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Vaccine Handling and Administration Among Poultry Farmers in Ibadan Metropolis, Oyo State, Nigeria

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Abstract: The study investigated vaccine administration among poultry farmers in Ibadan Metropolis. Multi-stage sampling technique was used in the selection of the sample size. Structured questionnaires were administered to obtain information from the respondents. The result was analysed using percentages, frequencies, pie-chart and bar chart. The study revealed that 84.17% and 15.83% of the respondents were males and females respectively. 65.83%, 27.50% and 6.67% of the respondents were within the age range of 20-40 years, 41-60 years and above 60 years respectively. Among them were 2.50%, 9.17%, 26.67% and 61.66% with no formal education, primary education, secondary and tertiary respectively. The study also revealed that only 42.86% consulted Veterinary personnel before vaccination and14.29% of the respondents vaccinated sick birds while 30.25% ever attended training/seminar on vaccine use and just 11.76% had contact with poultry extension agents. The results also showed that only 18.33% of the respondents added skimmed milk to diluents of vaccine, 45.83% used bore hole water as a source of diluents and 67.50% mixed vaccine with little diluent before adding to drinking water while 62.50% purchased their vaccines from Veterinary Shops. In the same vein, 50.83% of the respondents had experienced vaccine failure and 36.07%, 27.87%, 19.67%, 9.84% and 6.56% of these failures were associated with Newcastle disease, Infectious bursal disease, Fowl cholera, Fowl cholera and Coccidiosis respectively .It is therefore recommended that Veterinary personnel should be used in handling and sales of vaccines and vaccination. In the same vein, poultry extension agents should be empowered by the government to enlighten poultry farmers on vaccine handling and usage.
Keywords: Poultry, Vaccine, Administration, Extension agents, Veterinary personnel, Poultry diseases

INTRODUCTION

In Nigeria, poultry diseases remain the greatest threat to the poultry industry and are responsible for very large economic loses to the farmers [1]. Modern poultry farming has resulted in the development of high density poultry areas with increased risk of disease spread [2].The poultry sector manages this risk by routine vaccination against known poultry pathogens of specific economic importance. According to [3] the risk of transmission of certain trans-boundary poultry diseases to previously unaffected areas have increased as a result of globalization and the possible persistence and spread of disease agents through domestic and wild reservoirs. Poultry Vaccines are widely used to prevent infectious poultry diseases. Their use in poultry production is aimed at avoiding and minimizing the emergence of clinical diseases at farm level, thus increasing production [4]. A vaccine is a biological preparation that improves immunity to a particular disease. It is often made from weakened or killed forms of the microbe, its toxins or one of its surface proteins [5]. Vaccination is the administration of optimal and safe amount of attenuated antigens to stimulate immune response in the host against diseases. Poor administration is the most common cause of vaccine failure in poultry [6]. Planning and attention to detail resulting in better administration will improve disease control and therefore economic performance of poultry. A vaccine failure occurs when the chickens do not develop adequate antibody titre levels due to cold chain break, stress, management error or immune-suppression associated with other co-existing immune-compromising diseases. When vaccination fails, the natural inclination is to blame the vaccine, although this is certainly an important consideration, there are other factors that must be evaluated to determine the cause of the failure [7]. According to [8] a high level of maternal anti-bodies in the young chicken may interfere with the multiplication of live vaccines, reducing the amount of immunity produced. According to [9] stress may reduce the chickens' ability to mount an immune response. Stress could include environmental extremes (temperature, relative humidity), inadequate nutrition, parasitism, and other diseases. According to [10] live vaccines may be inactivated due to improper handling or administration. Before administering live vaccines, lot numbers and expiration dates must be checked. It is important that vaccines are stored and handled as

recommended by the manufacturers. Chickens may already be incubating the disease at the time of vaccine administration. Despite proper administration, the birds become diseased because time is needed to begin and reach protective levels [11]. Chickens may be immunosuppressed due to infection with infectious bursal disease virus or marek's disease virus or from consumption of feeds with high levels of mycotoxins [12]. This may result in the development of only limited protection from the vaccine and an excessive vaccine reaction with morbidity and mortality. Poor quality (low vaccine titre, contamination etc) of vaccine may be responsible for vaccine failure. This poor quality would have been as a result of handling errors as it is generally accepted globally that the vaccine manufacturing industry is highly regulated and has extensive internal quality control. Vaccine failure due to problems with the vaccine is rare [11].

Even though vaccination of poultry is regular and a routine activity among farmers in Ibadan metropolis, farmers still report incidences of disease outbreak. Could these incidences or outbreaks be as a result of lapses in vaccine handling? Financial losses caused by major epidemic diseases of poultry have been enormous for both the commercial and public sectors. This study was therefore intended to investigate the various processes involved in vaccine handling and administration in Ibadan metropolis, Oyo State, Nigeria.

MATERIALS AND METHODS

The study was conducted in Ibadan metropolis using sampled commercial poultry farmers as the study population. Multistage sampling technique was used firstly to purposively select six local government areas within Ibadan metropolis (Akinyele, Ido, Oluyole, Ona-Ara, Egbeda and Lagelu) because most poultry production activities take place there [13]. The second stage involved random selection of 2 wards in each of the six local government areas while the third stage involved random selection of 10 farmers from each of the 12 wards who were poultry vaccine users, thus arriving at a sample size of 120 respondents. Data were collected through the administration of structured questionnaires. Data collected were summarized using statistical tools including frequencies, percentages, pie chart and bar chart.

RESULTS AND DISCUSSIONS

Findings in table 1 indicate that 84.17% of the respondents are male. This shows that majority of the farmers are males. A high percentage of the respondents (65.83%) were within the age group of 21-40. 61.66% of the respondents have tertiary education. This high level of education as discovered in this study is in tandem with [14] who reported that about 63% of commercial chicken keeping household heads were educated in Kenya. This is highly relevant to the use of veterinary medicines in that farmers are likely to understand instructions on vaccine use and management practices.

Table 1: Personal characteristics of respondents (n=120)

Variables (%)	Frequency	Percentage
Sex:		
Male	101	84.17
Female	19	15.83
Age		
20-40 years	79	65.83
41-60 years	33	27.5
Above 61years	8	6.67
Marital Status		
Single	59	49.17
Married	55	45.83
Others (Divorce, Widow/widower)	6	5.0
Educational Qualification		
No formal education	3	2.5
Primary education	11	9.17
Secondary education	32	26.67
Tertiary education	74	61.66

Source: Field survey2013

Result from table 2 indicate that most of the poultry farmers have some knowledge of vaccine use, as 67.23% understand vaccination schedules, 82.35% read and keep to manufacturer's instructions on vaccine labels. This could be attributed to respondents level of education as discussed in table 1. A high (75.83%) percentage vaccinate birds only during cool periods and very few (14.29 %) vaccinate sick birds. Not vaccinating sick birds is an indication of good knowledge and effective management practice

associated with proper vaccination protocol as [9] reported that stress may reduce a chicken's ability to mount an immune response and thus, sick birds should not be vaccinated. About 52.99% of the respondents use appropriate syringe size which is compatible with mineral oil thus, reducing vaccine failure. This percentage out of a hundred is poor and may lead to problems as [15] reported that various multi-dose syringes are available in the market, the brand selected must be compatible with mineral oil often used as adjuvant for effective vaccination. However, a good number of the respondents have engaged in practices that could have been responsible for the observed cases of vaccine failure in the study area. It was discovered that just (42.87 %) of the respondents consult veterinary personnel before vaccination. A few (30.25 %) have attended training on vaccine use and a negligible (11.76 %) have had contact with poultry extension agents, which also is an indication of poor extension delivery to the poultry farmers in Ibadan metropolis. Result from the table also shows that most of the necessary precautionary measures required to be taken during vaccine administration were in use by the respondents as 75.0 % use fresh cold water as diluents, 77.5 % starve the birds of water before the administrating vaccines, 82.5 % provide adequate number of drinkers for the birds to all reach the mixed vaccine at the same time and 82.7 % ensure adequate drinking space for all the birds. However, it was discovered that just (18.35%) of the respondents added skimmed milk. Skimmed milk at the rate of 2g/l be added while reconstituting vaccine in water to overcome the detrimental effect of chlorine and other dissolved chemicals that can affect the efficacy of the vaccine [16]. Not adding skimmed milk to diluents by majority of the respondents may be one of the reasons for the observed incidence of vaccine failure in the study area.

Table 2: Percentage distribution of respondent's knowledge and precautions taken during vaccine administration (n = 120)

Variable (%)	Frequency	Percentage
Consult Vet. Personnel on vaccination	51	42.86
Attend training on vaccination use	36	30.25
Understand vaccination schedule	80	67.23
Read manufacturer instructions on Vaccine labels	98	82.35
Vaccinate sick birds	17	14.29
Use appropriate needle size	62	52.99
Keeping vaccination date record	85	71.83
Vaccine birds during coolest period of day	91	75.83
Contact with poultry extension agents	14	11.76
Use fresh cold water	90	75
Starve birds of water	93	77.5
Adequate number of drinkers	99	82.5
Sufficient drinking space	99	82.5
Addition of skimmed milk	22	18.33

Multiple responses.
Source: field survey 2013

Result from table 3 shows that majority (62.5%) of the respondents got their vaccines from Veterinary shops. this may be so because of the regular contact of 42.86% of the respondents with Veterinary personnel as shown in table 2. About 7.5% do not maintain cold chain. Maintaining cold chain is vital to keeping the viability of antigenic material as reported by [17]. A low (10.83%) percentage of the respondents purchase vaccines in fraction. This could be as a result of their belief that purchasing a complete dose may be a waste of resources considering their flock size. In the process of dividing the vaccine and repackaging, vaccines may be contaminated, thus losing their antigenicity and so not protect birds. About 67.5% of the respondents mix vaccine with little diluents before adding to drinking water. This is a good practice and is recommended by [14], where it was stated that vaccines should be reconstituted in a small quantity of diluents (5-10 litres) before adding to drinking water to ensure homogenous vaccine solution. The fact that 32.5% of the respondents mix directly with drinking water may pose a threat to vaccine efficacy in the study area.

Table 3: percentage distribution of other factors that can lead to vaccine failure (n=120)

Variables	Frequency	Percentage (%)
Source of Vaccines		
Hatcheries	36	30
Vet. Shops	75	62.5
Other Poultry Farm	9	7.5
Method of Preservation		
Maintain Cold Chain	111	92.5
No cold chain	9	7.5
Source of Diluents		
Bore hole Water	55	45.83
Tap Water	2	1.67
Normal Saline	16	13.33
Well Water	40	33.3
Stream/pond Water	7	5.83
Route of administration		
Oral/drinking Water	83	69.17
Wing Web	3	2.5
Subcutaneous/Intramuscular	4	3.33
Spraying	7	5.83
Others	23	19.17
Quantity of vaccine purchased		
1 complete Vial	101	84.17
Fraction	19	15.83
Method of reconstitution of Vaccine		
Mix directly with drinking Water	39	32.5
Mix vaccine with Little quantity of diluents before Adding to drinking Water	81	67.5

Source: Field Survey,2013

Result from fig.1 indicated that 50.83% of the respondents have experienced vaccine failure, While 49.1% have not. The fact that, more than half of the respondents have experienced vaccine failure may be a reflection of the manifestation of the consequences of lapses in vaccine administration in the study area. Vaccine failure could also result from factors outside the scope of this study such as, factors associated with the vaccine itself, factors associated with the bird/flock and factors associated with management practices like the hygiene status of the farm concerned [4].

Fig 1: Incidence of vaccine failure among respondents

Result from fig. 2 shows that the diseases with the highest rate of vaccine failure were Newcastle (36.07%) and infectious bursal disease (27.87). This is not surprising as both Newcastle and Gumboro vaccines are given in water (orally) and in most cases by the farmers themselves, hence the likely chance of abuse of normal vaccine protocols. The result also shows low vaccine failure rates in coccidiosis (6.5%) and fowl pox (9.84%) respectively. These vaccines are usually administered via wing web or subcutaneously, by veterinarian who are well trained and not by the farmers. In a similar study, [17], reported that the skills of the Veterinary professional handling the coccidiosis and fowl pox vaccines may be one of the reasons for the observed low incidence of fowl pox and coccidiosis diseases among farmers in that study.

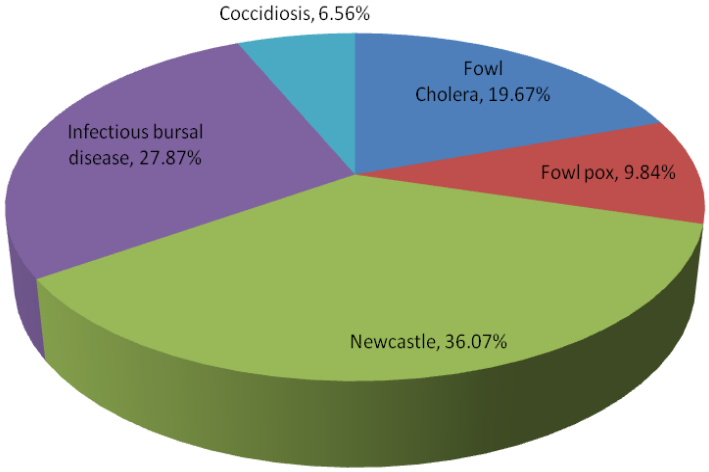

Fig 2: Pie-chart showing disease in which vaccine failure occurred

CONCLUSION

Most of the respondents had tertiary education. Less than half of the respondents consult veterinary personnel before vaccinating their birds. Most of the respondents have never attended any form of training in vaccine handling. There was poor extension delivery to the poultry farmers in the study area. There were breaches in the recommended practices of vaccine handling and administration in the study area as most of the respondents failed to add skimmed milk to dubious water used as diluents and there was rampant direct reconstitution of vaccine with drinking water. Finally, More than half of the respondents have experienced vaccine failure and the diseases with the highest rate of failure were Newcastle and Gumboro. There is the need to ensure that veterinary personnel are used in handling and sell of vaccines and vaccination. In the same vein, poultry extension agents should be mobilized and empowered by the government and private sector to enlighten poultry farmers on vaccine handling and storage. Also, regular and continuous vocational training in various aspect of poultry management with particular emphasis on vaccine use and administration should be organised for the poultry farmers in the study area.

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