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Assessment of Antibiotic Usage in Some Selected Livestock Farms in Oyo State, Southwest, Nigeria.

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Target Audience: Livestock farmers and processors, Regulatory bodies and consumers.

Abstract

A survey to assess the use of antibiotics was conducted in 120 livestock farms across the 4 agricultural zones of Oyo state, Nigeria. Data were collected through the use of structured questionnaires on respondents characteristics; educational status, usage, adherence to prescription and withdrawal periods and were analyzed through descriptive statistical tools. The results showed that 70.8% were male, with the highest age group in 31-40yrs. About 70.88% showed they have attended higher Institution with more of the farmers involved in poultry production. Only one respondent claim not to use antibiotics in his farm in the entire state and was excluded in other questions. Preventive use of antibiotics was 39.5% with oral route of administration as 40.3% as claimed by the farmers. About 97.5% and 93.1% claimed to read and administered the various antibiotics based on the instruction label respectively, while only 71.3% strictly adhere to it but the remaining 28.7% did not strictly adhere to it. Moreover, 85.4% of the farmers got to know about the expiry date through the manual label. Almost all the farmers (91.6%) were aware of the withdrawal periods but only 54.10% were always conscious of it. Only few (16.8%) of the farmers called the professionals to administer the drugs while majority of them (63.9%) administered it by themselves and others used their attendants or fellow farmers. However, the farmers in this state (92.5%) found the antibiotics used as either effective or highly effective. The abuse of these drugs cannot be ruled out therefore given the room for drug residue in meat from the state.

Keywords: Antibiotics, preventive, therapeutic, growth promoters, route of administration, withdrawal periods,

Description of problem

Modern system of livestock production requires intensive management (1) where the farm animals are raised in high density, usually with stimulated feeding, and weight gain optimized so as to decrease time to mature weight (2) in other to meet up with ever-growing demand for meat. Traditionally, raising large numbers of animals in a close

proximity often requires the use of the tools of prophylactic, metaphylactic and growth promotional antimicrobials in order to prevent morbidity and mortality, to ensure animal welfare, and for economic benefit (3). In swine, the majority of antimicrobial use is for treatment or prophylaxis of respiratory and enteric disease, while in poultry, antimicrobials are primarily used for intestinal infections, namely colibacillosis and necrotic enteritis (2,3). The method of administration and the volume of antimicrobial used will vary depending on the animal species, stage of production, and risk of disease (3).

The huge benefit accruable to veterinary interventions in animal production is beginning to be overwhelmed by the negative effects of abuse and uncontrolled use, resulting in drug residues (4). The implication of meat drug residue on human health has been said to include antibiotics resistance (4). It is estimated that 60 to 80% of all cattle, sheep, swine and poultry receive antimicrobials at some point in time (5) and according to Jawetz, (6) not more than 5 to 10% of antimicrobial was employed on proper clinical dosage resulting in a wide spread misuse of antimicrobial drugs. Previous observations indicated that antibiotic use as it relates to animal health is more a matter of management quality than it is of farm size (7). Though, Oyekunle and Owonikoko (8) have shown how antimicrobial drugs are being used and abused by poultry farmers in Ogun State, paucity of data exist on whether these drugs are being administered properly in other parts of Nigeria particularly Oyo state, where there is a large concentration of livestock farms. This study is therefore aimed at generating information on antibiotic usage and level of compliance with instructions, bearing in mind the perceived low level of literacy in the area.

Materials and Methods

Study area

This work was carried out in Oyo state of South Western part of Nigeria. Oyo state was created in February, 1976 and covers a total of 27,249 square kilometres of land mass. Agriculture is the main occupation of the people in this state while the climatic conditions also favours the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, palm produce, cashew and livestock production. Oyo State has 33 Local Government Areas (LGAs). For effective administration of agricultural practices in the state, agricultural zones (based on the World Bank assisted agricultural development Programme model) are used with their headquarters bearing the name of the most developed town or city in the area. Oyo state has 4 zones which are Ogbomoso, Oyo, Saki and Ibadan-Ibarapa.

Scope and data collection

One hundred and twenty (120) commercial livestock farms in the state were randomly sampled. Thirty (30) livestock farms were selected in each agricultural zone. Data were obtained through structured questionnaire that

adequately cover all relevant information needed for the study and depending on the literacy level of the respondents, a personal interview schedule method was used. Data collected were socio-economic characteristics of the farms, purpose of usage, dosage, withdrawal period, and route of administration.

Data analysis

The data collected, were collated and analysed, using descriptive statistic tools with the used of SPSS computer software (9) to generate means, percentages and tables.

Results and Discussion

Personal profile/socio- economic characteristics of livestock farmers in Oyo state

The gender variation of livestock farmers in Oyo state had 70.8% male as against 29.2% female (Table 1). Majority of the farmers are within the age bracket of 31 - 60years with the highest (40.8%) in 51 – 60 years. The educational level of the farmers in the state (Table 1) showed that 28.40% of the farmers have attended secondary education while 71.60% showed that they have gone through higher Institution. Years of existence for the farm visited varied, 40.8% of them reported 1-5yrs, 30.8% and 20.8% are for 6-10yrs and 11-20yrs, respectively. Poultry farming appeared more in this area as 41.67% are involved while 10.00% are ruminant farmers and 8.33% are piggery farmers alone.

The findings showed that livestock farming is a male dominated occupation in this environment and could be attributed to the financial resources and energy demands of the venture. This is in agreement with reports of (10) who reported that over 80% of males were involved in cattle production in Ibadan. However, compared with goat production in Ibadan town of Oyo State, female were the dominant (58%) rearers (11). The result gotten in this study was however lower to the figures obtained (93.78%) by (12) for farmers that are engaged in peri-urban dairy production in Ogun State.

The participation of adults in the venture could be attributed to the financial and family stability of this age group. Taiwo *et al.,* (10) reported that it could be due to the fact that issues of having personal house, sending children to school would have almost been settled, thus they were able to divert their resources to livestock production. It is of importance to say that some of the farmers in this area are retired civil servants and some are about to retire from the service since they are almost clocking sixty years of age for retirement. This is an indication that livestock practice is a good business for retired men after a fruitful career as this will keep them engaged, active and yield returns for them if well monitored.

Table 1: Socio-economic characteristics of respondents/farmers in Oyo state

Parameters		Frequency	%
Gender	Male	85	70.8
	Female	35	29.2
	Total	**120**	**100**
Age (years)	21 – 30	9	7.5
	31 – 40	18	15.0
	41 – 50	43	35.8
	51 - 60	49	40.8
	>61	1	0.8
	Total	**120**	**100**
Educational level	Primary	2	1.7
	Secondary	32	26.7
	OND	16	13.3
	HND	31	25.8
	B. Sc	33	27.5
	M.Sc/MBA	5	4.2
	Ph. D	1	0.8
	Others	-	-
	Total	**120**	**100**
Years of existence	1 – 5	49	40.8
	6 – 10	37	30.8
	11 – 20	25	20.8
	21 – 30	4	3.3
	>30	5	4.2
	Total	**120**	**100**
Types of livestock	Poultry	50	41.67
	Ruminant	12	10.00
	Piggery	10	8.33
	All the three	9	7.50
	Poultry & Ruminant	9	7.50
	Poultry & Fishery	16	13.33
	Poultry & Piggery	14	11.67
	Total	**120**	**100**

Adebayo and Adeyemi (13) have previously shown that education is a key factor in shaping the perception of farmers. The high level of education in western Nigeria could be traced to the free education introduced in the old western region where by government schools are free and this has indeed increased the awareness, attitude and importance of education in the region and possibly rubbed off on this generation. Years of existence of most farms in the study was in agreement with (8) that reported 51% and 26%, respectively for 1 to 5 and 6 to10 years of farm existence in their survey work on poultry in Ogun state. The pattern here indicated a sudden revolution in agricultural practices within the last 5 years, most probably due to Youth Empowerment Scheme and favourable government policies. The rush for poultry production might be due to the short generation interval and the perceived huge return on investment.

The use, purpose and route of administration of antibiotics

Nearly all the respondents (99.2%) claimed to use antibiotics in one form or the other (Figure 1). The purpose of usage as shown in Table 2 indicated that preventive purpose ranked highest with 39.5%, curative (33.6%) and growth promoters (24.4%). Oral route of administration was highest with 40.3% (Table 2). This result was in line with (5) that estimated that 60 to 80% of all cattle, sheep, swine and poultry in the US receives antimicrobials at some point in time. Raising large numbers of animals in a confined environment often required the use of antimicrobial drugs in order to prevent morbidity and mortality, to ensure animal welfare and for economic benefits (3). The respondents' reason for the use of antibiotics was in line with the general use of the drug. According to Silbergeld *et al*. (2) and Rosengren *et al*. (3) antibiotics 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. These drugs control many infections that are promoted by livestock production in present day farming conditions, making meat cheaper and more available. The constant usage however, promotes the development of microbes resistant to these drugs (14). The main sources of antibiotic residues in broiler meat are the therapeutic and growth promoting antibiotic drugs (3, 14).

Table 2: Purpose and Route of antibiotic administrations in Oyo state

Parameters		Frequency	%
Purpose	Preventive	47	39.5
	Curative	40	33.6
	Feed additives	16	13.5
	Growth promoter	13	10.9
	Others	3	2.5
	Total	**119**	**100**
Route	Oral	48	40.3
	Injection	17	14.3
	Feed	7	5.9
	Oral/injection	16	13.5
	Oral/feed	2	1.7
	Injection/feed	5	4.2
	All	24	20.2
	Total	**119**	**100**

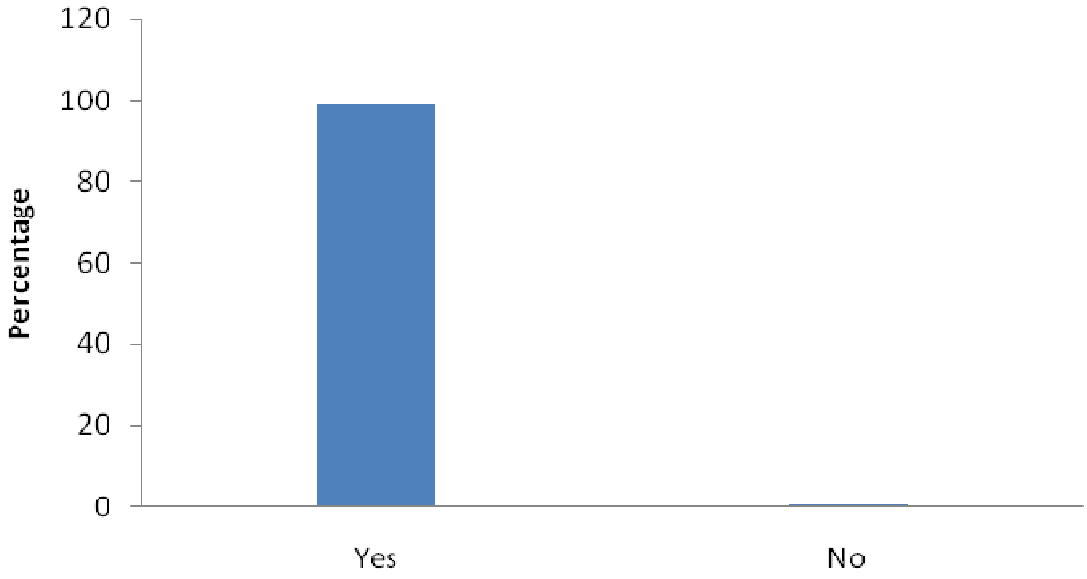

Figure 1: The use of antibiotic in Oyo State livestock farms

In this study, the preventive use of antibiotics ranked highest which contradicts the findings of (8) who reported curative (therapeutic use) as the highest (59.9%) followed by growth promotion (28.8%) and lastly preventive use (9.6%). This has shown the need for effective antimicrobials to treat and

prevent diseases in all species of animals is as great as ever. Despite the advances in animal breeding, the new strains of animals are still susceptible to infections with disease causing organism.

The route of administration of antibiotics is considered to be important in the occurrence of antibiotic residues in meat. Since most antibiotics that could lead to residue problems are associated with treatment of health problems intramuscular route of antibiotics administration is considered the most common route associated with antibiotic residue in food animals followed by oral administration (15). Intramuscular and subcutaneous injection can result in very large amount of antibiotics being deposited in a given area and in some situations becomes sequestered for a long period of time. The residue levels at such site may be considerably higher than in short acting one. This however depends on the frequency of administration of these drugs. In food-producing animals, antibiotic can be administrated orally through feed or drinking water and or parenterally (16).

Observation and Level of adherence to instructions and expiry date before usage

Only 2.5% of the respondents did not read instructions before administration of drugs while about 93.1% claimed to administer drugs based on the specified instruction (Table 3). The adherence to the instruction showed that 43.52% strictly adhere to instruction labels while 27.87% adhere very strictly to it. In Oyo state 97.5% were aware of the expiry date (Table 3) and 85.7% of this people however got to know it through label manual.

The high literacy level of the respondents in the study area has helped matters in the sense that the farmers could read and write and majority of them claimed to use antibiotics and adhere to the instruction labels. According to Khan (17), the antibiotic abuse occurs when they are used unnecessarily, over prescribed, employed in wrong combination, changed quickly over to the other drugs and used persistently which are evident of nonchalant attitude to the instruction and the non-adherence to it. According to the report of Adams (18), extra-label use of drugs which is referred to the administration of drugs in a manner that is not in accordance with the drug labeling is the most common cause of the residue of drugs in the tissues of food animals. This result was supported by (8) who also reported overwhelming majority of the respondents (97.1%) that claimed compliance with the recommended dosage while 2.9% did not.

Table 3 Adherence to Instruction and Awareness of Expiring Date

Parameters		Frequency	%
Reading of	Yes	116	97.5
Instruction	No	3	2.5
Before usage	**Total**	**119**	**100**
Administration	Yes	108	93.1
Based on instruction	No	8	6.9
	Total	**116**	**100**
Level of adherence	Very strictly	30	27.78
To instruction	strictly	47	43.52
	Fairly	18	16.67
	Not strictly	13	12.03
	Total	**108**	**100**
Awareness of	Yes	116	97.5
Expiry date	No	3	2.5
	Total	**119**	**100**
How do you	Label Manual	99	85.4
Know the	Farmers	12	10.5
Expiry date	Sellers	2	1.7
	Performance On the animal	3	2.6
	Total	**116**	**100**

However, this work contradicted the work of (19) who recorded 27.8% full adherence to vaccination schedule for chicken as against 56.7% non-adherence. Among the farmers in the non-compliance 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 for others.

Awareness and observation of withdrawal periods

In Oyo state, 91.6% of the respondents were aware of the withdrawal period (Fig. 2). Moreover 20.2% of them were

not observing withdrawal period while the rest which were the highest claimed to observe it. Also, 54.10% of them always observed it while 24.8% occasionally observe it, however, the rest were not sure of the frequency of observation.

Among other factors, failure to observe the withdrawal periods of a drug has been reported to be the major cause of antibiotic residues in food – producing animals (20). This according to (20) has been defined as the interval required for the residue toxicology concern to reach safe concentrations in the tissue of the animal before slaughter. The purpose of withdrawal periods is to ensure that residues are at acceptable levels, taking into account the method of administration, the rate of absorption, metabolism and excretion of the drug. According to Sundlorf (21), adherence to withdrawal time may be considered burdensome, inconvenient and expensive, this could have been the reason some farmers are not adhering to it. Although, the farmers in this state claimed to be aware of the withdrawal period, their frequencies of observing it showed that some farmers are not always conscious of it and this could be counter-productive to the consumers in the area.

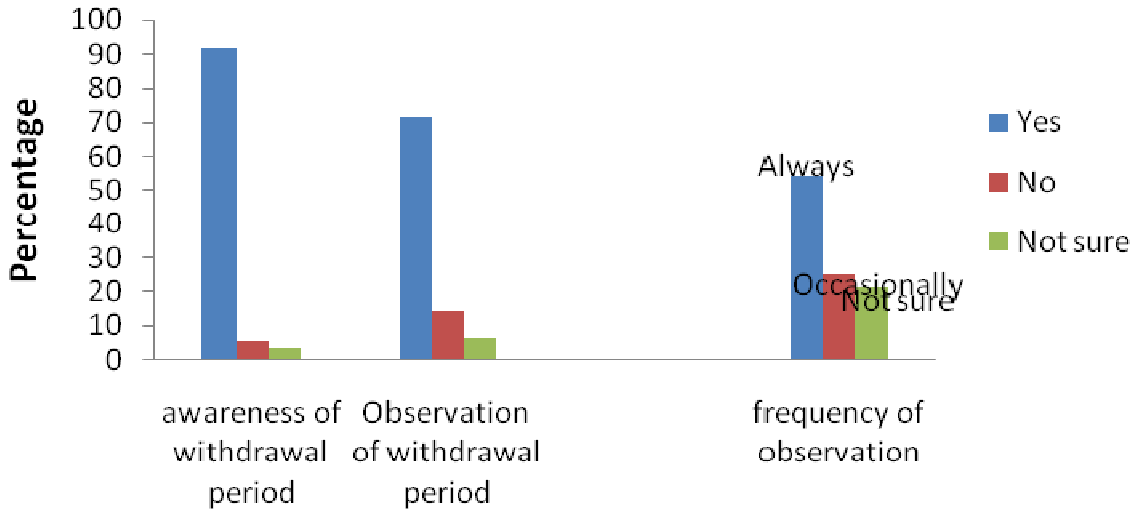

Figure 2: Awareness, Observation and frequency of observation of withdrawal period of antibiotics by livestock farmers in Oyo state, Nigeria.

Personnel that administered antibiotics

Figure 3 revealed that 63.9% administered the drug personally, while 16.8% called the professionals and the rest used attendants or fellow farmers in drug administration. The fact that more farmers personally administered antibiotics on their livestock could make abuse and misuse of these drugs inevitable. Reason for personal administration could be the cost of service charged by the professionals (Veterinarian). High charges might have discouraged the farmers from patronizing them coupled with the high price of the drugs, despite their good educational background as revealed in Table 1. This suggests that literate farmers constituted the larger percentage of those involved in the antibiotics or antimicrobial drug misuse (8). Anderson (22) had attributed the wide spread misuse of antimicrobials in animal husbandry and human community in developing countries like Nigeria to free access to such medicines. Oyekunle and Owonikoko (8) have earlier claimed that the supply of antimicrobial agents for administration to animals, herd or flocks should be the sole responsibility of the veterinary practitioner or under his supervision.

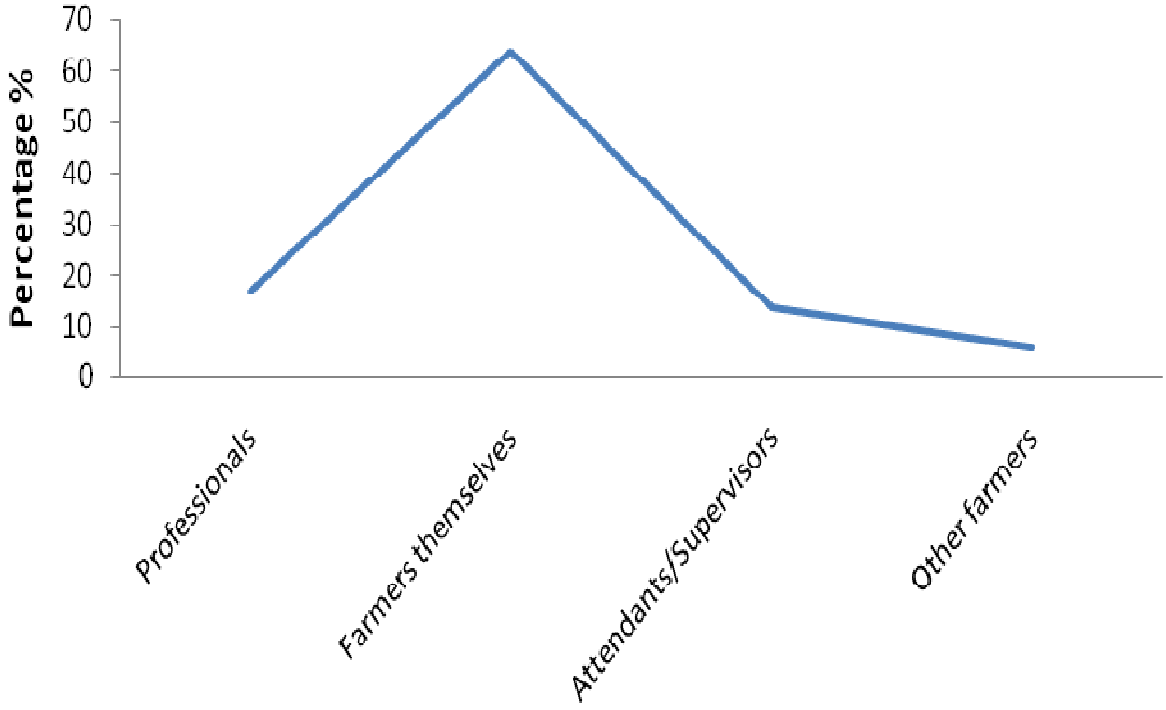

Figure. 3: Personel that administer antibiotics in Oyo state, Nigeria

Effectiveness and preservation of antibiotics

Almost all of the respondents found the various antibiotics to be highly effective (31.1%) and effective (61.4%) (Table 4). About 20.2% used all the drugs per time and the rest 79.8% did not. The various ways of preserving drugs are, on the shelf which is in the room, refrigerator and other means as shown in Table 4. This was in line with (8) who in their study found 99% of the farmers claiming a desired effect of the antimicrobial drugs and also enhancing their profit margin. According to them such desired effects include egg production, rapid growth rate, thriftiness, alertness and good health in poultry birds.

Table 4: Effectiveness of the antibiotic usage in Oyo state

		Frequency	**%**
Effectiveness Of drugs	Highly	37	31.1
	Effective	73	61.4
	Fairly	9	7.5
	Not effective	-	-
	Total	**119**	**100**
Use all per time	Yes	24	20.2
	No	95	79.8
	Total	**119**	**100**
Preserve the Rest	on the shelf	23	24.2
	in the room	32	33.7
	Refrigerator	30	31.6
	Others	10	10.5
	Total	**95**	**100**

Conclusion

This study has shown that:

1. Antibiotics are still being used in Nigeria despite the ban in Europe. It is being used for three primary reasons: treatment of sick animals, prevention and control of disease, and improved productivity in which oral route of administration is common.
2. Abuse of these drugs cannot be ruled out as some of the farmers were not conscious of the withdrawal period and does not strictly follow the inscription

labels, exposing meat consumers in the state to the drug residues.

3. Further studies to evaluate the presence of residues or not in meat sold in the state might assist the policy makers in Nigeria to take decision in the interest of the populace as either to join the European Union who has since banned the use of antibiotics drugs in livestock or to still continue with the use with proper advocacy to the farmers on proper usage.

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