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Knowledge, attitude and practice of observing withdrawal period of veterinary drugs in chicken and eggs by poultry farmers in Zaria

Tijani A. A.[1]*, Usman A.[1], Sanni K. B.[1], Muhammad H.[1], Ibrahim N. B.[1], Babashani M.[2], Salisu M. D.[3], Badmus K. A.[4] and Shekh MK[5]

[1]Livestock and Fisheries Department, National Agricultural Extension and Research Liaison Services, Ahmadu Bello University, Zaria, Nigeria.
[2]Large Animal Unit, Veterinary Teaching Hospital, Ahmadu Bello University, Zaria, Nigeria.
[3]Beef Research Programme, National Animal Production Research Institute, Ahmadu Bello University, Zaria, Nigeria.
[4]Department of Animal Science, Faculty of Agriculture, Federal University Gashua, Yobe State, Nigeria.
[5]University of Sindh, Jamshoro Sindh - Pakastan

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The veterinary drug is vital for healthy and quality food-animal production. Their use in poultry production is basically for treatment, prophylaxis and growth promotion. However, cases of misuse of these drugs by the poultry farmers have been reported. This is further worsened by extra-label use and non-observance of withdrawal period, leading to deposition of drug residues in poultry products, thus posing a public health concern. This paper assessed the poultry farmers' knowledge, attitude and practice of observing withdrawal period of veterinary drugs. Three hundred and eighty-five (385) questionnaires were administered and 380 (98.7%) response rate was recorded. Data were analyzed using Statistical Package for Social Sciences 23 and presented in frequency tables. Chi-square was used to determine the relationship between the variables. 57.1% of the poultry farmers in Zaria though well-educated had never checked withdrawal period while 53.2% of the farmers have ever sold their chicken/eggs while on medication. 67.5% out of the 42.9% of farmers that checked the withdrawal period on the packaging materials indicated 14 days as withdrawal period. There existed a strong relationship between the socio-demographic characteristics and other variables ($p<0.05$). The farmers managed the encountered poultry diseases using most common drugs; Doxygen® (43.2%) and Tylodox® (40%) for duration ranging from 3 to 7 days depending on disease severity and mortality rate. It is suggested that poultry farmers should follow information written on the packaging materials; strict legislation and extensive awareness on observing withdrawal period of drugs should be implemented by the government and relevant stakeholders.

Key words: Knowledge, withdrawal period, veterinary drugs, poultry, Zaria.

INTRODUCTION

Management of infections is an important issue in poultry production either by prophylaxis or treatment to get

*Corresponding author. E-mail: adamayoade@yahoo.com or aatjani@abu.edu.ng.

appropriate production (Sandhu et al., 2009; Singla and Gupta, 2012), however currently residues of drugs is an important public health issue. The humans are constantly being exposed to antibiotic residues through consumption of animal products (Okocha et al., 2018; Lawal et al., 2015; Nisha, 2008). The drugs used in livestock production have specified withdrawal period written on the packaging materials for practitioners' and farmers' attention. Majority of farmers are either unaware or in hurry to dispose animals to the market, thus ignoring the withdrawal period. This is further complicated by the indiscriminate use of antibiotics by smallholder poultry farmers. All these have caused continual presence of residues in poultry products (Khattab et al., 2010) and human systems after consuming those products (Amaechi, 2014), thus resulting in antimicrobial resistance that consequently leads to high failure rate of medical intervention in hospitals (Adebowale et al., 2016; Beyene and Tesega, 2014). Antibiotics are administered for prevention and treatment of diseases, and growth promotion especially in poultry industry (Graham et al., 2007). There are indications, however, that non-therapeutic use of antibiotics in animals far outweighs its use in humans (Terence, 2008). Several studies have been conducted to collect baseline data on the use of antibiotics in poultry production and provide a greater understanding of the potential impacts of veterinary practices on human health (Lindonne et al., 2019). The misuse of veterinary drugs in food animals, and specifically poultry, has the potential to generate residues in the products and poses a health hazard to consumers (WHO, 2004). Veterinarians are facing a dramatic change in attitude concerning drug residues. Until recently, veterinarians and other stakeholders did not pay sufficient attention to ensuring that the farmers adhered strictly to the withdrawal period for meat and eggs from animals treated with veterinary drugs (Beyene, 2016; Landers et al., 2012).

Withdrawal period, drug residues and wholesomeness of poultry products

The presence of the residues is caused by the failure to strictly adhere to the antibiotic withdrawal period in poultry (Olatoye and Ehinmowo, 2009), as each approved veterinary drug has a recommended withdrawal period, ranging from few days to few weeks (Doyle, 2006). During the withdrawal period; the time required for 99% of the birds in a population (treated according to labelled instructions) to be free of the drug residues, the animals and their products (such as milk, eggs and meat) are not to be offered for sale (Aniroot et al., 2018). The length of this period is based on the time necessary for drug residues in the animal to deplete to levels that are known to be safe (Khatun et al., 2018; Kabir et al., 2004). Withdrawal period is not the same for all drugs; it depends on the type of drug, dosage, route of administration and animal species and may be extended when combination therapy is practiced or when drugs are used in an extra-label manner (Brahma et al., 2012; Landers et al., 2012). Several studies indicated the causes of antibiotic residues in poultry products to include use of unapproved drugs, overdose, improper route of administration and non-adherence to withdrawal period (Sasanya et al., 2005; Al-Ghamdi et al., 2000; Duguma et al., 2018). The withdrawal period enables the animal to metabolically reduce the drug level in its tissues to level that is not of public health significance. This level gradually falls below the maximum residue limit (MRL) after some days (Amiri et al., 2014; Olsen et al., 2015). Most farmers are concerned with cost of production rather than public health risk of the drugs and therefore cannot delay disposing their chickens/eggs for purpose of observing withdrawal period (Sasanya et al., 2005). Unwatched withdrawal period is a common issue in developing countries.

METHODOLOGY

The study area covered various locations and settlements in Zaria and its environs. The study areas fall under Sabon Gari and Giwa Local Governments, Kaduna State. The sample size was calculated to be three hundred and eighty-five (385) farmers based on the formula of Thrushfield (1997). The pre-test was done by administering ten questionnaires to farmers using Kobo Collect tool. Quantitative method was employed in the collection of the data in questionnaires (385) distributed among the enumerators. This method required using a semi-structured questionnaire to collect respondents' information on the field. The duration of the administration of the questionnaires was 3 months spanned from November 2020 to February 2021. Ten (10) enumerators were recruited from the communities and trained for the survey. The scope of the study was limited to the smallholder farmers in various locations in Zaria and its environs who keep between 100 and 1,000 birds (broilers or layers) with about 5% of them having more than 1,000 birds. The semi-structured questionnaires were administered physically to the farmers. The questionnaire included information such as socio-demographic details, type of birds, system of rearing, flock size, usage of veterinary drugs, knowledge of withdrawal period, birds' disposal time and other vital questions as related to the study. Three hundred and eighty (380) responses were recorded out of the expected three hundred and eighty five (385) questionnaires. This indicated a response rate of 98.7%. The data entry was manually done by coding the variables on Excel worksheet. The data was analyzed by Statistical Package for the Social Sciences (SPSS) version 23. The test statistics was done using Chi-square and Fishers exact to determine the relationship between the socio-economic characteristics and other variables. The data is presented in frequency tables shown in Tables 1 to 4.

RESULTS AND DISCUSSION

The poultry farmers with tertiary education were recorded at 61.1%. This is similar to the finding of Okoli et al.

Table 1. Socio-demographic characteristics of the respondents.

Variable	Frequency (n=380)	Percent
Educational background		
No education	18	4.7
Primary	9	2.4
Secondary	100	26.3
Vocational	21	5.5
Tertiary	232	61.1
Location of the farm		
Shika district	57	15.0
Samaru district	105	27.6
Others	218	57.4
Type of birds' reared		
Broilers	257	67.6
Layers	84	22.1
Cockerels	39	10.3
Age of birds (in weeks)		
1-12	286	75.3
13-24	22	5.8
25-36	27	7.1
37-48	10	2.6
49-60	27	7.1
61 and above	8	2.1
Mean age ± SD = 14.19 ± 21.3		
Population of birds		
<200	208	54.7
201-400	100	26.3
401-600	35	9.2
601-800	4	1.1
801-1000	13	3.4
1001 and above	20	5.3
Mean population ± SD = 353.1 ± 478.2		
Type of rearing system		
Deep liter	319	83.9
Cage	61	16.1

Source: Field survey

(2005) who recorded higher proportion (70.91%) of the poultry business practitioners with tertiary education in Imo State. Contrary to this, Ursule et al. (2020) recorded 35% of the smallholder farmers as having completed their tertiary education. Samaru recorded about 27.6% while Shika district recorded 15.0%. The major farms (57.4%) surveyed were spread in different locations under the two local governments. The broiler production (67.6%) was found to be the most predominant type of birds reared majorly on deep litter system (83.9%). This is slightly different from the finding of Tsado et al. (2017) who reported that 30.4% of the farmers in Kwara State practiced broiler production while 59.8% of them practiced both broilers and layers, respectively. Though the Mean age ± SD of the birds is 14.19 ± 21.3 weeks, about three quarter (75.1%) of the birds reared were

Table 2. Knowledge of drug withdrawal period and disposal of birds.

Variable	Frequency (n=380)	Percent
Ever heard of withdrawal period		
Yes	189	49.7
No	191	50.3
Ever checked the withdrawal period of the drug before use		
Yes	163	42.9
No	217	57.1
Approximate duration of withdrawal period of any drug(in days) **(n=163)**		
14	110	67.5
21	53	32.5
Ever sold birds while on medication		
Yes	202	53.2
No	178	46.8

Source: Field survey

Table 3. Relationship between the socio-demographic characteristics and `other variables.

Socio-demographic characteristics	Test Statistics			
	Ever heard of withdrawal period	Ever checked the withdrawal period of the drug before use	Approximate duration of disposal after use of any drugs	Ever sold birds while on medication
Educational background	χ^2=126.578, df=4, p=0.000	χ^2=56.538, df=4, p=0.000	χ^2=67.964, df=8, p=0.000	χ^2=64.270, df=4, p=0.000
Location of the farm	χ^2=35.079, df=4, p=0.000	χ^2=25.599, df=4, p=0.000	χ^2=42.369, df=8, p=0.000	χ^2=52.938, df=4, p=0.000
Type of bird's rearing	χ^2=15.523, df=2, p=0.000	χ^2=6.441, df=2, p=0.040	χ^2=8.140, df=4, p=0.087	χ^2=21.196, df=2, p=0.000
Age of the birds (weeks)	χ^2=32.127, df=5, p=0.000	χ^2=11.082, df=5, p=0.050	χ^2=20.930, df=10, p=0.022	χ^2=8.772, df=5, p=0.119
Population of the birds	χ^2=36.355, df=5, p=0.000	χ^2=36.355, df=5, p=0.000	χ^2=36.813, df=10, p=0.000	χ^2=51.502, df=5, p=0.000
Types of rearing system	Fishers exact = 0.036	Fishers exact = 0.001	Fishers exact = 0.003	Fishers exact = 0.000

Source: Field survey

within 1 to 12 weeks old. More than half (54.7%) of the farms reared <200 birds despite the mean population of the flocks ± SD was recorded as 353.1 ± 478.2. It was only 5.3% of the farms that reared more than 1,000 birds at the time of the survey. This finding was in unison with Abalaka et

Table 4. Common drugs used in poultry production.

Variable	Frequency (n=380)	Percent
Common antibiotics use*		
Doxygen	164	43.2
Tylodox	152	40.0
Others (Neoceryl and Oxyfuravit)	128	33.7
Anti-coccidial drug*		
Amprolium 200	256	67.4
Dewormer used		
Piperazine	212	55.8

*Multiple responses.
Source: Field survey

al. (2013) who reported 45% of the rural smallholder farmers in Kogi State reared between 100 and 199 birds yearly.

More than half of the poultry farmers (50.3%) have never heard of withdrawal period of drugs. It is saddening that about 57.1% of them have never checked the withdrawal period on the drugs' labels before use. Only 42.9% indicated they checked the withdrawal period before use. Similarly in Nigeria, Nsofor et al. (2013) elucidated that majority of farmers were neither unaware nor follow the mandatory withdrawal period after administering antibiotics, and that they were reportedly unaware of risks associated with the presence of antibiotic residue in poultry products. Out of this 42.9%, 67.5% of the farmers indicated 14 days as the approximate duration of disposal (withdrawal period) of chicken/eggs after use of any drugs in poultry production. This result indicates that majority of the farmers had poor knowledge and awareness about withdrawal period of drugs, thus they were not observing it. The study indicates that poultry farmers are not really knowledgeable on the effects of withdrawal period. This is in agreement with the work of Lindonne et al. (2019) who reported farmers' poor knowledge regarding the prudent use of antibiotics in poultry production. Similar findings of low knowledge about antibiotic usage have been reported in Tanzania (Katakweba et al., 2012; Duguma et al., 2018). More than half of the farmers (53.2%) have ever sold their birds while on medication. This suggests that they neither wait to complete the treatment duration nor observe the withdrawal periods of the drugs they use. This agrees with Adebowale et al. (2016) who opined that, farmers discontinue antibiotics once the clinical symptoms subsided and with Amaechi (2014) who confirmed that farmers failed to complete the recommended treatment duration once the market existed for their products. It also agrees with the finding of Turkson (2009) who discovered that some poultry farmers in Ghana sold their chicken to unsuspecting consumers while the flocks were still on medication. The work of Khatun et al. (2018) validated the finding that most antibiotics have withdrawal period ranging between 7 and 21 days, but specifically 14 days for gentamicin.

From the various Chi-square ($p< 0.05$) values mentioned earlier, it is observed that a strong relationship existed between the socio-demographic characteristics and the variables used in assessing the farmers' awareness and practice of observing withdrawal period of veterinary drugs in poultry production.

The most common antibiotics used by the farmers in the study areas are Doxygen®(43.2%) and Tylodox® (40.0%), while 33.7% of the farmers mentioned other drugs like (Neoceryl® and Oxyfuravit®). It agrees with the finding of Aondover et al. (2019) who indicated that Doxycycline and Neomycin are common antibiotics in the Nigerian poultry industry. This concurs with Mund et al. (2017) who stated that Doxycycline, Gentamicin and Tylosin as the most common antibiotics in poultry. This is different from Oluwasile et al. (2014) that the most commonly used antibiotics in Ogun State, Nigeria are Neoceryl®, Enrofloxacin® and Furazolidone®. Amprolium® (67.4%) and Piperazine® (55.8%) were the most mentioned anti-coccidial drug and dewormer, respectively. This same had been reported by Mund et al. (2017) as the drug of choice in managing coccidiosis and worms, respectively.

CONCLUSION AND RECOMMENDATIONS

The assessment of knowledge, attitude and practice of observing withdrawal period of veterinary drugs among the poultry farmers in Zaria was carried out using semi-structured questionnaires. The study showed that large

proportion of the smallholder poultry farmers in Zaria are well educated and reared majorly broilers of less than 200 flock size on deep litter system. However, the findings revealed that the farmers did not observe the withdrawal period of drugs to the extent that some of them sold their chicken/eggs while the birds are on medication. This non-adherence to observing withdrawal period of veterinary drugs has potential public health threat as the poultry products may accumulate harmful drug residues. There is a strong relationship between the socio-demographic characteristics and other variables used in assessing the farmers' awareness and practice of observing withdrawal period of veterinary drugs in poultry production. The farmers failed in completing the treatment regimen once the market for the products is available. It is also discovered that withdrawal periods of some veterinary drugs majorly known by the farmers were 14 and 21 days. The Doxygen® and Tylodox® are the most common drugs used based on the prevalent poultry diseases in the area, the severity of the disease and mortality rate. It is therefore recommended that the legislation concerning withdrawal period of drugs in livestock production especially poultry must be strictly implemented. An extensive awareness has to be carried out by veterinary extension specialists to educate animal health professionals and farmers on the need to observe withdrawal periods of drugs used in poultry production as it poses food safety risks to the populace. More research should be conducted to determine the presence of drug residues in various poultry products on the farms in Zaria and its environs before being disposed to the markets.

CONFLICT OF INTERESTS

The authors have not declared any conflicts of interests.

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