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Patterns of Antibiotic Sales by Drug Stores and Usage in Poultry Farms: A Questionnaire-Based Survey in Maiduguri, Northeastern Nigeria

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Abstract: Antibiotics are still deemed necessary for the treatment and prevention of infectious diseases in farm animals intended for food production and to protect public health from food-borne diseases. One possible approach to the resistance problem is the appropriate use of antibiotics for prevention and treatment of infections. A survey was conducted to determine the antibiotic usage in poultry farms and the brand of antibiotics sold over the counter in drug outlets. Reputable poultry farms and drug outlets were identified and questionnaires were administered to 20 poultry farmers. A yes or no type of response was developed to assess level of reported purchase and use of antibiotics without prescriptions. Majority of the respondents (80%) agreed to have purchased an antibiotic without a prescription and the most commonly named antibiotics used by poultry farmers was Tetracycline (Oxytetracycline) 36.5%. It was available in all the drug stores (100%) visited. This was followed by amino glycosides (Neomycin) with 15.2% in poultry farms and 27.2% in drug stores. The widespread access to antibiotics without prescription with resultant inappropriate use, may lead to increased development of resistant strains.

Key words: Antibiotics, poultry farms, drug stores, glycosides, Maiduguri

INTRODUCTION

The major aim of poultry production is to increase productivity without any constraints in cost of feed or equipment and most importantly diseases which have a direct effect on performance of the birds (Ambali and Ibrahim, 1996). Because of the relatively short productive life of poultry, disease induced lesions virtually end up in irreparable damage to weight gain and egg production (Adene, 2004). Thus, prophylactic measures stand out to be one of the best options for efficient productivity in poultry since any recuperative period for no matter how short affect productivity (Adene, 2004). In poultry industry, antibiotics are commonly administered for therapeutic, prophylactic and growth promotion purposes (Cohen, 1998) and their use has been on the rise in many developed nations (Morley *et al.*, 2005). According to the Union of Concerned Scientists in USA, approximately 70% of the total antibiotics used are for non-therapeutic purposes (Mellon *et al.*, 2001). Cohen (1998) also reported that about 80% of total antibiotics administered to poultry worldwide are unnecessary. Therefore, this close but complex relationship between the volume of antibiotics used and the rate of bacterial resistance development shows that the more we use antibiotics indiscriminately, the more we lose them (Apata, 2009).

Inappropriate use of antibiotics is strictly associated with the accessibility of antibiotics to individuals without prescription. Although, many developed countries have efficiently controlled the availability of antibiotics by insisting that no antibiotics are dispensed without a health professional's or pharmacists prescription (Larson *et al.*, 2003; Reeves, 2007), quite a number are now confronted with this practice because of access to online pharmacy (Reeves, 2007). However, in developing countries, antibiotics are sold to individuals without prescription (Reeves, 2007). In countries such as the United Republic of Tanzania and Uganda, veterinary antimicrobials are easily accessible and under low levels of control from government authorities (WHO, 2001).

Mitema *et al.* (2001)'s report on assessment of antimicrobial consumption in Kenya revealed that approximately 14600 kg of active antimicrobials were used annually in animal food production of which

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tetracycline (56%) and sulfonamides+trimethoprim (22%) accounted for nearly 78% of the antibiotics used. Similarly, Kolar *et al*. (2002) reported high resistance due to increased incidence of tetracycline and erythromycin usage especially in *Escherichia coli* and enterococcus infections.The worldwide increase in antibiotic resistant bacteria (Morris and Masterton, 2002) has led to social and scientific concern that over prescription and misuse of antibiotics is responsible for this trend (Smith *et al*., 2002). Nevertheless, there is paucity of information on the consumption of antibiotics by food-producing animals in African countries including Nigeria.

To the best of the knowledge, information on the sales and usage of veterinary antibiotics in North Eastern Nigeria is particularly lacking. This research was therefore designed to identify the antimicrobial agents marketed by drug outlets and their utilization by poultry farmers in the study area.

MATERIALS AND METHODS

Study area: The study was conducted in Maiduguri, the capital of Borno State, North-Eastern Nigeria. Maiduguri lies between latitude 11°32' North and 11°40' North and latitude 13°20' East and 13°25' East and located between the Sudan Savannah and Sahel Savannah vegetation zones. The climate of Maiduguri has March to April as the hottest period of the year with a short rainy season of 3-4 months (June to Sept.) followed by prolonged dry season of >8 months with November to January being the coldest (Ibrahim *et al*., 2006).

Data collection: Between February and December 2010, a survey was conducted to identify the brands of antibiotics marketed by drug outlets and structured close-ended questionnaires administered to determine utilization by poultry farmers in the study area. Ten major veterinary drug outlets were selected randomly and 20 poultry farms were purposively selected on the basis of good record keeping. The core questions assessed include purchase of antibiotics without prescription, purpose of antibiotic use and duration of usage. Data generated were analyzed using descriptive statistics with the aid of Microsoft Office Excel®.

RESULTS

The result of antibiotics marketed by the drug stores in the study area is shown in Table 1. Oxytetracycline (27.2%) was the most commonly observed antibiotic marketed. This is followed by neomycin (13.8%) and streptomycin (12.1%). Sulphadiazine (0.5%), trimethoprim (0.5%) and furazolidone (0.9%) were the least antibiotics marketed in the study area. It was observed that all antibiotics were sold freely over the counter without prescription in all the drug stores.

Table 1: Distribution of antibiotics observed in the drug stores in Maiduguri, Northeastern Nigeria

Antibiotics	No. of recorded in drug stores	Antibiotic in drug stores (%)
Erythromycin	21	9.4
Oxytetracycline	61	27.2
Streptomycin	27	12.1
Neomycin	31	13.8
Colistin	23	10.3
Chloramphenicol	5	2.2
Tylosin	13	5.8
Doxycycline	13	5.8
Enrofloxacin	3	1.3
Norflaxocin	5	2.2
Pefloxacin	3	1.3
Ampicillin	6	2.7
Ciprofloxacin	2	0.9
Sulphadiazine	1	0.5
Trimethoprim	1	0.5
Furazolidone	2	0.9
Gentamycin	3	1.3
Penicillin	4	1.8
Total	224	100.0

Table 2: Response to questionnaire survey on use of antibiotics in poultry farms

Survey questions	Respondent	Respondent (%)
How often do you consult a veterinarian per month?		
1-2	5	25
3	11	55
>5	4	20
How many times did you use antibiotics during last year?		
1-2	7	35
>3	13	65
For what purpose?		
Therapy	9	45
Prophylaxis	6	30
Growth promoters	5	25
Do you follow correct dosage instructions?		
Yes	14	70
No	6	30
Do you discontinue use once symptoms subside?		
Yes	12	60
No	8	40
Have you purchased antibiotics without doctor's prescription for the last 1 year?		
Yes	16	80
No	4	20
Do you keep leftovers for future use?		
Yes	15	75
No	5	25
Have you ever used non-prescribed antibiotic?		
Yes	16	80
No	4	20

Table 2 showed antibiotic utilization by poultry farmers. About 11 (55%) of respondents consulted a veterinarian at least once every month and majority 13 (65%) used antibiotics at least three times in the course of production. The purpose of antibiotic usage was higher 9 (45%) for therapy than either prophylaxis 6 (30%) or

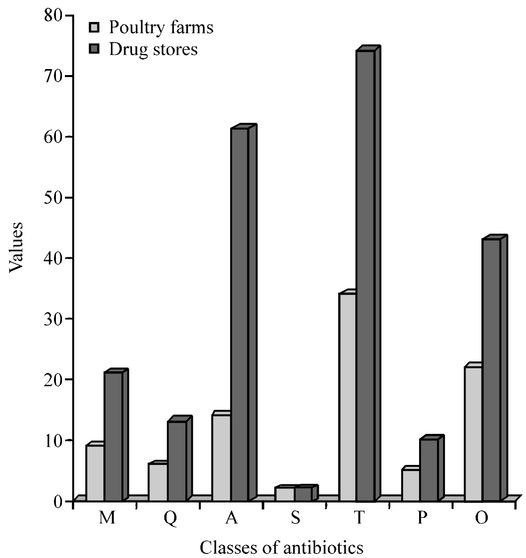

Fig. 1: Comparison of classes of antibiotics available in both poultry farms and drug stores in Maiduguri. M = Macrolides; Q = Quinolones; A = Aminoglycosides; S = Sulphonamides; T = Tetracyclins; P = Penicillin; O = Others

5 (25%) growth promotion. About 80% of the respondents admitted to have purchased an antibiotic without prescription and were correctly able to write the name of antibiotic purchased. Among the respondents, 12 (60%) did not administer complete dose of antibiotics as recommended by the manufacturer while 15 (75%) keep the drugs for future use (Table 2).

Figure 1 compares the classes of antibiotics marketed in drug stores and those used by poultry farmers. Tetracycline and aminoglycosides were found to be the most common classes of antibiotics marketed in drug stores as well as used by poultry farms while sulphonamides and quinolones were the least classes of antibiotics in both drug stores and poultry farms.

DISCUSSION

This study observes that all antibiotics (100%) were freely marketed without prescription. This finding is much higher than the 74.6% found in Kenya (Mitsi *et al*., 2005). This means that antibiotics were more likely to be bought in the study area than in most other parts of Africa. Oxytetracycline and neomycin were available in all the drug stores in the study area and corresponds to the antibiotic mostly used by the poultry farmers. This finding is similar to the report of Bett *et al*. (2004) in Kenya and might not be unconnected to the extended spectrum of activity of the drugs especially to the most prevalent poultry infections in the study area (Mitema *et al*., 2001). Although, streptomycin 27 (12.1%), erythromycin 21(9.4%) and Colistin 23(10.3%) were marketed in the drug stores, the frequency of utilization by farmers was low. This may be attributed to their narrow spectrum of activity and cost.

Contrary to the findings of Cohen (1998) where large proportion of antibiotics were administered to poultry for prophylactic treatment and growth promotion purposes, this study revealed higher therapeutic utilisation.

Similar study in Pennsylvannia (Sawant *et al*., 2005) showed that tetracyclines and beta lactams were the most frequently used antibiotics in dairy herds with 50% of farmers completing the course of treatment. In contrast, 60% of the respondents did not complete the course of treatment probably due to the fact that most veterinary drugs do not have a defined dosage for every species as reported by Chauvin *et al.* (2002). Consequently, this practice could result in the exposure of microorganism to subtherapeutic doses of antibiotics leading to resistance developmentas reported by Kolar *et al*. (2002).

CONCLUSION

It is concluded that sales of antibiotics need to be regulated in the environment to prevent misuse of antibiotics and slow antibacterial resistance development. Over the counter sell of antibiotics should be discouraged as it encourages misuse of such antibiotics by farmers that have access to drugs without prescription. Finally, alternatives to antibiotics such as the application of probiotics, dietary yeast extracts and phages in poultry production should be explored.

RECOMMENDATIONS

This report also recomends that antibiotic susceptibility testing should be carried out by competent laboratories before veterinarians prescribe an antibiotics. This will go a long way a reducing multiple prescription and subsequent administration of different sets of antibiotics for a single infection as most farmers would first try several antibiotics before consulting a veterinarian. Further studies are similarly needed to determine if poultry and indeed other farmers observe the withdrawal periods as recommended by antibiotics manufacturers before passing the products for human consumption.

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