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## Evaluation of Factors Regarding Misuse of Antimicrobials in Poultry and Piggery Farms in Abia State, Nigeria

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**Abstract-** A survey was conducted to evaluate the factors that can cause misuse or abuse of antimicrobials in poultry and piggery farms. This evaluation was conducted between May 2011 and April, 2012 using a structured questionnaire distributed by the author to farm managers. The results showed that level of education of farm managers have a role to play in prudent use of antimicrobials. Only a small percentage (10% for poultry, 20% for piggery farms) of antimicrobial prescriptions were made by veterinarian, while the key prescriptions (70% poultry, 60% piggery farms) were made by the farmers or the farm managers. Laboratory analysis was not routinely done on samples before antimicrobial administration. Majority of antimicrobial administration (45% for poultry farms, 60% for piggery farms) were based on history of disease and mere observations on the animals. In the poultry farms, 60% of farm managers have degree and they adhered to the average of 3-4 days (65%) duration of antimicrobial administration. The results showed that majority of antimicrobial administrations were made by farm managers with minimal laboratory analysis of samples. It is anticipated that this findings will create awareness on the appropriate use of antimicrobials on farm animals.

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EVALUATION OF FACTORS REGARDING MISUSE OF ANTIMICROBIALS IN POULTRY AND PIGGERY FARMS IN ABIA STATE, NIGERIA

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# Evaluation of Factors Regarding Misuse of Antimicrobials in Poultry and Piggery Farms in Abia State, Nigeria

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## I. INTRODUCTION

The use of antimicrobial compounds in food animals production provides demonstrated benefits, including improved animal health, higher production and in some cases, reduction in food borne pathogens. For many decades, antimicrobial resistance has been recognized as a global health problem (CDC, 2010). Some of its causes are widely accepted, for example, the overuse and inappropriate use of antimicrobial for non bacterial infections and inadequate antimicrobial stewardship in the clinical arena. Some of the types of antimicrobial misuse in clinical practice include unjustified prescription, under prescription, under dosing and short duration (Bartoloni *et al*, 1998). Antimicrobial prescription in many developing countries is almost entirely empirical and based on surveillance data obtained from locations or at a time that it is unlikely to be relevant to the ensuring situation.

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Another problem is the practice of farmers who are more likely to fail to complete a prescribed course of antimicrobials (Pechere, 2001). Antimicrobial choice is based on experience, folklore or customer preference usually in complete disregard of the long-term consequences of antimicrobial uses. Clearly, factors like cost and availability of diagnostic/health care influences antimicrobial misuse.

Priority should be given to education, directed at prescribers of antimicrobial to reduce inappropriate use (O'Connor *et al*, 2001). Despite the widespread adoption of antimicrobial use in food animals, reliable data about the quantity and patterns of use (e.g. dose and frequency) are not available (Surmah *et al*, 2006). Quantifying antimicrobial use in food animals is challenging due to variations in study objectives- investigators may measure only therapeutic uses, only non therapeutic uses, or a combination thereof, depending on their outcome of interest- and lack of clarity surrounding the definitions of therapeutic vs non therapeutics.

As a result of the aforementioned problems, there is need to study and evaluate the factors that necessitated the misuse of antimicrobials in poultry farms and commercial piggery farms in Abia State, Nigeria.

## II. MATERIALS AND METHODS

### a) Animal production

A total of 90 poultry and 72 piggery farms from 17 local government areas of Abia State, Nigeria were solicited to participate in the evaluation of misuse of antimicrobials. The poultry and piggery farms that participated in this study were recommended by Agricultural Development Project (ADP) officials in Abia State and were classified as large poultry farms and commercial piggery farms respectively. Poultry and piggery producers were selected for the study if they:

1. Would allow access to available farm records related to antibiotic use
2. Granted permission to interview them on antibiotic use
3. Possess records that relates to morbidity, mortality, education levels of their workers and contacts with veterinarians. The 70 poultry and 60 piggery farms

that met the study criteria were requested to take part in the evaluation.

*b) Survey Questionnaire*

Well-structured questionnaires on antimicrobial usage were administered by the author to poultry and piggery producers or managers of each farm. The first part of the evaluation questionnaire was administered to all 70 poultry farms. The second part of the evaluation questionnaire was administered to all 60 piggery farms. This evaluation was conducted from May 2011 to April, 2012.

*c) Statistical Analysis*

Answers to the questionnaire were analyzed using regression analysis to determine the factors that

are responsible for abuse or misuse of antimicrobials. Also simple statistical methods such as mean, bar chart and percentages were used to interpret the questionnaires. All analysis was done using SPSS (2006) version 11.5 software.

III. RESULTS

Figure 1 depicts the level of education of poultry and piggery farmers. Among the poultry farmers, degree holders occupied the highest percentage (60%), while for piggery farmers, secondary school certificate (SSCE) "O" level holders had the highest percentage (35%).

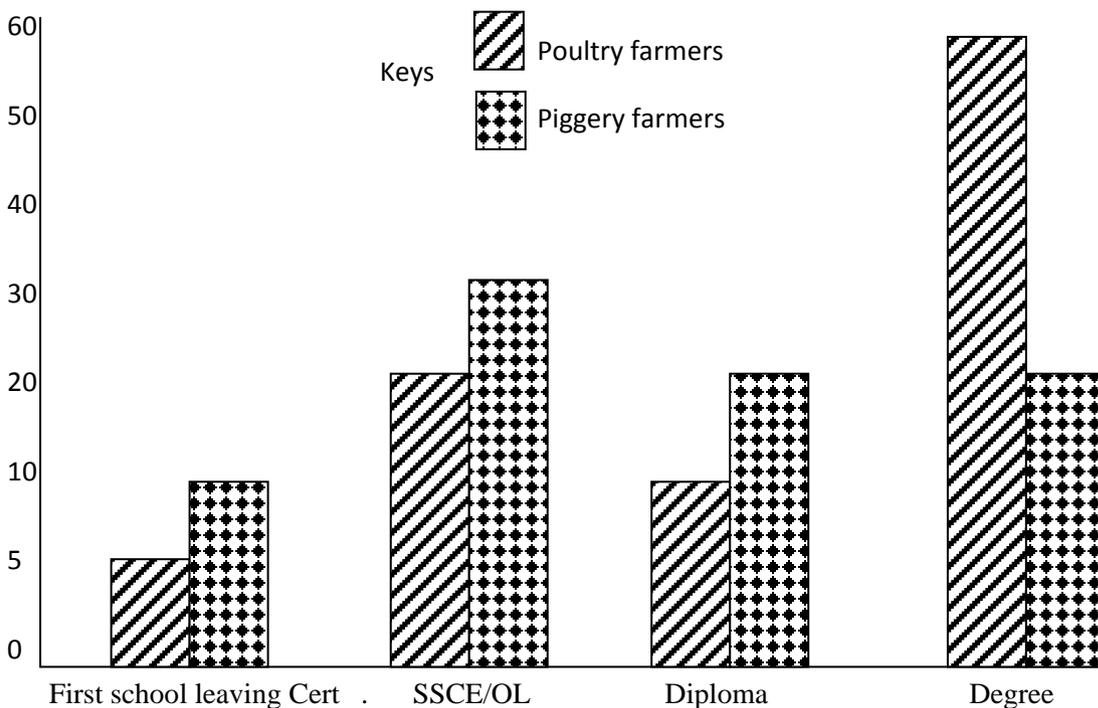


Figure 1 : Distribution of poultry and piggery workers according to their level of education

The duration of antimicrobial administration was investigated to ascertain if farmers adheres to the duration of drug administration. Figure 2 showed that majority of the antimicrobials were given within 3-4 days (65%) in poultry farms and (60%) in piggery farms.

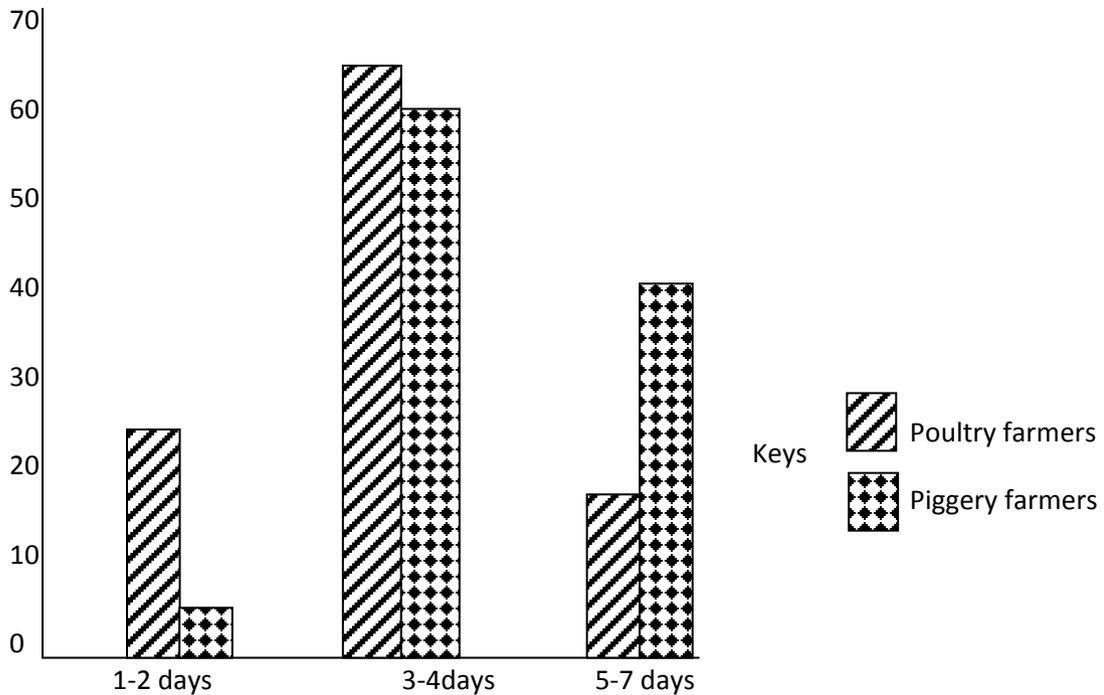


Figure 2: Duration of antimicrobial administration in poultry and piggery farms

The tendency to rely on personal experience for antimicrobial use, dosage and withdrawal period inspired the researcher to investigate on personnel that prescribe antimicrobial agents.

while in piggery farms majority of drug prescriptions were made by farmers (60%). In both poultry and piggery production, farmers made the highest number of prescriptions.

Figure 3 showed personnel that makes prescription of antimicrobial administration. In poultry farms, 70% of drug prescription was made by farmers,

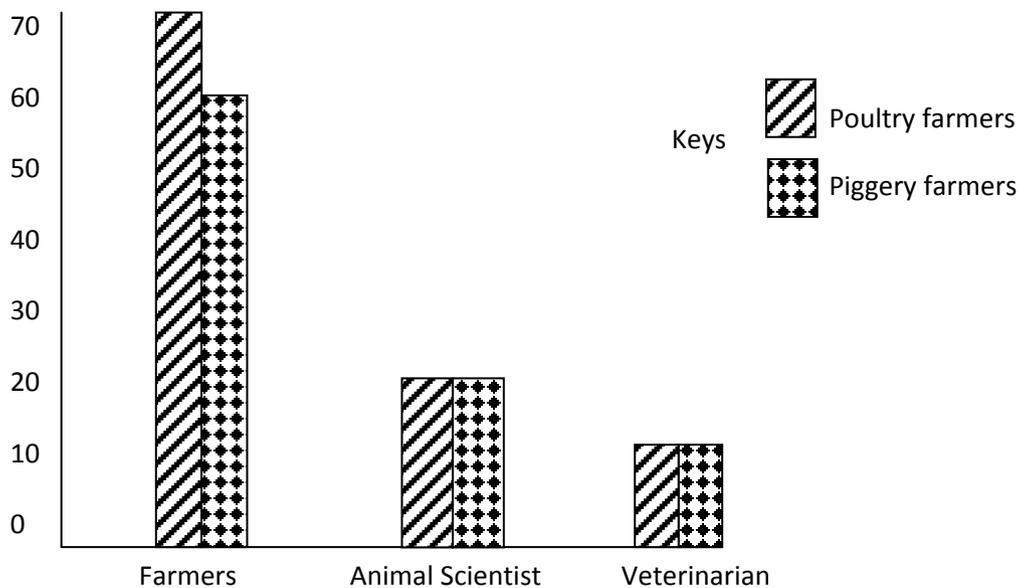


Figure 3: Personnel that makes prescription of antimicrobial administration

Figure 4 showed that majority of antimicrobials used were given to pigs and poultry birds without laboratory analysis done on samples to isolate aetiological agents. In poultry farms, 65% had no laboratory analysis done on samples prior to antimicrobial use, while it was 75% in piggery farms.

farmers use antimicrobials in treatment. For the poultry workers clinical investigation (50%) accounts for an important reason for treatment using antimicrobials. For the piggery farmers history of disease and mere observation account for 60% of their reasons for treatment.

The basis for treatments using antimicrobials was investigated. Figure 5 showed the basis why

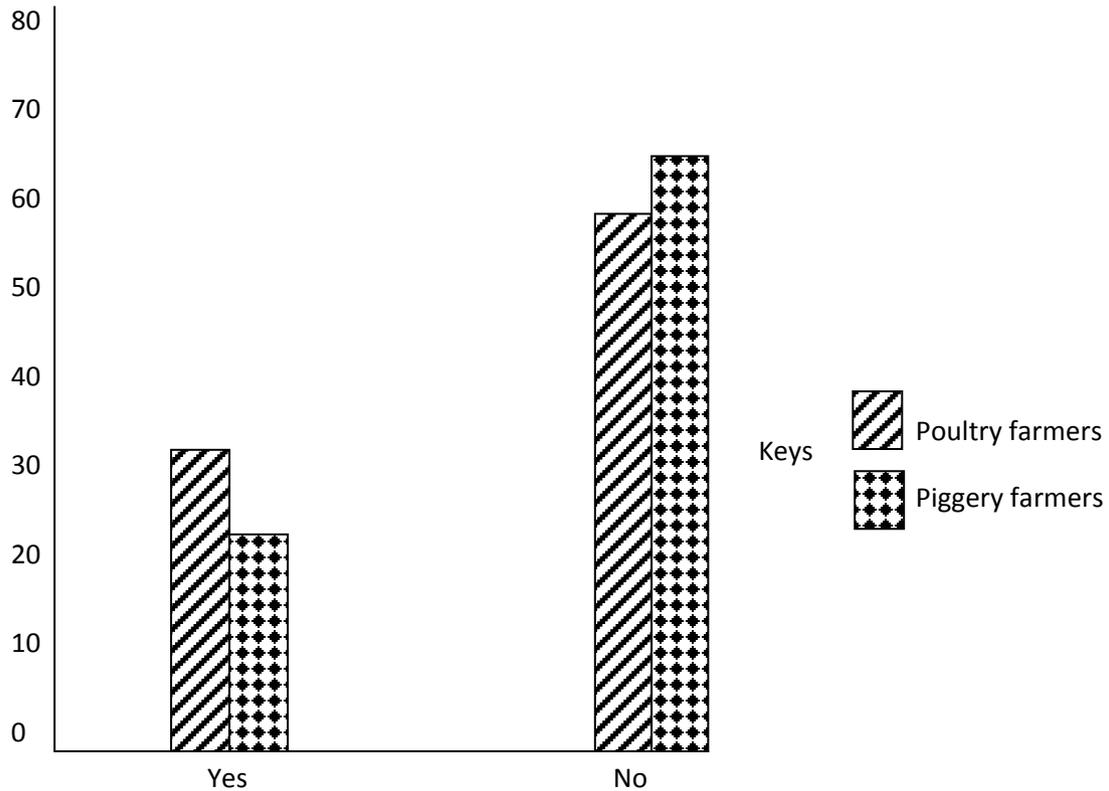


Figure 4 : Any laboratory analysis done prior to antimicrobial use?

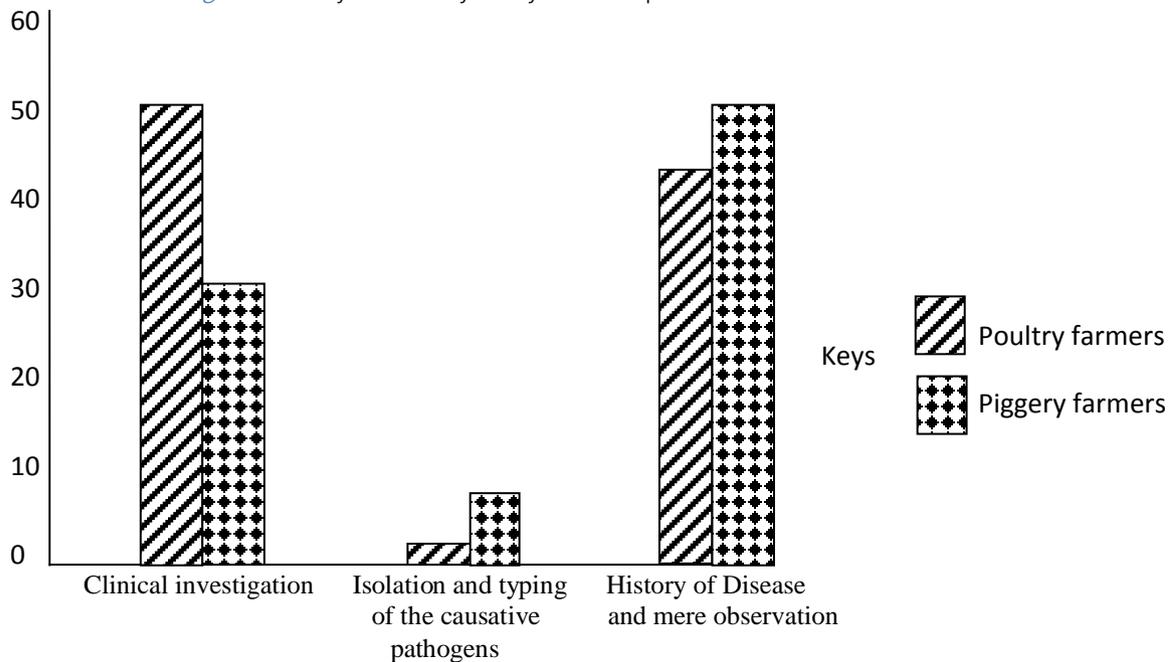


Figure 5 : Basis for treatment using antimicrobials on poultry birds and pigs

Response of respondents on whether the antimicrobial treatment was completed or not is shown in Figure 6. In the poultry farms, 70% of farmers affirmed

that the antimicrobial treatment was completed according to the prescription and duration of treatment, while in the piggery farms, it was 60% of the farms.

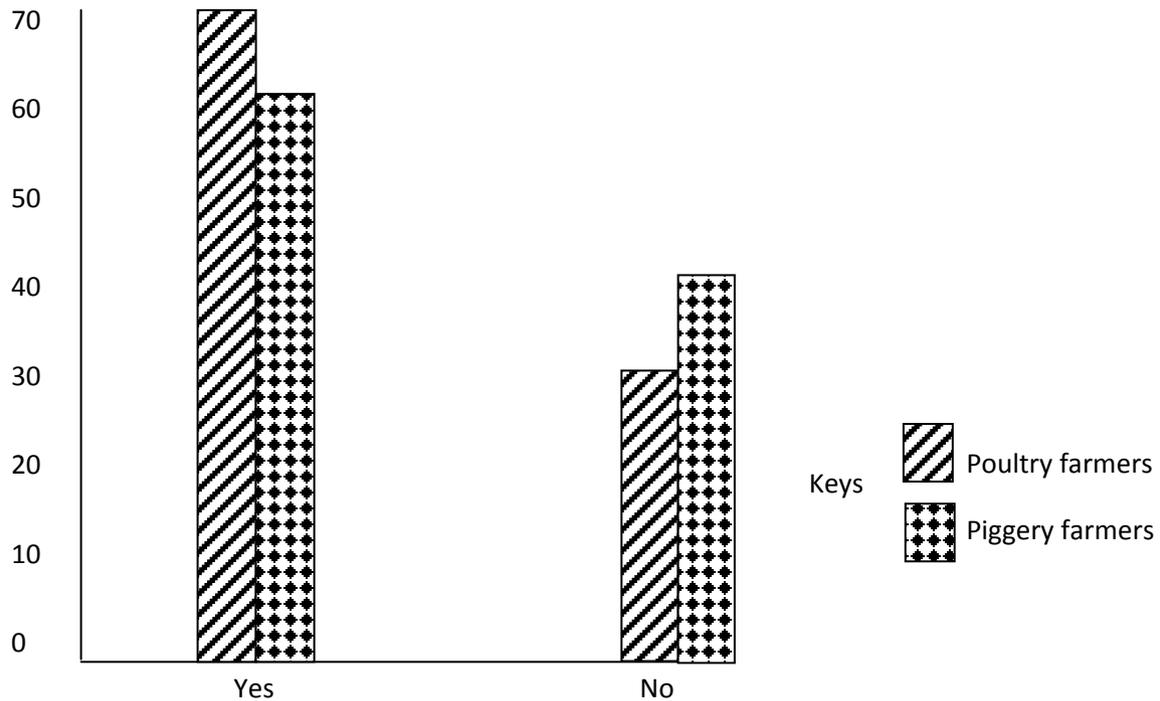


Figure 6: Completion of antimicrobial treatments in poultry birds and pigs

Figure 7 which showed the frequency of consulting a veterinarian indicated that in poultry farms veterinarians were frequently (40%) consulted, while in piggery farms veterinarians were mostly consulted during emergency (40%). These differences in response in the frequency of consulting veterinarian among the poultry and piggery farmers might be as a result of acute nature of some poultry diseases as opposed to

pig diseases. Also since majority of piggery farmers are SSCE O/Level holders who may not see any reasons of consulting veterinarians except during emergency. This is in contrast to poultry workers where majority of their workers are educated (degree holders), who sees the need for consulting veterinarian frequently for advices and treatments.

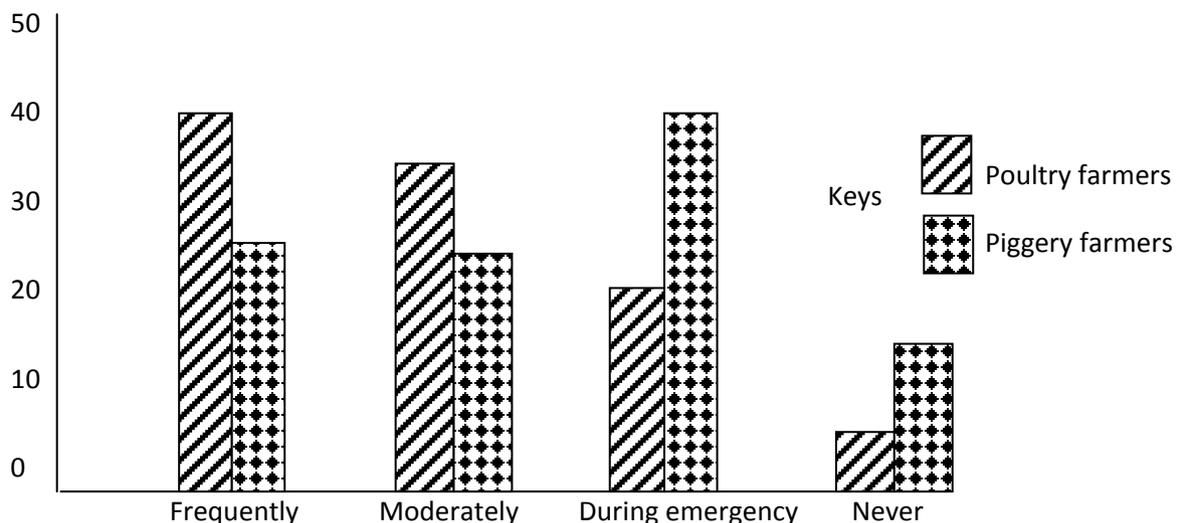


Figure 7: Frequency of consulting a veterinarian

#### IV. DISCUSSIONS

Antibiotics are widely used in food animal production for therapy and prevention of bacterial infections and for growth promotion (McEwen and Fedorka-Cray, 2002). Food animals are raised in confined conditions that promote the spread of infectious diseases (WHO, 1997). Most enlightened farmers are involved in poultry business because it involves the use of intellectual and experience. Because of the vulnerability of the poultry birds, extra carefulness and knowledge are needed for the business to thrive well. This was not the same with piggery farming. Pigs which are omnivores thrive well on any type of food including kitchen wastes, garbage etc. This might be the reason why educated and non-educated were involved in the pig production as can be seen in Figure 1.

Antimicrobials are often over used because of low cost and ready availability, often without veterinary prescriptions and are administered for long periods of time at sub-therapeutic concentrations to entire groups or herds of animals (Gossens, 2009). Sixty-five percent of antimicrobials were used in poultry farms visited without laboratory analysis, while 75% of antimicrobials were used in piggery farms without laboratory analysis. Lack of diagnostic services (65% for poultry, 50% for piggery farms) was the major reason given by farmers for not carrying out laboratory diagnosis on samples. This might be due to unavailability of equipment and materials for this service or the cost of this service may hinder farmers with meager income to pay for such analysis. The over-use of antimicrobials in intensive pig farming is implicated in the emergence of a new pig strain of the superbug methicillin-resistant *Staphylococcus aureus* (MRSA) (Wease and Van Dugkeren, 2010).

The antimicrobials were administered based on clinical investigation in poultry birds (50%) and history of disease and mere observation in pigs (60%). This showed that majority of treatments were not based on isolation and typing of causative pathogens. It means that diagnoses were done tentatively instead of confirmatory. Resistance has developed to virtually all antimicrobials used in food animals. The most important driver of resistance selection and spread is antibiotic over-use (Aarestrup *et al*, 2008; O'Brien, 2002). Causes of abuse or misuse of antimicrobials in food animals showed that education on antimicrobial resistance was lacking amongst dispensers and prescriber of antimicrobials. Records from questionnaire also showed that other causes of abuse of antimicrobials in food animals included that prudent antimicrobial use was lacking amongst dispensers and prescribers of antimicrobials; inappropriate doses were frequently used in food animals. Also included are purchase and administration of antimicrobials without proper prescription. These were done ignorantly not minding

the availability of veterinarian. Other factors identified from the study included inefficient regulatory mechanism on the use of antimicrobials, marketing of substandard antimicrobials and inappropriate doses of drugs frequently used in food animals.

It is suggested that the extensive and often indiscriminate use of antimicrobial agents in animal husbandry might constitute a risk factor in creating an animal reservoir of antimicrobial-resistance bacteria (Tenover, 2001). From this reservoir, resistant strains or resistance genes might spread to humans via the food chain. Some data have indicated that food-producing animal species, raw poultry and other meat products harbor antimicrobial-resistant, Gram positive bacteria (Aarestrup *et al*, 2008). The increased global flow of antimicrobials brought with it the threat of antimicrobial resistance.

The tendency to rely on history of disease and mere observation for antimicrobial use, dosage and withdrawal period was observed among the farmers. These lapses could lead to improper antimicrobial usage as was observed by Zwald *et al*, (2004) in dairy farms. Absence of antimicrobial treatment records, the lack of written plans for treating sick animals, the failure to complete an antimicrobial treatment course were other factors that could lead to inappropriate use of antimicrobials and emergence of antimicrobial resistant bacteria.

#### V. CONCLUSION

Antimicrobial abuse is the main driver in the issue of antimicrobial resistance. The misuse and abuse of antimicrobials in food animals is a major source of the problem. Improved surveillance and national regulation is needed to ensure that antimicrobials are used prudently and are not routinely fed to animals for non therapeutic purposes. National authorities, veterinarians, physicians and farmers all have a role in "preserving the power of antibiotics".

#### VI. RECOMMENDATION

Antimicrobial use data for animals should be made available to aid in assessing the public health impacts of antimicrobial use in animals and policy changes on antimicrobial consumption.

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