

Antimicrobial drug usage for poultry production within a local government area in Ogun State

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Abstract

A survey was carried out to determine the use and misuse of antimicrobial drugs in the poultry industry within Ijebu North Local Government, Ogun State. A questionnaire to adequately cover all relevant information needed for the study was designed, and depending on the literary level of the respondents an interview schedule or structured method was used. Information was collected on socio-economic characteristics of the farm, type of antimicrobial drug used, regime and purpose of antimicrobial drug administration and the effects. The results, revealed large-scale misuse of antimicrobial drugs by poultry farmers in the local government. It is suggested that the only solution to the problem at present is to rear healthy birds so that fewer diseases would be experienced so as to reduce the use of antimicrobial drugs.

Keywords: *Antimicrobial drugs: usage, poultry production*

Introduction

Antimicrobial drugs are substances of both natural and synthetic origin which at low concentration are inhibitory to the growth or development of microorganisms (Turk and Porter, 1974). In animal husbandry, these substances are used therapeutically to control infectious diseases and prophylactically to reduce the population of intestinal microbes which leads to more efficient feed conversion and weight gain (Linton, 1982).

It has been estimated, however, that not more than 5 to 10% of the vast output of antimicrobial was employed on proper clinical indication (Jawetz, 1963). Wide spread mis-directed antimicrobial use is just a waste of money, it is to be deplored for a number of medical reasons among which are:

- a. accumulation of the drug in the tissue of the treated animal (Peters, 1989)
- b. emergency of drug resistant strains (Walton, 1996)
- c. misplaced faith in antimicrobial drugs which often leads to neglect of other forms of treatment or measures which may be more relevant (Turk and Porter, 1974).

Though the use of antimicrobial drugs in poultry management is popular and synonymous with poultry enterprise (Dafwang *et al.*, 1996) there are no reports on whether these drugs are being administered on proper clinical indication in Nigeria bearing in mind the consequences of the contrary as stated above. This survey, therefore, investigated the

use and misuse of antimicrobial in the poultry industry in Ijebu –North local government area in Ogun State.

Materials and methods

Study area

This work was carried out in Ijebu – North local government area of Ogun State. The local government covers an area of about 13,394 hectares of land. It is located approximately between latitude 60°55' and 7°N and longitude 3°5' and 4°5'E.

Agriculture including poultry production is the dominant occupation of the people. Ijebu Igbo and Ago-Iwoye are the urban centers followed by Oru, Awa and Ilaporu. Ijebu-Igbo, the headquarter of the local government is the fourth largest urban center in Ogun State. The total population of the local government is 142,549 (N.P.C., 1992).

Data collection and analysis

Data were obtained from 104 poultry farmers between December, 1996 and January, 1997. A questionnaire to adequately cover all relevant information needed for the study was designed, and depending on the literacy level of the respondents an interview schedule or structured method was used. Information were collected on socio-economic characteristics of the farms, type of antimicrobial used, regime and purpose of antimicrobial drug administration and the effects. The respondents (poultry farmers) were purposively selected from Ijebu-Igbo, Ago-Iwoye, Oru, Awa, Ilaporu and Aparaki. Sixty respondents were picked from Ago-Iwoye, because of the location of the farm settlement scheme there and the involvement of staff and students of the Ogun State University in poultry production. Twenty-five respondents were picked from Ijebu-Igbo while 5 each were picked in Oru, Awa and Ilaporu with the remaining 4 from Aparaki. The data collected

were analysed by the use of descriptive analysis, with emphasis on absolute distribution and percentage.

Results

The distribution of respondents by experience revealed that 49% of them were in poultry business from 1 to 5 years while 25% were in it from 6 to 10 years (Table 1). The poultry industry in the local government varied from small scale to large scale involving about 52% and 14% of the farmers respectively. Some of the farmers (17.3%) kept local chicken while others (82.7%) kept commercial exotic chicken (Table 1). In this study the classification as to whether the scale of operation was small, medium or large was entirely that of the respondents (Table 1) as most of them were unwilling to disclose the number of their birds. The poultry enterprise in the local government involved raising of birds for egg and meat production with 47.1% and 15.4% of the farmers respectively participating (Table 1). Not less than 80% of the respondents had secondary education and above. The antimicrobial drugs that were administered to birds by the farmers in the local government are listed in Table 2.

Our observation in this study revealed that majority of the respondents (82.7%) administered antimicrobial drugs to their birds without seeking expert advice. Regardless of whether an expert was consulted or not, 7.7% and 24% of the respondents administered antimicrobial drugs on weekly and monthly basis respectively only 59.6% of them did so for curative purpose (Table 3). While 9.6% and 28.85% of the respondents administered antimicrobials for disease prevention and growth promotion respectively, 2% did so because they saw other farmers administering the drugs (Table 3). However, an overwhelming majority of the respondents (97.1%)

Antimicrobial drugs in poultry production

Table 1 *Socio-economic characteristics of poultry enterprises in Ijebu North Local Government area*

Item	Frequency	Percentage
<i>A. Period operation (year)</i>		
Under 1	8	7.7
1 - 5	51	49
6 - 10	26	25
11 - 20	18	17.3
Over 20	1	1.0
<i>B. Scale of operation</i>		
Small Scale	54	51.9
Medium	35	33.7
Large Scale	15	14.4
<i>C. Breed of birds</i>		
Local chicken	18	17.3
Commercial chicken	86	82.7
<i>D. Types of birds</i>		
Chicken	102	98
Turkey	2	2
Duck	0	0
Guinea fowl	0	0
<i>E. Academic qualification of farmers</i>		
Illiterate	11	10.5
Primary education	12	11.5
Secondary education	27	26
Tertiary education	54	53
<i>F. Types of poultry enterprise</i>		
Egg production	49	47.1
Broiler rearing	16	15.4
Cockgrel rearing	0	0
All of the above	39	37.6
<i>G. Types of consultant</i>		
Self	24	23.1
Friend	62	59.1
Expert	18	17.3
<i>H. Status of the experts consulted</i>		
Veterinary doctor	46	74.2
Livestock superintendent	10	16.1
Livestock assistant	6	9.7

Some of the respondents could not differentiate between a veterinary doctor and the two other "experts"

claimed compliance with the recommended dosage while 2.9% did not comply (Table 4). Among the farmers in the latter group, some claimed that they learnt from previous experience not to comply with the recommended dose while the cost of the drug was the reason in one case.

The desired effects of the antimicrobial drugs were observed by 99% of the farmers with enhanced profit margins for 73.1% (Table 4). Such desired effects include egg production, rapid growth rate, thriftiness, alertness and good health. However, 26.9% of the farmers experienced negative effects of antimicrobial drug administration on profit margin while 7.7% did not observe satisfactory level of consistency in drug action.

Discussion

Misuse of antimicrobial drugs consists of treatment conditions not needing or not amenable to drug therapy, choice of the wrong agents for conditions in which drug therapy is indicated and useless or misguided attempts at prophylaxis (Turk and Porter, 1974).

From the above, the important question to be answered by the results of this study was 'how many farmers in the local government misused antimicrobial drugs'? The inclusion criteria were (1) all the respondents that administered antimicrobial without consulting an expert before doing so and (2) all those who administered antimicrobials on weekly or monthly basis for disease prevention.

Table 2 *Type of antimicrobial drugs in use in the poultry industry in Ijebu-North Local Government area*

Drug	Frequency			Percentage		
	Broiler	Layers	Cockerels	Broiler	Layers	Cockerels
Tetracycline	2	12	7	10.5	18.8	33.3
Oxytetracycline	3	13	4	15.8	20.8	19.0
Chloramphenicol	1	10	2	5.3	15.6	9.5
Coccidiostat	4	10	1	21.1	15.6	4.8
Penicilline	3	12	3	15.8	18.8	14.3
Others	6	7	7	31.6	10.7	19.0

Table 3 *Regime and purpose of administration of antimicrobial drugs to birds in Ijebu-North Local Government area*

A. Regime	Frequency	Percentage
	0	0
Daily	0	0
Weekly	8	7.7
Monthly	25	24.0
Occasionally	71	68.3
B. Purpose		
Preventive	10	9.6
Curative	62	59.9
Growth promotion	30	28.8
Other purposes	2	2.0

Table 4 Compliance with the recommended dosage and the effects of antimicrobial drug administration

	Compliance with recommended dosage		Types of effects after application		Satisfactory efficacy		Effect of drug cost on profit		Consistency in drug effect	
	Yes	No	Positive	Negative	Yes	No	Positive	Negative	Yes	No
Frequency	101	3	103	1	103	1	76	28	96	8
Percentage	97.1	2.9	99	1	99	1	73.1	26.9	92.3	7.7

On the basis of these, it may be correct to say that the majority of the respondents (82.7%) in this study misused antimicrobial because they did not seek expert advice before administering drugs to their flock. The result of this study also showed that not less than 81% of the respondents are literate (Table 1). This suggests that the literate farmers constituted the larger percentage of those involved in antimicrobial drug misuse. The effect of the scale of operation and the experience of the farmers on antimicrobial drug misuse could not be clearly ascertained.

Poultry are just as likely as other animals and man to succumb to generalized or local bacterial infections. Often the most suitable method of treating this type of health problem is to medicate with an appropriate antimicrobial agent (Walton, 1996). However, a true realization of the nature of the antimicrobials and how they work is paramount to the understanding of their use. This implies that antimicrobials are better administered on animals or birds by the experts or under their recommendation and supervision. While treating animals or birds, the expert is aware of the need to protect the health of the human population and will make every effort to use antimicrobials only when necessary and for the least possible time (Walton, 1996).

Because antimicrobial drugs are usually administered intermittently and absorbed and excreted irregularly, the time dose relationship has to be considered in order to maintain sufficient effective drug concentration (Jawetz *et al.*, 1982). It is recommended that sufficient amount of effective drug be given and treatment continues long enough to eradicate an infection (Jawetz *et al.*, 1982). The elimination of any drug from the animal body normally follows an exponential decay curve and eventually very low concentration may be reached when further decrease is extremely slow and the residue may not be eliminated completely (Peters, 1989). The time taken for all the tissue concentration of residue to fall below the tolerant level is then set, as the withdrawal or withholding period of the drug (Peters, 1989).

Food animals including poultry, are intensively farmed in order to optimize productivity and to enable the individual bird to perform to its full genetic potential. Despite the advances in animal breeding the new strains are still susceptible to infection with disease causing organisms. And currently there are no widespread programmes to select birds that are genetically resistant to common diseases. Therefore the need is as great as ever for effective antimicrobials to treat and prevent diseases in all species of animals. What is required is judicious use of the drugs.

The finding in this study that 7.7% and 24% of the farmers in the local government administered antimicrobial on weekly and monthly basis respectively lends credence to the view held by Oyekunle and Olubi (1992) that these drugs are over used on food producing birds. In practical terms, this should not be the case because antimicrobials are relatively expensive substances. It is not surprising, therefore, that not less than 26% of the respondents indicated negative effect of antimicrobial drug administration on their profit margin.

Furthermore, presence of antimicrobial drug residue in broiler meat meant for human consumption in Ogun State was previously reported (Oyekunle and Olubi, 1992). Our findings in this study suggest that poultry farmers in the study area were not conscious of the risk of residue in edible tissues because a proportion of these farmers (7.7% and 24%) used drugs in a manner that was capable of promoting their accumulation in tissues of the treated birds. On the other hand, surveys carried out in some developed countries have shown that antimicrobial residues are relatively rare in food animals and when detected, the concentrations were very low, often less than 1 part per million (Walton, 1996). The success of the developed country in this regard can be attributed to the various Acts of Parliament in those countries. Such Acts include the Medicine Act 1968 and the Misuse of drugs Act 1971 of the United Kingdom (Brander and Pugh, 1977). Anderson (1997) had attributed the widespread use of antimicrobials in animal husbandry and human community in developing countries to free access to such medicines.

However, similar drug relating legislation to those effectively utilized in the developed countries are in existence in Nigeria. There is

the Pharmacy Law (Anon. 1948) in Nigeria that places under restriction some substances being used in medical, dental and veterinary practices. These substances are listed under four schedules in the Pharmacy Law (Anon., 1948). Antimicrobials are listed under Part III of the First Schedule of the Pharmacy law (Anon, 1948). According to this law and subjects to certain exemptions, it is unlawful for any member of the public to possess or supply drugs in Part III of the First Schedule. The exemptions include certain authorized persons such as registered or licensed medical practitioner or dentist, registered medical assistant, qualified veterinary surgeon, selling dispenser or chemistry and druggist (Anon., 1948). The law states further that any person may have a drug under restriction in his possession for medical, dental practitioner or dentist, medical assistant or qualified veterinary surgeon. Therefore the supply of antimicrobial agents for administration to animals, herd or flock is the sole responsibility of the veterinary practitioner or under his supervision. The Pharmacy Law (1948) with the regulations made under it, is a comprehensive measure aimed at controlling the sales and distribution of drugs for human and veterinary uses in Nigeria. What is lacking at present is the enforcement of the law and the regulations made under it by various governments in the country.

In extreme cases, comments have been made that antimicrobials should not be used at all in animal production (Anon., 1997) because their use leads to emergence of resistant bacteria. According to Walton (1996) such statements showed a complete lack of understanding of the nature of animal diseases, their transmission and maintenance, and inhumane disregard for animal welfare. In his contribution Casewell (1997) argued that the issue was too complex for the medical profession to pass judgement on

whether antimicrobials should or should not be used in animals. The controversies surrounding the use of antimicrobials in animal husbandry could be resolved only through cooperation between medical and veterinary research communities to understand more about the transfer to resistance mechanism between bacteria in the veterinary field to those in the human context (Anderson, 1997).

Another problem associated with antimicrobial misuse particularly prophylactic medication is that some of the drugs can act indiscriminately on beneficial as well as on harmful bacteria to assist in causing disease. This misuse of medicinal substances plays an increasingly important part in the epidemiology of enteric infections and other diseases in animals (Halpin, 1978). Bohnhoff *et al.* (1964) in an experiment observed that the number of *Salmonella enteritidis* (*S. enteritidis*) needed to initiate infection in mice reduced tremendously after a single large dose of streptomycin, the remarkable reduction in the infective dose of the *S. enteritidis* following streptomycin treatment was due to lowering of the number of the bacteria of the genus *Bacteroides* in the intestine. The *Bacteroides* normally help to keep the pH of the intestinal contents too low for multiplication of *S. enteritidis* so that only an overwhelming dose of the bacteria can initiate disease (Halpin, 1978). But when the number of the *Bacteroides* is reduced by therapy, then a small number of enteric pathogenic bacteria can cause disease (Halpin, 1978).

The call by Walton (1996) for changes in attitudes towards established agricultural practices in view of the continued intensification of production is worthy of consideration in this country. According to Walton (1996) the driving forces behind these changes are the need to increase production efficiency to reduce cost by using healthier birds so that fewer diseases would be

experienced and thus there would be less need for antimicrobial medication.

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