeated sampling is needed to give more accurate assessment of the prevalence, potential risk factors and economic impact of the coccidiosis.

References

Ashenafi A 2000 survey on identification of major disease in chicken in three selected agro climatic zones in control Ethiopia, faculty of veterinary medicine, Addis Ababa University DeberZeit, Ethiopia, DVM thesis.

Ashenafi H and Eshetu Y 2004 study gastro intestinal helminthes of local chicken in central Ethiopia.

Bailliere Tindall 2001 Intercooled Stata-7 Statistical. Data London, pp: 630. Stata-7, 1984-2001.

Chauhan H V S and Roy S 2007 poultry disease diagnosis and treatment, 3rd edition in India at Ramprinto graph, Delhi.

Dawit A, Tamirat D and Setotaw R 2008 draft report on over view and ground paper on Ethiopian's poultry sector in: relevance of HPAI research in Ethiopia, Addis Ababa.

Duszynski, Donald W, Steve J Upton and Lee Couch 1970 the coccidiosis of the world Department *of Biology, University of New Mexico Division of Biology, Kansas State University*.

Elmusharaf M A. and Beyene A C.2007 Departement of nutrition,faculity of veterinary medicine,ultrecht university,the Nitherlands.

Gari G, Getachew T and Ph Dorchies 2008 International Journal of Poultry Science, Asian Network for Scientific Information, Study on Poultry Coccidiosis in Tiyo District, Arsi Zone, Ethiopia 7 (3): 251-256, 2008 ISSN 1682-8356.

Kinung'hi S M, T Getachew, M H Hafez, W Moges, K Moses, G Mathias and P O B Maximillian 2004 Assessment of Economic Impact Caused by Poultry Coccidiosis in Small and Large Scale

Poultry Farms in DebreZeit, Ethiopia, Tan Veterina Limited/Mwanza Medical Research Centre, Tanzania Faculty of Veterinary Medicine, Addis Ababa University, Ethiopia Faculty of Veterinary Medicine, Free University of Berlin, Germany 3 (11): 715-718.

Mazengia Hailu, Tilahun S B and Negash T 2009 Incidence of infectious bursal disease in village chickens in two districts of Amhara Region, Northwest Ethiopia,

Murray J Kennedy, Ph.D. and J.A. Hanson, B.Sc., D.V.M 2007 Animal Health Division WWW.miller hatcheries.com/information/disease/ coccidiosis.htm)

Radostitis O M, D C Blood and C C Gay 2007 Veterinary medicine. a text book of the disease of cattle,sheep,pigs,goats and horses. 8th ed. London.philadelphia, PA: Bailliere Tindal.

Soulsby E J, Saif Y M, Barns j H, Fadly M A, McDougald R L and Swayne E D 1982 Helminths, Arthropods and Protozoan in Domesticated Animals, 7th Edn.

Thrusfield M 2005 Sampling In: Veterinary Epidemiology, 3nd edn London: Black Well Science Ltd 179-284.

WWW.rightdiagnosis.com/medical/coccidosis.htm, 2012).

Zeleke A, Gelaye E, Sori S, Ayelet G, Sirak A and Zekarias B 2005 Investigation on infectious bursal disease outbreak in Debre Zeit. International Journal of Poultry Science 7: 504-506

Access this Article in Online	
	Website: www.ijarbs.com
Quick Response Code	Subject: Veterinary Medicine
DOI:10.22192/ijarbs.2017.04.04.009	

How to cite this article:
Muluken Gebeyeh and Liuel Yizengaw. (2017). The Prevalence of Poultry Coccidiosis in Intensive Farm and Indivdual Small Holder Poultry Farm in Hawassa Town District. Int. J. Adv. Res. Biol. Sci. 4(4): 57-66.
DOI: http://dx.doi.org/10.22192/ijarbs.2017.04.04.009