IMPRUDENT ANTIBIOTIC USAGE IN POULTRY FARMS ACROSS NIGERIA: IMPLICATIONS FOR POULTRY PRODUCTION AND DISEASE MANAGEMENT

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ABSTRACT

Prudent antibiotic usage in poultry boosts productivity and limits emergence and spread of antibiotic-resistant organisms, especially zoonotic pathogens, transmissible through the food chain. A nation-wide survey to determine the pattern of antibiotic administration in poultry was conducted among 2,402 randomly selected poultry farmers,in12 of the 36 States ofthe federation; using structured questionnaire.Finding showed thatcritically important antimicrobials, belonging to the WHO lists of '*Highest'* and '*High'* priority antibiotics, were administered sub-therapeutically; for prophylaxis and growth enhancement purposes. Many diseases that warranted the antimicrobial administration were of viral etiology. Only 64.2% of the farmers administered the drugs based on veterinary doctors' prescription while62.3% of them did not observe recommended withdrawal period after the drug administration. Enlightenment of the farmers on the benefits of prudent agricultural use of antimicrobials is imperative; for sustainable poultry production and to curtail development and dissemination of antimicrobial-resistance pathogens.

KEYWORDS: antibiotics, antibiotic-resistance, poultry diseases, poultry farms

INTRODUCTION

The poultry subsector is the most commercialized and the fastest growing agribusiness in Nigeria.The growth in the poultry industry may be attributed to prudent use of antimicrobials in combating most infectious diseases, inimical to poultry production in the tropics (Njoga*et al.,* 2018). Good antibiotic steward in food-animal production has also curtailed spread of zoonotic pathogens and transmissible through the food chain. Prudent agricultural use of antibiotics involves administration of the appropriate drug, for the right disease, at the appropriate dose, all through the recommended period of time. Chemotherapeutic and prophylactic uses of antibiotics in poultry production are well recognized; but use of sub-therapeutic doses for growth promotion purposes, is rapidly gaining popularity in Nigeria(Chinwe*et al.,* 2014). Upsurge in demand for foods of animal origin, occasioned by boom in human population and increase in middle class income in most developing countries, aredriving the sub-therapeutic usage; to cater for the shortfall in available animal protein, in a record short time.

Sub-therapeutic use of antibiotics to fast-track poultry production is associated with emergence and spread of antimicrobial-resistant pathogens, which may worsen the animal's health problem or may be transmitted to humans via the food chain. Adebowale*et al.* (2016) reported that poultry farmers incur up to 35%

additional cost of production, due to treatment of antibiotic-resistant bacteria. Other imprudent antibioticusage such as non-observance of withdrawal period (WP) facilitates accumulation of antimicrobial residues in poultry products, which could reach the human populations through the food chain (Njoga*et al*., 2018). Consumption of antimicrobial residues in edible animal products predisposes to health problems including, allergy in sensitized individuals, bone marrow depletion or aplastic anemia, disruption of normal intestinal flora infavour of pathogenic bacteria, toxicity and carcinogenicity (Nisha, 2008; Njoga*et al.*, 2018).

This nation-wide study was therefore carried out to determine the antibiotic usage pattern in poultry farms in Nigeria. This will guide policy formulation for preservation of the therapeutic efficacy, for sustainable poultry production and to safeguard public health.

MATERIALS AND METHODS

Structured and pretested open-ended questionnaire was used to obtain information ontypes and pattern of antimicrobial drug usage in poultry; as well as the diseases that warranted the drug administration.

A total of 12 states, 24 agricultural zones (AZ) and 2, 402 poultry farms were randomly selected and surveyed. At first, four of the six geopolitical zones, namely Southeast, Southwest, North-central and Northwest were purposively selected for the study, based on the history of high poultry production activities. In each selected zone, three states and two AZs per state were selected by simple random sampling. The same sampling method was used to select at least 100 poultry farms from each selected AZ, based on the consent the farm owners to participate in the study and accessibility of the farm.

RESULTS

The classes of antimicrobials administered and percentage of farmers involved were: tetracycline (25.4%), aminoglycosides (18.5%), macrolides (14.8%), quinolone and fluoroquinolone (14.8%), chloramphenicols (11.3%), sulfonamides (8.5%) and penicillin and betalactam (6.8%).The diseases that 'necessitated' antibiotic treatment in farms surveyed were not only of bacterial etiology and included: Newcastle (31.7%), coccidiosis (21.3%), gumboro (26.4%), salmonellosis and colibacillosis (13.4%).Only 64.2% of the farmers administered the drugs based on veterinary prescription. On the purpose of the drug administration, 36.2% used the drugs for treatment, while 36.7% and 27.1% administered it for prophylaxis and growth promotion purposes respectively. Majority (62.3%) of the farmers who administered these drugs did not observe the recommended WP thereafter.

DISCUSSION

The high rate of antibiotic administration (63.8%) for non-therapeutic purposes in this study is in tandem with the 68.5% found in South Africa (Eagar *et al.*, 2013). Farmers may have resorted to non-therapeutic use of antibiotics as a 'quick fix' or compensation for poor management practices observed in the farms surveyed. This may explain why critically important antibiotics, including second generation fluoroquinolone (ciprofloxacin) were used for prophylaxis in some farms.

Occurrence of antibiotic-resistant bacteria due to non-chemotherapeutic use of antibiotics has been reported in chicken in Nigeria (Chinwe*et al.*, 2014). Sub-therapeutic administration of antibiotics, is an important factor in the epidemiology of emergence and dissemination of antibiotic-resistant bacteria (Njoga*et al.*, 2018), transmissible through the food chain. Cognizant of the fact that egg is sometimes consumed raw in Nigeria (Onyenweaku*et al.*, 2018); these resistant-organisms can easily reach the human population via consumption of infected raw eggs or undercooked poultry products. Even when the

emerged antibiotic-resistant organism is not zoonotic, it may transfer its resistance genes to zoonotic organisms; for onward transmission to humans (Van den Bogaardand Stobberingh, 2000).

The practice of administering un-prescribed antibiotic drugs in poultry farms is unethical and may be to save cost of veterinary services, in order to probably maximize profit. This 'cost saving' habit, without recourse to the negative implications on human and animal health is counterproductive. When people who are not formally trained in veterinary clinical practice administer un-prescribed antibiotics to food animals, the likelihood of incorrect doses and other chemotherapeutic errors; that may adversely affect the pharmacokinetics of the drugs is most probable. These, no doubt, facilitate emergence and spread of antibiotic-resistant bacteria, and accumulation of antibiotic residues, beyond safe levels in poultry products or the environment.

The continued use of chloramphenicol in poultry, after over two decades of its prohibition for systemic administration, due to its complicity in aplastic anaemia, is most unfortunate. Easy access to veterinary antibiotics in Nigeria, exemplified by its sell as over-the-counter, including those classified as '*Highest'* and '*High'* priority antibiotics, may be contributory to the continued use. Most importantly, lack of legislation against this practice and obvious inadequate implementation of the available veterinary drug laws in Nigeria are to be blamed.

CONCLUSION AND RECOMMENDATION

There is extensive imprudent administration of antibiotics in poultry in Nigeria. Thisunderscores the urgent need to enlighten the farmers on the benefits of prudent use of antibiotics inpoultry production and disease management. Discontinuation of sale of essential antibiotic as over-the-counter drug and strict implementation of veterinary drug laws is imperative; to safeguard the therapeutic efficacy for sustainable poultry production and to preserve public health.

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