



Knowledge, Attitude and Practices of Coccidiosis in Chickens by Poultry Farmers in Southwest, Nigeria

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SUMMARY

Coccidiosis is a major disease of economic importance in Nigeria requiring adequate knowledge and understanding of the disease pattern as well as correct attitude and acceptable practices in order to effectively control or at least minimize the negative effective on poultry production. In this study semi-structured questionnaire was administered randomly to 166 poultry farmers in Oyo and Ogun States to determine their knowledge and attitude towards chicken coccidiosis and their adopted prophylactic practices. The data obtained were subjected to descriptive statistics, Chi-square and logistic regression at $p \leq 0.05$ significance level. About 56.4% of the respondents were >50 years with 84.4% having tertiary education and 93.4% were married. About 50.6% of the poultry farms had 1000-5000 flock size with 59.0% using open drinkers resulting in regular water spills on litter which predisposes to coccidiosis. About 95.9% of the respondents were aware of coccidiosis and 82% of them got their information on coccidiosis from Veterinary professionals and this is significantly associated ($p < 0.05$) with good knowledge of coccidiosis. Almost 85% of the respondents have suffered coccidiosis outbreaks with 72.9% occurring in chickens under 8 weeks. Only 73% have foot dips at their farm entrance and this has biosecurity implications on coccidiosis control. Only 15.1% of the respondents could recognize two or more clinical signs of coccidiosis and are said to have good knowledge of the disease while the majority (84.9%) associate coccidiosis with only bloody faeces. Usage of both deep litter and battery cage system was significantly ($p < 0.05$) associated with good knowledge of coccidiosis. Muslim respondents and those using Veterinary Consultants had significantly higher practice of vaccine prophylaxis adoption. Veterinary extension education and faith-based advocacy will enhance better attitudes to and practices of coccidiosis management by farmers; like the adoption of coccidiosis vaccination which will not only reduce anticoccidial usage but also minimize anticoccidial residues in poultry products.

Key words: Coccidiosis, Extension, Poultry;

INTRODUCTION

The poultry industry in Nigeria has recorded considerable expansion in recent times but poultry diseases remain one of the major threats to boosting poultry production in Nigeria (Akintunde *et al.*, 2015). Parasitic diseases are of high incidence in poultry due to the inherent tropical conditions under which the farmers operate (Idika *et al.* 2016). Epizootiological studies have established the importance of coccidial infection as a major parasitic disease in Nigeria based on the economic implications of its outbreak in poultry farms (Lawal *et al.*, 2016).

Although coccidiosis is controllable under most circumstances, the cost of control makes the disease one of the most expensive parasitic diseases encountered in the poultry industry. Advances in poultry husbandry, nutrition and chemotherapy have made clinical outbreaks of coccidiosis rather infrequent but subclinical coccidiosis continues to be one of the poultry industry's most common and expensive diseases worldwide (Adriana *et al.*, 2016). The broiler industry in particular relies on continuous in-feed prophylaxis with application of anticoccidial drugs. There is currently, a growing global concern about the twin issues of drug resistance and drug residues, (Founou *et al.*, 2016). With the increasing interest in poultry production evidenced by the proliferation of poultry farms, it is pertinent to continually evaluate management issues associated with coccidiosis in commercial chicken farms.

MATERIALS AND METHODS

One hundred and sixty six poultry farmers were selected through random sampling of poultry farms based on the list of poultry farmers registered with Poultry Association of Nigeria in Southwest States. Willingness to participate in the survey and condition of confidentiality were among the criteria for the selection.

Questionnaire Interview

The study was conducted using semi structured questionnaire. The questionnaire was designed to collect data in respect of the Respondents' Socio-demographic characteristics and farm management experiences and practices. The data obtained were entered into Microsoft Excel Program and analysed using Epi-Info version 3.3 to determine their association with the respondents' Knowledge of Coccidiosis and the Preventive Practices adopted against the disease. Chi-square was used to determine the level of significance of the result obtained at $p \leq 0.05$.

Results

I. Respondents' Demographic, Socio-Economic and farming characteristics

The data obtained on poultry farmers' characteristics are shown in table I. Out of the 166 poultry farmers interviewed, 92 (56.4%) were 50 years and below while 74 (45.6%) were above 50 years. Majority of the poultry farmers 140 (84.4%) had tertiary education while 26 (15.6%) had secondary education. A total of 114 (68.7%) of the respondents were Christians, 49 (29.5%) were Muslims while only 3 (1.8%) were Traditionalists. The table further showed that 155 (93.4%) of the respondents were married, 10 (6%) were single while only 1 (0.6%) was widowed.

Table I: Percentage Distribution of the Socio-Economic-Demographic Characteristics of Poultry Farmers

II. Respondents Knowledge of Chicken Coccidiosis in Southwest, Nigeria

The knowledge of respondents on coccidiosis has to do with previous experience and information available to the farmers. Details of the data obtained in respect of the respondents' knowledge of coccidiosis are shown in table III below. A total of 159 (95.9%) respondents' aware of the disease called Chicken coccidiosis

as generally indicated by bloody diarrhea. About 136 (82%) of the farmers received information on coccidiosis from veterinary doctors, veterinary clinic or from veterinary School. Majority of the

Variable	Parameters	Freq	%
Age	Below 10 years	0	0
	10-30 years	18	10.8
	31-50 years	74	44.6
	Above 50 years	74	44.6
Educational Attainment	Primary Education	0	0
	Secondary Education	26	15.6
	Tertiary Education	140	84.4
	Others	0	0
Religion	Christians	114	68.7
	Muslims	49	29.5
	Traditionalists	3	1.8
	Others	0	0
Marital Status	Single	10	6
	Married	155	93.4
	Widowed	1	0.6
	Divorced	0	0

respondents 88.0% confirmed that an outbreak of coccidiosis had occurred on their farms before and 72.9% of the outbreaks were reported in chickens less than eight weeks of age. In the questionnaire, the clinical signs of coccidiosis were listed include ruffled feathers, droopy wings, inappetence/dosing and bloody droppings. Only 15.1% of the respondents recognized two or more of these clinical signs while majority (84.9%) respondents recognize bloody droppings as the only sign of coccidiosis.

Respondents’ Attitude to Chicken Coccidiosis

This general perception of the respondent on management of chicken coccidiosis was

confidently expressed by as a disease that is easily controlled. About 72.9% of the respondents claimed that coccidiosis occur in chickens under 8 weeks of age while 25 (15%) said it occurred in older chickens. About 61(36.7%) of the

Table II: Percentage distribution of Respondents Knowledge of Chicken Coccidiosis in South West Nigeria

Variables	Parameters	Freq	%
Educational attainment:	Primary School	0	0
	Secondary School	26	15.6
	Tertiary Education	140	84.4
Aware of Coccidiosis.	Yes	159	95.9
	No	7	4.1
Source of awareness.	Radio/TV	9	5.4
	Vet/School/Vet Clinic	136	82.0
	Fellow farmers	9	5.4
	Personal experience	4	2.4
	No information at all	8	4.8
Previous occurrence on farm.	Yes	146	88.0
	No	20	12.0
Recognition of Clinical signs of coccidiosis	Good	25	15.1
	Fair	141	84.9
Coccidiosis outbreak despite prevention	Yes	50	30.1
	No	116	69.9

respondents said coccidiosis is more prevalent in the rainy season, 82 (49.4%) claimed it is not seasonal while 8 (4.8%) said it is more prevalent during the dry season. While 126 (75.9%) respondents agreed that coccidiosis is of economic significance, 40 (24.1%) either do not know or do not believe that the disease is of any economic significance. Also, about 50(30.1%) of the respondents had coccidiosis despite preventive measures. About 152 (91.6%) of the respondent believe that the preventive measure they adopt is very effective while 14 (8.4%) said they were barely effective. In all 20 (12%) of the respondents agreed to adopt immunoprophylactic

Table III: Percentage distribution of Respondents’ Practice affecting Chicken Coccidiosis Management in Southwest Nigeria

measures while 146 (88%) preferred their current

prevention and control practices. About 120 (72.3%) of the respondents based their adoption on cost-effective analysis while 46 (27.7%) did not.

Variables	Paramters	Freq	%
Age of Farms	Less than 1 year	1	0.6
	1-5 years	48	28.9
	Above 5 years	117	70.5
Type of chickens on farms	Broilers	3	1.8
	Layers	135	81.3
	Breeders	9	5.4
Age range of chickens on Farms	2 or more breeds	19	11.5
	0-8 weeks	4	2.4
	9-18 weeks	8	4.8
	19 weeks & above	110	66.3
	Multiple ages	44	26.5
Poultry population	200 – 999	10	6.0
	1000 – 5000	84	50.6
	5001 – 10000	34	20.5
	10001 – 50000	23	13.9
	50001 – 330000	15	9.0
	Open Sided	165	
	Controlled Environment	1	0.6
	Deep Litter	73	44.0
	Cage system	53	
		31.9	
Method of Securing Livestock feed for the birds	Produced on the farm	78	47.0
	From external sources	88	53.0
Watering system	Manual system	98	59.0
	Automatic system	60	36.2
	Both systems	8	4.8
Water spill in the pens	Occurs very often	117	70.5
	Occurs rarely	49	29.5
	Allow to dry	4	2.4
	Mark out wet litter and replace with dry ones	154	92.8
	Fix the wet litter with other surrounding litter	3	1.8
	Not deep litter system	5	3.0
	Deep litter system		
Presence of caked litter	Yes	102	61.4
	No	61	36.8
	Not deep litter system.	3	1.8
	Monthly	90	54.2
	Quarterly	35	21.1
	Yearly	5	3.0
Disinfectant Foot dip at the entrance of pens	Not deep litter system	36	21.7
	Present	121	73.0
	Absent	45	27.0

Respondents' Practices Related to Coccidiosis Management

The detailed data obtained in respect of the factors associated with practices of coccidiosis management is as shown in table V. About 84(50.6%) of the poultry population was based on farms with flock size of between 1000 and

5000. About 44% of the poultry farmers reared their flock strictly on deep litter while 53% got their feed supply from external sources. About 98(59%) of the respondents use manual open drinkers with 117(70.5%) regularly experienced water spillage on the farms which is indicative of poor coccidiosis management. A total of 154 (92.8%) of the respondent farmers remove wet litter and replace it with dry one while 4(2.4%) and 3(1.8%) either allow the litter to dry on its own or mix it with surrounding dry litter. A total of 90(54.2%) respondent farmers replace their litter monthly while 35 (21.1%) and 5(3%) replace theirs quarterly and annually respectively. About 121(73%) had foot dip at the pen's entrance while in 45(27%) foot dip is absent. The majority of the respondent farmers 135(81.3%) reared only layer chickens while 19(11.5%) reared two or more breeds of chicken. About 44(26.5%) of the farmers kept chickens of multiple ages on their farms. In relation to coccidiosis preventive practices, 91(54.8%) of the respondents adopted vaccine prophylaxis while 50(30.1%) applied chemoprophylaxis either in feed or in water. The adoption of preventive method was influenced in 98(59%) of the respondents by their external consultants while 42(25.3%) and 26(15.7%) were influenced by their staff and fellow farmers respectively. About 30.1% of the respondents had recorded coccidiosis outbreak despite preventive measures.

Factors associated with Good knowledge of Coccidiosis of Poultry Farmers in Southwest, Nigeria.

The factors of age, education, religion, age of farms, rearing method, source of extension information and disease outbreak in spite of prevention were evaluated to determine their association with the Farmers knowledge of Chicken coccidiosis. Religion has the least association (p=0.95) followed by the age of the poultry farms (p=0.92). The age of the farmer and the educational level followed at p=0.81 and p=0.44 respectively. The incidence of outbreak after prevention was next at p=0.07. All these factors were however not significantly associated with good knowledge of coccidiosis. The farmers using both deep litter and cage system as well as those sourcing their extension information from qualified Veterinary personnel are significantly associated with good knowledge at p= 0.03 and p=0.02 respectively.

Factors Associated with Practice of Prevention of Coccidiosis

Factors such as Age, Education, Religion, Rearing method, prevention method adopted, and the cost effectiveness assessment of preventive measure were evaluated for their association with the Practice of Poultry farmers in Southwest in respect of chicken coccidiosis immunoprophylaxis. Age of the respondents was the least associated at p = 0.73, this is followed by the preventive method used at p = 0.48. Next was the rearing method used (deep litter/Cage or deep litter & Cages) at p = 0.26. The Educational level of the respondents followed at p = 0.2. The Cost effectiveness of the chosen method was nearly significant at p = 0.066. Usage of External Veterinary Consultants and the Islamic religious affiliation of respondents have significant associations with the choice of good preventive

Table IV: Factors Associated with Good Knowledge of Coccidiosis by Poultry farmers in Southwest Nigeria

Variables	Good Knowledge n (%)	Fair Knowledge n (%)	Odds ratio	95% CI	P value
Age					
-Young Adults(<50yrs)	15 (61.0)	78 (55.0)	1.3	0.5-3.6	0.81
-Old Adults (>50yrs)	9 (39.0)	64 (45)			
Education					
-Pry & Secondary	3 (11.0)	23 (16.0)	0.64	0.1-3	0.44
-Tertiary	22 (89.0)	118 (84.0)			
Religion					
-Christians	18 (72.0)	96 (68.0)	1.2	0.4-3.7	0.95
- Muslims	7 (28.0)	45 (32.0)			
Age of farms					
< 5years	8 (33.0)	41 (29.0)	1.2	0.4-3.6	0.92
>5years	16 (67.0)	101 (71.0)			
Rearing Method					
-Deep Litter/Cage	14 (56.0)	113 (80.0)	0.3	0.1-0.9	0.03 ^a
-Deep Litter & Cage	11 (44.0)	28 (20.0)			
Source of information					
-From Vet Clinic/Vets	7 (28.0)	87 (62.0)	0.2	0.08-0.7	0.02 ^b
-Other Sources	13 (72.0)	54 (38.0)			
OT					
Yes	12 (50.0)	37 (26.0)	2.9	1-8	0.07
No	12 (50.0)	105 (74.0)			

a,b – p values with superscripts have statistical significant difference.

DISCUSSION

The generality of poultry farmers had experienced and are still experiencing outbreaks of coccidiosis among different batches of chickens being reared. However, the knowledge, attitude and practices of coccidiosis management vary across different husbandry systems as evident in the results of our present study. The higher number (55.7%) of respondents below 50 years may be indicative of the relationship between youthful agility and the physical demand of poultry farming. Oladoja and

Table V: Factors Associated with Preventive Practice against Coccidiosis by Poultry farmers in Southwest Nigeria

Variables	Coccidiosis Vaccine	No Coccidiosis Vaccine	Odds Ratio	95% Confidence Limit	P Value
Age					
< 50 yrs	63 (54.0)	30 (60.0)	0.8	0.4-1.8	0.73
> 50 yrs	53 (46.0)	20 (40.0)			
Educational Level					
Pry & Sec	22 (19.0)	4 (8.0)	0.3	0.1-0.9	0.2
Tertiary	94 (81.0)	46 (92.0)			
Religion					
Christians	72 (62.0)	42 (84.0)	0.3	0.1-0.9	0.03 ^a
Muslims	44 (38.0)	8 (16.0)			
Rearing Method					
Deep litter					
Cages	49 (54.0)	24 (69.0)	0.5	0.2-1.3	0.26
	42 (46.0)	11 (31.0)			
Prevention method					
Coccidiostat	111(97.0)	48 (95.0)	1	0.2-9.8	0.48
Vaccines	4 (3.0)	3 (5.0)			
Who influenced choice?					
External	80 (64.0)	18 (35.0)	4.2	1.8-9.5	0.0008 ^b
Fellow farmers	35 (36.0)	33 (65.0)			
Cost Effectiveness					
Yes	90 (78)	30(60)	2.4	1-5.4	0.066
No	26 (22)	20 (40)			

a,b – p values with superscripts have statistical significant difference

poultry farmer respondent correlated to a higher probability of attaining moderate level of poultry disease management as against the low level. The present study however, did not show any significant relationship between tertiary education and good knowledge of chicken coccidiosis. Majority of the respondents, 68.9% are Christians. This is in tandem with the report of Oladoja and Olusanya 2007 which reported 67% Christian poultry farmers in Ijebu area of Ogun State. Religion plays an important socio-cultural role in one’s way of life, relationship and occupation. It is unclear really why there was such a wide disparity in the religious affiliation of the farmer respondents since poultry farming is devoid of the religious prejudices associated with pig farming.

About 93.4% of the respondents were married. This perhaps was

because poultry farming is

dominated by middle aged persons.

Olusanya (2007) reported a 73.9% of below 50 years poultry farmer respondents in his study. The majority of the respondents (84.4%) had tertiary education, which probably reflects the increasing technical nature of modern poultry farming and its requirement of a higher level of complementary education attainment. This result is at variance with that of Oladoja and Olusanya 2007 who reported a mere 20.68% of respondents with tertiary education thereby indicating increasing demand for improved knowledge of poultry rearing technicality to cope with the current reality. Poultry farmers with tertiary education are more likely to keep abreast of innovations in the field of poultry disease management. Akintunde and Adeoti (2014) reported that the years of formal education of a

Similarly, Oladoja and Olusanya,(2007) reported 95.9% of married poultry farmer respondents. Majority (95.9%) of the respondents have heard of chicken coccidiosis. This could be due to the ubiquitous distribution of *Eimeria* species in poultry establishments (Williams, 1996). It also confirms the widespread and endemic nature of coccidiosis in the study area. This is corroborated by Lawal *et al.*, (2016) which reported that coccidiosis is endemic both in commercial and backyard poultry farms in Maiduguri. About 82% of the respondents obtained information on coccidiosis from Veterinary doctors, Veterinary Clinics or Veterinary Colleges, which clearly shows the role of these professional in technical extension information

dissemination. Such farmers are likely to be better informed about the coccidiosis disease which may translate into good knowledge. This was confirmed in this study as the factor of the respondents sourcing their information on coccidiosis from qualified Veterinary personnel were significantly associated with good knowledge of coccidiosis ($p = 0.02$). Akintunde *et al.*, (2014) also reported a positive correlation between access to livestock extension services and high probability of attaining moderate to high level of disease management.

The fact that 88% of the respondents have experienced outbreak of coccidiosis on their farms should ordinarily engender a better knowledge of the aetio-pathogenesis and prognostic outcome of coccidiosis. This study also showed that 72.9% of the outbreaks occurred in chicks less than 8 weeks which corroborate the report of Lawal *et al.*, (2014) that coccidiosis is more of a disease of young chickens. This knowledge may prompt the farmer to develop the attitude and practice of deploying appropriate preventive measures early in the life of the chicks to prevent any outbreak. The ability to recognize the clinical signs of coccidiosis is a crucial element in the evaluation of knowledge of coccidiosis. In this study only 15.1% of the respondents were able to state two or more clinical signs of coccidiosis. The remaining 84.9% associated coccidiosis with only bloody faeces. Prompt and correct identification of clinical signs of coccidiosis are very important for the proper diagnosis of diagnosis and for the selection of appropriate anticoccidial drug or vaccine (Jatau *et al.*, 2012).

The practice of deep litter rearing system by most of the respondents (68.5%) could be due to the lower capital requirements for a deep litter system than a battery cage system of same size but deep litter system predisposes the chickens to higher risk of coccidiosis outbreak (Ola-Fadunsi, 2017), which could have informed the reported higher adoption of vaccination (62.4%: 54.8% + ½ of 15.1%) prophylactic measures. Farmers using both deep litter and battery cage system according

to this study, have a significantly higher knowledge of coccidiosis than those using either of the system ($p = 0.03$).

This study did not show any significant relationship between the age of the farms; previous coccidiosis outbreak in spite of preventive measures and good knowledge of coccidiosis. This is rather interesting because ordinarily, how long a farm has been in existence and previous coccidiosis outbreaks is expected to enhance better knowledge of the disease. This result is at variance with Akintunde *et al.*, (2014) which reported a relationship between years of farming experience and moderate to high level of disease management.

About 61.4% (36.7% and ½ of 49.4%) of the respondents said coccidiosis is more prevalent in the rainy season. This may engender an attitude and practice of taking extra preventive precaution against coccidiosis in the rainy season as distinguished from the dry season. This study corroborates the reported findings of Ola Fadunsi (2017) that coccidiosis incidence is about 1.7 times more during wet season than the dry season. Only 1 (0.6%) of the poultry farms were started in the past one year while 70.5% were over 5 years old. It might be an indication that fewer people are presently going into poultry farming in the past 5 years. This might be because a lot of young people now prefer commercial motorcycle ('Okada') riding which bring in quicker returns with relatively less starting capital (Adebo and Adesida, 2017).

About 59% of the respondents practice the use of manual drinkers while the rest either use automatic drinkers (Nipple or bell drinkers) or a combination of the two. Manual drinkers are disposed to frequent water spillage on the litter and this can cause dampness that could create a conducive environment for the proliferation of coccidian oocyst which may increase the risk of outbreak of coccidiosis (Dunlop and Selle, 2016). The use of nipple drinkers may on the contrary cause excessive dryness in the litter which may make the darkling beetles (*Alphitobius*

diaperinus) which act as vector of *Eimeria* species for chicken to attack them in their search for water (Goodwin and Waltman, 1996). Good litter management and watering of chicken are critical in coccidiosis control practices (Dunlop and Selle, 2016; Williams, 1996).

The 91.6% of the respondents that seemed satisfied with their adopted preventive measures may be difficult to convince to change to newer and perhaps more economical methods later especially if they do not have a Veterinary consultant. Only 73% of the respondents have foot dip at the entrance of their poultry pens while 11.5% stocked 2 or more breeds of chicken with 26.5% keeping multiple ages of chickens. All these raise bio-security concerns which may adversely affect disease management and control. Akintunde *et al.*, (2014) reported that bio-security practices contributed largely to explaining the overall degree of poultry disease management practice in Southwest Nigeria.

The logistic regression of factors associated with the practice of adoption of coccidiosis vaccine prophylaxis showed that respondents that consulted Veterinarians had a significantly higher adoption rate of coccidiosis vaccine (OR=4.4, $p=0.0008$, CI 1.8-9.5) than those sourcing information from own staff or fellow farmers. This is a further confirmation of the earlier stated significantly higher knowledge associated with those that sourced their information on coccidiosis from qualified Veterinary professionals.

The significantly higher practice of coccidiosis prophylaxis adoption by respondents of the Islamic faith is probably due to their regular meetings at local Friday Jumat services which might afford them the opportunity of comparing notes on practices of coccidiosis management.

CONCLUSION

This survey showed that poultry farmers in southwest Nigeria have variable knowledge of occurrence, patterns and management of coccidiosis in chickens. The factors associated with significantly good knowledge of coccidiosis

and adoption of prevention include rearing of chicken on deep litter and cage systems, sources of information and religious practice. Veterinary extension education and faith-based advocacy for poultry farmers on effective coccidiosis prevention will enhance adoption and diffusion of new coccidiosis management and preventive techniques that may reduce anticoccidial chemotherapy with its attendant resistance and residue issues.

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