



Original Article

A Survey on Antibiotic Usage in Poultry

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ABSTRACT

The survey is continually lacking in developing countries to justify the regulation of antibiotic usage in poultry farming. Imprudent use of antibiotics in food-producing animals is associated with health risks for consumers. This study aimed to gather baseline data on which antibiotics are used in some selected commercial poultry farms in Minna metropolis, Nigeria between March and April 2022. A total of 30 questionnaires were distributed to poultry farmers in the study area. The result of the study indicated that the majority (40.0%) fell within 41-50 years old, who were either college of education/polytechnic holders (70.0%). Many, (60.0%) had no animal science base discipline. Almost all 26(86.0%) participants used one or more antibiotics. Antibiotics were commonly administered for both prophylactic and therapeutic 14(53.8%) and for leasers extent for prophylaxis 4(15.4%), therapeutic 4(15.4%), and 4(15.4%) for growth promotion. All, 26 participants that used antibiotics in their farms procured antibiotics from veterinary stores while 20(76.9%) consulted with animal health workers before using antibiotics. The most frequently used antibiotics in the study area are oxytetracycline 8(30.8%), while the least is neomycin 4(15.4%). This study provides baseline data on the extensive and inappropriate use of antibiotics by poultry farmers in the study area. Thus, it is recommended that awareness of the prudent use of antibiotics by farmers and supervision to obtain reverse in antibiotics should be a preference.

Keywords: Antibiotic usage, food-producing animals, growth promoters, Minna metropolis, poultry farming.

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Cite this Article: Adamu, I.I. (2022). A Survey on Antibiotic Usage in Poultry. *Global Journal of Animal Scientific Research*, 10(2), 81-90.

Retrieved from <http://www.gjasr.com/index.php/GJASR/article/view/137>

Article History: Received: 2022.09.19 Accepted: 2022.11.02

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INTRODUCTION

Poultry farming has undergone some tremendous changes in structure and activity by transforming itself from mere backyard farming into a major commercial sector (Dalal and Kosti, 2018). It is one of the most important sectors of the agricultural economy in Nigeria that has experienced significant growth in recent years (Geidam, *et al.*, 2007). It is the largest livestock sector among the domestic animal stock in the country, where it's accounting for about 30% of the industry (Geidam, *et al.*, 2007). Although chicken is the most commonly farmed species because it enjoys a relative advantage in the ease of management, wide acceptance of its product, and quick and higher return to capital investment (Dumaup and Ampode, 2020).

The growth and laying performance of birds are frequently improved by using growth promoters or feed additives that have a positive impact on the growth and immune responses. They also enhance visceral health, which steers to acceleration in feed conversion efficiency, rise of genetic growth potential, and reduction of waste products output from intensive poultry production (Apata, 2012). Furthermore, World health organization "WHO" (2003) published that, in many parts of the world food-producing animals are given antibiotics daily to make them grow faster and prevent disease. Antibiotics are given at sub-therapeutic dosages for the maintenance of the micro-flora of the intestine and for ameliorating the performance in general along with prevention of certain specific pathological conditions of the intestine (Mathew *et al.*, 2009; Hassan, *et al.*, 2010). This trend is likely to continue given the growing demand for the protein of animal origin. At the time when antibiotics are used for growth promotion, a small amount is usually administered as compared to therapeutic use. This may cause bacteria to develop resistance to antibiotics (WHO, 2017). As a result, the emergence and spread of antibiotic resistance compromise the nutritional and economic potential of poultry and other food-producing animals. This could lead to serious consequences on public health (Rinsky *et al.*, 2013).

The use of antibiotics is restricted in many parts of the world. However, 80% of raised livestock were fed some kind of antibiotic or growth promoter (Lee *et al.*, 2001; Mudalal *et al.*, 2021). In many developing countries, antibiotic use in food animals remains unregulated, leading to inappropriate use of the drugs and a widespread increase in antibiotic resistance (Usui, *et al.*, 2014). Therefore, this study survey aims to gather baseline data on which antibiotics are used in some selected commercial poultry farms in Minna metropolis, Nigeria.

MATERIALS AND METHODS

Study Location

The study was conducted in Minna metropolis the administrative headquarters of Niger State, Nigeria. Minna is located in the middle belt on latitude 9°35'50" North of the equator and longitude 6°33'25" East of the Greenwich meridian. It has a tropical

climate. The summer has good rainfall, while the winter has very little. The average annual temperature is 27°C. The rainfall has an average of 1229mm.

Field Survey

A cross-sectional survey was conducted between March and April 2022. The survey was carried out using a well-structured questionnaire. Large and small poultry farms were present in the study area. The farms are entirely private and owned by individuals who rear poultry from the stage of chicks to chicken, which lasts for 45 days. A total of 30 poultry farms were randomly surveyed. A questionnaire was administered to one employee (in charge) on the poultry farm and information targeting the age of the worker, various antibiotics used in the poultry farm, source of prescription, source of procurement of antibiotics, and reason and types of antibiotics used were documented.

Data Analysis

Data collected were entered into a Microsoft Excel sheet and imported into IBM SPSS statistics (version 23) for analysis. Descriptive statistic was used to determine the frequency of responses in the survey.

RESULTS

Participant characteristics: From the survey, a total of 30 farms were visited, majority of the poultry farms were small-scale poultry units having 100 or more birds grown for commercial purposes. Each of the 30 visited farms participated in the study giving a response rate of 100%. The major age group of the participants is between 41-50 years of age 12(40.0%) and possessed college of education or polytechnic certificates 21(70.0%), of which more than half 18(60.0%) had animal science base discipline. Table 1, revealed the participant's characteristics of some selected commercial poultry farms in Minna metropolis.

Usage of Antibiotics

Almost all the participants, 26(86.7%) had used one or more antibiotics during the 45 days of flock life, while 4(13.3%) did not use antibiotics. Of the 26 participants who used antibiotics, they reported that antibiotics were used for various purposes and were not restricted to use for a specific ailment. On the 26 farms where antibiotics were used, 4(15.4%) participants reported they used antibiotics as prophylaxis, 4(15.4%) therapeutic, 14(53.8%) both prophylactically and therapeutically, while 4(15.4%) used antibiotics as growth promoters. All 26(100%) participants that used antibiotics on their farm sourced antibiotics from a veterinary store, while most, 20(76.9%) frequently consulted with animal health workers before using antibiotics,

and only 6(23.1%) consulted with a veterinary doctor. Table 2 shows the participant's responses to statements about antibiotics and their uses.

Table 1: Participant's characteristics of some selected commercial poultry farms in Minna metropolis (n = 30)

Variables	Categories	Frequency	Percentage
Age (Years)	<30	6	20
	30–40	8	26.7
	41–50	12	40
	>50	4	13.3
	Total	30	100
Literacy status	Primary	0	0
	Secondary	2	6.7
	College of Education/Polytechnic	21	70
	University	7	23.3
	Total	30	100
Educational discipline	Animal Science	18	60
	Non-animal science-based discipline	12	40
	Total	30	100

Table 2: Participant's responses to statements about antibiotics and uses in Minna metropolis (45 days of flock life)

Variables	Categories	Frequency	Percentage
Use of antibiotics on the farm	Yes	26	86.7
	No	4	13.3
	Total	30	100
Reason for antibiotic usage	Prophylaxis	4	15.4
	Therapeutic	4	15.4
	Prophylaxis and therapeutic	14	53.8
	Sub-therapeutic	4	15.4
	Total	26	100
Source of procurement of antibiotic	Veterinary store	26	100
	Local vendors	0	0
	Total	26	100
Source of prescription	Veterinary doctor	6	23.1
	Animal health worker	20	76.9
	Drug seller	0	0
	Self	0	0
	Total	26	100

Most Used Antibiotics

Furthermore, the result revealed that 40 antibiotic-active ingredients belonging to seven antibiotic classes are used within the 45 days of flock life in the selected farms with the Oxytetracycline 8(30.8%) and Neomycin 4(15.4%) being the highest and least, respectively and is presented in Table 3 in frequency order.

Table 3: Most frequently used antibiotics in Minna metropolis (45 days of flock life)

Antibiotics	Frequency	Percentage
Oxytetracycline	8	30.8
Promin	6	23.1
Gentamycin	5	19.2
Neomycin	4	15.4

DISCUSSIONS

The survey on participants' characteristics showed that the interest in poultry farming in Minna metropolis increased with an increase in the age of farmers <30 to 50 years and declined thereafter. The reason is not far-fetched, because they are energetic, enthusiastic, and inquisitive learners, they can be easily trained and made aware of the harmful effects of antibiotics misuse and the consequences to public health. However, this finding agreed with Oladeje *et al.*, (2022)

Based on the survey in Minna metropolis, a large percentage of the participants are educated having either college of education/polytechnic certificates or degree certificates. This report agreed with Joshua *et al.*, (2018) that 63.4% of poultry farmer's possessed tertiary education in Ile-Ife, Nigeria. This result is also consistent with the findings of Akure *et al.*, (2022) in Faggae Local Government Area of Kano State, and Olanipekum *et al.*, (2022) in Ekiti State, Nigeria, who reported that majority of the poultry farmers possessed tertiary certificates of education. This finding is contrary to the report of Khan, *et al.*, (2018) who reported that 60.0% of the participants had only a primary level of education in Mymensingh Sadar of Bangladesh, India. However, this does not suggest that in poultry farming education is not a barrier but rather an added advantage for efficient management.

The antibiotic usage observed in this survey revealed that poultry farmers in Minna metropolis relied heavily on antibiotics medication. Those that used antibiotics on their farms were multi-drug users and they also used one or more antibiotics for prophylactic, therapeutic, both prophylactic and therapeutic and growth promotion. The higher percentage obtained in this finding on the use of antibiotics in both prophylactic and therapeutic is congruous to the submission of Joshua, *et al.*, (2018) that, 63.3% of antibiotics were commonly administrated for both prophylactic and therapeutic among farmers in Ile-Ife, Nigeria. It was also reported that only 3.3% of the farmers used antibiotics for growth promotion. The higher usage of antibiotics for both prophylactic and therapeutic purposes as observed in this report is also in alliance

with the findings on poultry layers farm in Ogun State, Nigeria by Adebowale, *et al.* (2018); and Oladeji, *et al.*, (2022). On the 26 farms where antibiotics were used, only a small percentage used antibiotics for prophylactics, therapeutics, and growth promotion. This implies that using antibiotics for both prophylactic and therapeutic in Minna metropolis may be because farmers would like to improve productivity and healthier poultry breeds. Besides, poultry farmers might fear reputation loss if the birds' morbidity and mortality are regular. However, this finding is contrary to Adelowo *et al.*, (2014) who stated that 86% of poultry farms used antibiotics for growth promotion. This finding also disagreed with Khan, *et al.*, (2018) where 57.5% of antibiotics were used for growth promoters. The reason behind the variation in the usage of antibiotics in Minna metropolis compared to previous findings can be related to the difference in time, place, and season of research.

It is well observed that, the sourcing of antibiotics by the poultry farmers in Minna metropolis indicated that, poultry farmers are well informed. All the farmers that used antibiotics in their farms sourced them from veterinary stores which are possibly owned by trained and qualified professionals such as veterinarians. This report agrees with Oladeji *et al.*, (2022) who documented that 34.0% of the poultry farms purchased their antimicrobials from veterinary stores. However, the report is in contrast to Okoli, *et al.* (2002), and Okoli *et al.*, (2005) who reported in their findings that, unqualified personnel is involved in the retailing of veterinary drugs especially poultry medicines in south-eastern Nigeria.

Based on the responses from the participants, it is evident that all the farmers that used antibiotics on their farms obtained a prescription from registered and qualified personnel, either animal health workers or veterinary doctors. This finding is closely related to the finding of Emmanuel *et al.*, (2021) who reported that 64.2% of the farmers administered antibiotics based on veterinarian prescription. Also, Oluwasile *et al.*, (2014); and Oladeji *et al.*, (2022) reported that the majority 50.0%; and 27.4% of the antibiotics used by poultry farmers were prescribed, respectively. However, this finding is a variance from Amaechi, (2014) who reported that most of them 70.0% of poultry farmers practices self-medication. Also, Nurudeen *et al.*, (2019) stated that over 80% of the respondents used antibiotics intentionally without a veterinarian's prescription. Self-medication is rampant among poultry farmers largely due to claims of good experience by farmers, the unavailability of veterinary services, and or the extra cost of veterinary services (Okoli *et al.*, 2002; Okoli *et al.*, 2005). The administration of antibiotics without a veterinarian prescription will result in misuse, hence, detrimental not only to the birds but also to public health (Lamikanta, 2011).

The result obtained in this study shows that Oxytetracycline, Promin, Gentamycin, and Neomycin are the most frequently used antibiotics in Minna metropolis. Out of the four frequently used antibiotics, Oxytetracycline was found to be the highest, while neomycin is the least. Oxytetracycline a Tetracycline antibiotic is popular

because of its broad-spectrum action, low cost, and availability in long-acting formulation (Olatoye and Afisu, 2013; Aktas and Yarsan, 2017). The report of Gberindyeret *et al.*, (2019) also indicated that tetracycline; sulphonamides, and aminoglycosides were the most common classes of antibacterial drugs for poultry uses in Nigeria. Also, this finding is compatible with Paul, *et al.*, (2021) who documented a high oxytetracycline usage among layer poultry farms in Gombe metropolis, Northeast, Nigeria. Tetracycline is the most abused antibiotic for its prophylactic and therapeutic of poultry disease in Nigeria (Liselotte *et al.*, 2010; Adebowale *et al.*, 2018; Awogbemi *et al.*, 2018). Neomycin is an aminoglycoside that has a mechanism of action and spectrum of activity primarily Gram-negative (Lamikanra, 2011). It is used in poultry in cases of bacterial enteritis caused by *E. coli* and *Salmonella* causing while diarrhea, paratyphoid, and chronic respiratory disease (Price *et al.*, 2012; Yang *et al.*, 2014). Neomycin is water soluble making it possible for oral administration through drinking water. However, the use of neomycin by poultry farmers in Minna metropolis was lower by 15.4% in this study compared to other studies conducted in Nigeria (Oluwasile *et al.*, 2014; Joshua *et al.*, 2018), but similar to a report from Bangladesh where neomycin was the lowest 38.6% among broiler farms (Tasneem *et al.*, 2020).

CONCLUSION

Antibiotics have been used extensively in poultry industries prophylactically, for disease prevention, therapeutically, for disease treatment, and/or sub-therapeutic, for growth promotion. As observed in this study, there is an extensively inappropriate use of antibiotics in poultry farms and limited knowledge of the repercussion on animal and human health among poultry farmers surveyed. These stress the crucial need to educate the farmers on the importance of the prudent use of antibiotics in food-producing animals and disease management. Also, inappropriate use of antibiotics among the educated and experienced participants in Minna metropolis restates the need for stopping or limiting the use of antibiotics particularly oxytetracycline, and rigorous enforcement of veterinary drug laws to safeguard therapeutic default in both animals and humans.

ACKNOWLEDGMENT

The author is grateful to the owners and managers of the poultry farms for their participation in the survey.

CONFLICTS OF INTEREST

The authors declare no conflict of interest regarding the publication of this paper.

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