# AWARENESS OF SMALL SCALE POULTRY KEEPERS ON RECOMMENDED ANTIMICROBIAL WITHDRAWAL PERIODS IN CHICKEN IN ILALA MUNICIPAL

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**Master of Public Health Dissertation**
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**By**

**Rukia Saidi Mng'ombe**

**A dissertation Submitted in Fulfillment of the Requirements for the Degree of Master of Public Health of Muhimbili University of Health and Allied Sciences**

**Muhimbili University of Health and Allied Sciences**
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## CERTIFICATION

The undersigned certify that he has read and hereby recommends for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation titled **"Awareness of poultry keepers on recommended antimicrobial withdrawal periods in chicken in Ilala municipal"**, in fulfillment of the requirement for the degree of Master of Public Health of Muhimbili University of Health and Allied Sciences.

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**Dr. Larama MB. Rongo**

Supervisor

_____

Date

## DECLARATION

## AND

## COPYRIGHT

I, **Rukia Saidi Mng'ombe,** declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature……..… Date……

## ACKNOWLEDGEMENT

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I say God bless you all.

## ABSTRACT

### Introduction

In Tanzania commercial Chicken are frequently raised in conditions where there is high level of stress, diseases and poor nutrition. To overcome some of these, farmers excessively use antimicrobials in treatment and control of diseases. This might results in antimicrobial residues in meat and eggs of chicken.

### Objective

To assess awareness of poultry keepers on antimicrobial withdrawal periods in chicken and human health hazards associated with antimicrobial residues in Ilala Municipal.

### Methodology

Using descriptive cross sectional survey design,a total of 269 small scale poultry keepers were interviewed with the aid of a structured questionnaire to obtain information on awareness on recommended antimicrobial withdrawal periods, awareness on human health hazards associated with antimicrobial residues, antimicrobial usage and sources of information on awareness of poultry keepers on recommended antimicrobial withdrawal periods in Ilala Municipal. A two level multistage sampling technique was used to obtain required number of participants. Data were analyzed by using SPSS statistical software.

### Results

The study results shows that the commonly used antimicrobials were tetracycline 75%, tylosin 52%, enrofloxacin 49.4%, sulphadiazine 29.7%, norfloxacin 13% and duoxycycline 24.2%. Out of 269 small scale poultry keepers, 199 (74%) poultry keepers were not aware of the drug withdrawal periods. The proportion of small scale poultry keepers who were aware on antimicrobial withdrawal period was significantly higher at ($p<0.001$) among those with higher level of education. Also 79% of small scale poultry keepers were not aware of the health effects associated with consumption of eggs and meat that contains antimicrobial residues. Awareness on the health effects varied significantly ($p=0.001$) with education level,

small scale poultry keepers who were aware of health effects were those with relatively higher level of education than those with low level of education.

**Conclusion**

The overall result of this study indicate that there is a wide spread misuse of antimicrobials by poultry keepers and this reflect lack of awareness and adherence to the recommended antimicrobial withdrawal periods in chicken production. This results to production of chicken meat and eggs which contains antimicrobial residues.

**Recommendation**

The findings obtained from the study raises a need for educational programme on the use and misuse of antimicrobials in chickens and the public health impact of antimicrobial residues in foods from animal origin to various stake holders such as producers of poultry products, consumers and drugs dealers.

It is also recommended to provide education on importance of recommended antimicrobial withdrawal periods to the poultry keepers so as to enable them to adhere to the recommended withdrawal periods which will consequently results to production of poultry product which are free from antimicrobial residues.

Keywords**:** Antimicrobial Withdrawal Periods, Antimicrobial residues, Poultry keepers and Chicken

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| | |
|---|---|
| ADI | Acceptable Daily Intake |
| FAO | Food and Agriculture Organization |
| FDA | Food and Drug Administration |
| MLD | Ministry of livestock Development |
| MOA | Ministry of Agriculture |
| MRL | Maximum Residual Limit |
| MUHAS | Muhimbili University of Health and Allied Sciences |
| NBS | National Bureau of Statistics |
| SSFs | Small Scale Farmers |
| VMD | Veterinary Medicine Directorate |
| WHO | World Health Organization |

## OPERATIONAL DEFINITIONS

Maximum residue limit (MRL) is the maximum concentration of a veterinary drug residue that is legally permitted or recognized as acceptable in or on a food as set by a national or regional regulatory authority

Residues of veterinary medicinal products, as defined by the European Union, are "pharmacologically active substances (whether active principles, recipients or degradation products) and their metabolites which remain in foodstuffs obtained from animals to which the veterinary medicinal product in question has been administered".

Withdrawal period is the time which passes between the last doses given to the animal and the time when the level of residues in the tissues (muscle, liver, kidney, skin/fat) or products (milk, eggs, honey) is lower than or equal to the MRL.

Acceptable Daily Intake is the amount of a residue that is considered safe for a person to eat every day over a lifetime.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background

Poultry farming is the raising of domesticated birds such as chicken, turkeys, ducks and geese, for the purpose of farming meat or eggs for food. Poultry are farmed in great numbers with chicken being the most numerous. Chicken are raised as a source of food, for both their meat and their eggs. Poultry industry is world-wide well-developed and is the largest supplier of animal protein in the form of meat and egg (Law & Payne, 1996).

The Food and Agriculture Organization of the United Nations estimated that in 2002 there were nearly sixteen billion chickens in the world. The figures from the Global Livestock Production and Health Atlas for 2004 were as follows: China (3,860,000,000), United States (1,970,000,000), Indonesia (1,200,000,000), Brazil (1,100,000,000), India (648,830,000), Mexico (540,000,000) and Nigeria (143,500,000).

In 2009 the annual chicken population in factory farms was estimated at 50 billion. With 6 billion raised in the European Union, over 9 billion raised in the United States and more than 7 billion in China.

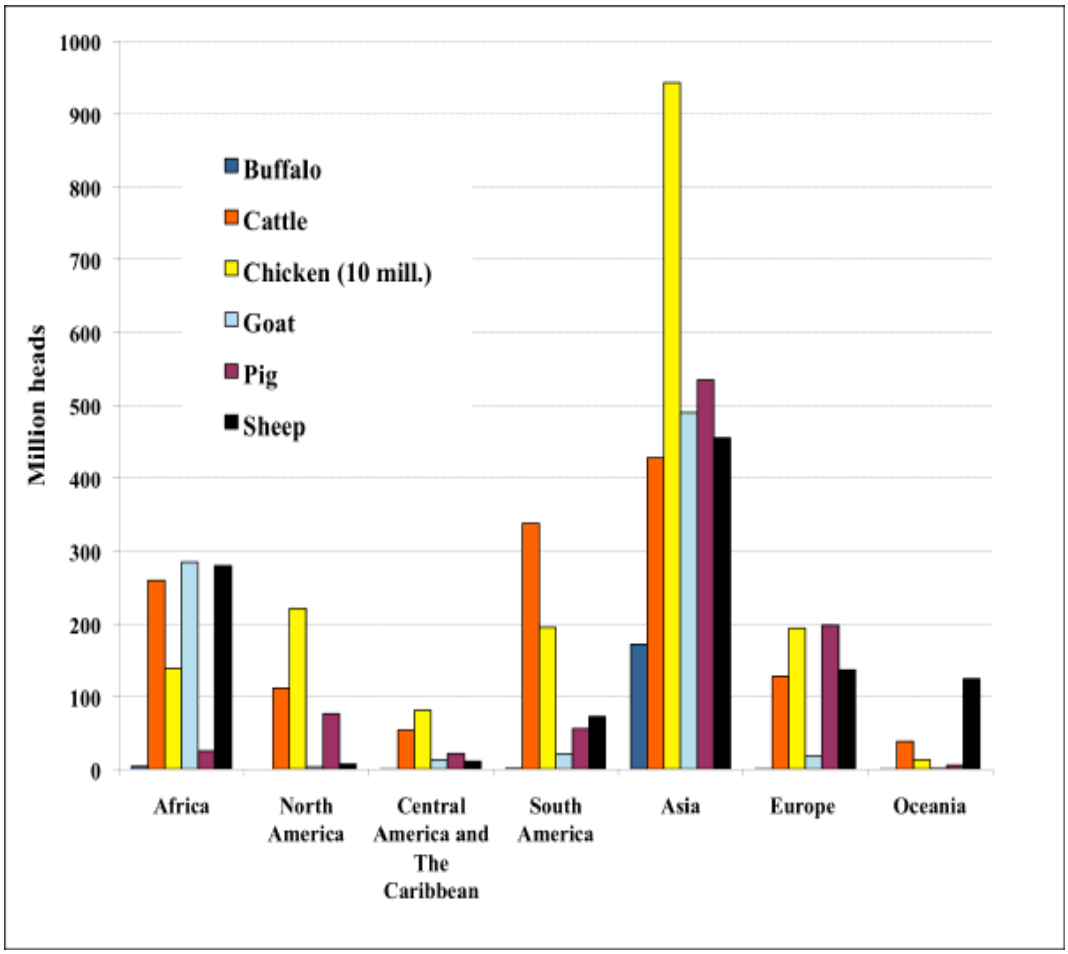


**Figure 1: World Livestock population by regions in 2007**

Source: FAO (2009)

The poultry industry in Tanzania like any other developing country consists of traditional and commercial production system (Goromela *et al.*, 2007). The poultry population in Tanzania is estimated to be 58 million birds which include 23 indigenous, 35 commercial and 1.2 million ducks (Msami, 2008). Indigenous chickens are the major types found in the traditional system and covers over 70% of the national flock, supplying most of the poultry meat and eggs consumed in rural areas and about 20% in urban areas (Minga *et al.*, 2001; Msami, 2008). The productivity of commercial chicken is very high and its production is always concentrated in big cities and towns, contributing more than 80% of all eggs consumed in urban and peri-

urban areas (Msami, 2008). Chicken farming in Tanzania is growing due to increased demand of poultry meat and eggs for protein supplementation (Nonga *et al.*, 2009). However, both commercial and traditional poultry systems are constrained by diseases as a consequence to poor quality feeds, inadequate technical support services and low genetic potential of the local (Njombe and Msanga, 2010; Lwelamira, 2012).Due to the high frequency of diseases coupled with gross inadequacies in animal health service delivery system in the country, often treatment is done by farmers following the consultation over the counter at veterinary drug outlets. This has increased the likelihood of farmers excessively using antimicrobials in treatment and control of diseases (Kurwijila et al., 2006). This might result in drug residues accumulating in both meat and eggs. When such drugs are administered by nonprofessionals without proper instructions from the professionals, correct dosages as well as withdrawal period are unlikely to be observed. This misuse of antimicrobials is a potential hazard to human health. Several studies on antimicrobial residues in foods of animal origin in Tanzania have been conducted and the results shows that there were antimicrobial residues in the tested samples from the animal which was treated recently (Mmbando, 2004, Karimuribo *et al.*, 2005; Kurwijila *et al.*, 2006, Simon, 2007).

Withdrawal period is the period required to elapse between the last dose administered and when animal's product can be taken for human consumption. In reference to this study, a withdrawal period is the period required to elapse between the last dose of antimicrobial administered and when eggs and meat can enter the food chain. Until the withdrawal period has elapsed, the animal or its products must not be used for human consumption. The time that must elapse after the last treatment of a veterinary medicine before an animal can be slaughtered, or the animal product can be taken, for human consumption is calculated from data collected in scientific studies. These studies determine how rapidly the marker residue is depleted from edible issues and edible products and how quickly the levels of the marker residue fall to below the MRLs. Sometimes an "uncertainty factor" is included in the determination to allow for inconsistencies in the data and differences between individual animals. A withdrawal period is set for each veterinary medicinal product intended to be used

in food producing species so that the residues in each food will be below the relevant MRL and, therefore, ensure no risk to consumer health (VMD, 2009).Withdrawal period for a veterinary medicine is there for a purpose to ensure consumer safety. Farmers and veterinarians who do not respect withdrawal periods or misuse substances that they are handling are breaching their responsibility as partners in the food chain (NOAH, 2012).

The labels for the respective veterinary drug product must include warning statements that highlights the human safety related issues on its use. These include withdrawal periods for tissues or withholding times for eggs, when applicable. When a drug is used in a food producing animal, the specified withdrawal period or the withholding time must be observed before the animal is slaughtered or the egg is harvested for use as food to allow the residues to deplete below the MRL (TFDA, 2003).

Withdrawal periods are a large driver when it comes to antimicrobial treatment selection for all species produced for food. The length of some product withdrawal periods can be longer than the production life expectancy of some species (broiler poultry). As a result antimicrobial selection tends to encourage the use of those products with a short or no withdrawal period e.g. Tylosin and tiamulin in laying hens. It is only on very rare occasions (and usually after use of a zero withdrawal product has failed to address the clinical problem) that a product with an egg withdrawal would be used in laying poultry(VMD, 2009).

The use of antimicrobial drugs went along with non-compliance to the recommended withdrawal periods. Apart from using antimicrobial agents, a significant number of farmers reported not to comply with the recommended drug withdrawal periods (James *et al.,* 2005). The non-compliance to withdrawal period by farmers could be associated with many reasons including fear of losses. Most of the poultry keepers are subsistence farmers and since there is frequent occurrence of diseases which needs regular uses of drugs, observing withdrawal period could lead to more losses. The other reason which could be considered is lack of awareness to farmers on the possible side effects of antimicrobials and other drugs to humans (Nonga *et al.,* 2009).

Veterinary antimicrobial residues are considered to be public health hazards. Human accidentally receives different amounts of these drug residues which can consequently cause a number of health effects. For example, penicillin in chicken was reported to cause severe anaphylactic reaction in some consumers (Teh and Rigg, 1992). Nitrofuran drugs commonly employed for the treatment of salmonellosis and other bacterial infections in livestock are banned for use in livestock feed in many countries, because of their mutagenic potentials (NAFDAC, 1996). The WHO has recommended the prohibition of use of chloramphenicol in all food producing animals (Settepani, 1984). Non detected effects of antimicrobial residues in human communities are revealed by a wide spectrum resistance to antibiotics as a chronic effect (Simonsen *et al.,* 1998). An outcome of resistance to antibiotics is necessity to new antibiotics for controlling infectious diseases of human (Kotretsu, 2004). Surveys indicate that most antimicrobial residues are generally found at levels below 1 parts per billion (ppb) (Mac Cracken *et al.,* 1976), but even at these low concentrations they may have an effect on the human gut flora. For example, 225 people in Jalisco, Spain reported symptoms of trembling, headache and malaise after consuming meat with antimicrobial residues (Doyle, 2006).

In order to ensure safety of global health, the international recognized bodies such as Codex Alimentarius Commission which is a Joint FAO/WHO body for food standardization and the European Union have set tolerance or Maximum Residue Limit (MRLs) and Acceptable Daily Intake (ADI) for humans and withdrawal periods for pharmacologically active substances including antimicrobial agents prior to marketing (Reig and Toldrá, 2008; Turnipseed and Andersen, 2008; Peters *et al.*, 2009). The antimicrobial residues in animal tissues above maximum residue limit (MRLs) clearly have an impact on human health. Concern has been expressed about possible harmful effects on humans through the extensive indiscriminate use of antimicrobial drugs (Simonsen *et al.*, 1998).

Elsewhere in Tanzania, some studies have reported the presence of antibiotic residues in chicken eggs and meat (Nonga *et al*., 2009) in milk and beef (Karimuribo *et al*., 2005; Kurwijila *et al*., 2006), in beef (Mmbando, 2004). Dar es Salaam being among the leading region in urban and peri urban for keeping chickens has limited information on the veterinary antimicrobial drug use in chicken, awareness of farmers on drug withdraw period and possible

health effects of antimicrobial residues to chicken consumers. Therefore this study will establish the baseline information on the general uses of veterinary antimicrobials in chicken, establish farmers awareness on drug withdraw period and knowledge on effects of antimicrobial residues to consumers in Dar es Salaam, Tanzania. The findings were expected to be useful in supporting initiatives for public health educational interventions on health hazards associated with antibiotic residues and open doors for further study on magnitude of the antibiotic residues problem.

## 1.2 Research problem

Use of veterinary antimicrobials in chicken production has recently become a very important public health issue since it may results in drug residues in eggs and meat and stimulation of microbial resistance to antimicrobial when chicken are culled for human consumption. The presence of the antimicrobial residues in chicken products could be due to perception of farmers regarding the recommended antimicrobial withdrawal periods, poor animal health services delivery, lack of food quality assurance systems and lack of awareness of poultry keepers on human health risks associated with consumption of eggs or meat which contains antimicrobial residues.

In Tanzania, legislations regarding antibiotic drug application in farm animals as well as monitoring and control of their residues are not adequately enforced (Nonga *et al.*, 2009). The inadequacy has probably led to the reported high rates of antimicrobial residues in poultry products. For example, 100% of screened eggs were positive for antimicrobial residues in a study conducted in Morogoro, 2010 (Nonga *et al.*, 2010). Another study also conducted in Morogoro, 2009 indicated that 50% of broiler tissues were positive while 70% of the chicken farms visited were positive to antimicrobial residues (Nonga *et al.*, 2009). In addition, studies conducted in the same region reported elevated levels of antimicrobial residues in milk, beef and chicken meat (Kurwijila *et al.*, 2006). Dar es Salaam is the largest producer and consumers of commercial chicken products in Tanzania (Msami, 2008), but information related to awareness of antimicrobial withdrawal periods among poultry keepers in the city is not available. To address this gap, this study was conducted to assess awareness of poultry keepers on antimicrobial withdrawal period in Ilala Municipal.

### 1.3 The conceptual framework of the study

The conceptual framework of the study shows that lack of awareness of poultry keepers on antimicrobial withdrawal periods and human health hazards resulted from lack of advice on withdrawal periods from livestock extension officers, drug sellers and low literacy level amongst poultry keepers in Ilala Municipal.

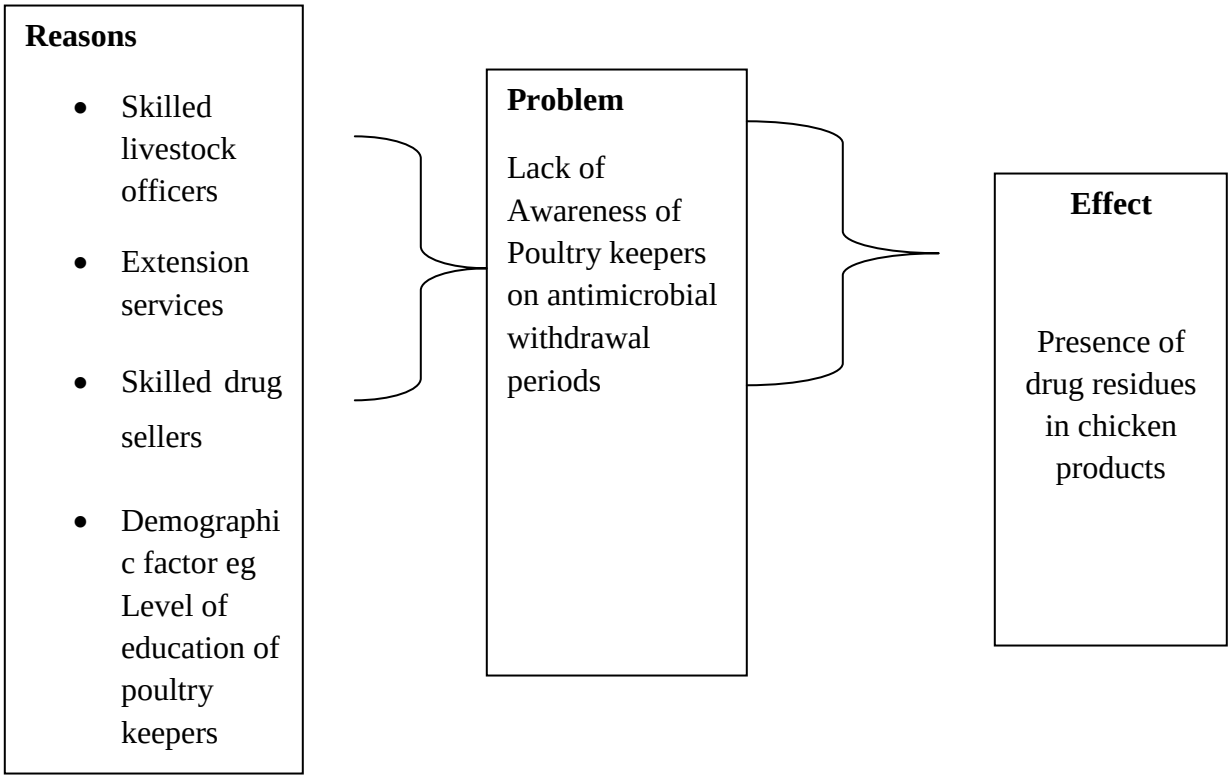


**Figure 2: The conceptual framework of the study**

### 1.4 Rationale of the study

Academically the findings of the study are expected to strengthen knowledge/awareness of poultry keepers on antimicrobial withdrawal period.

In policy making the Ministry of Healthy in Tanzania can use the findings from this study to review livestock policy related to antimicrobial use in poultry production.

The study findings may also inspire and raise other researchers' curiosity to conduct large-scale studies in this area.

The research is part of the partial fulfillment of the requirement of the award of Masters of Public Health.

The study was anticipated to generate baseline scientific data that would add knowledge to the poultry keeper's awareness on withdrawal periods and health effects of drug (antimicrobial) residues.

The study would also form basis for airing of health education interventions to poultry keepers and general public on the issues related to drug withdrawal periods and possible health hazards.

In addition the study would possibly fill the existing gaps on the association between presence of drug residues in eggs collected from the market and the poultry keeper's awareness on withdrawal periods.

## 1.5 Objectives

### 1.5.1 Overall objective

To assess awareness of poultry keepers on antimicrobial withdrawal periods in chicken and human health hazards associated with antimicrobial residues in Ilala Municipal

### 1.5.2 Specific objectives

1. To assess awareness of poultry keepers on recommended antimicrobial withdrawal periods in Ilala Municipal
2. To assess awareness of poultry keepers on antimicrobial residues in chicken eggs and meat
3. To assess the awareness of poultry keepers on human health hazards associated with antimicrobial residues.
4. To identify sources of information on antimicrobial withdrawal periods to the poultry keepers in Ilala Municipal.
5. To determine the commonly used veterinary antimicrobials in chicken in Ilala Municipal.

**Outcome variable (Dependent variables)**

Awareness of Poultry keepers' on the recommended antimicrobial withdrawal periods

**Independent variables (reasons)**

- Availability of advice from skilled livestock officers
- Availability of extension services
- Demographic variables
- Skilled drug sellers

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Poultry population

Poultry industry plays a significant role in the economy of agricultural households in Tanzania. Poultry industry generates considerable amount of cash income and determine the household economic and social status in many communities. Poultry population in Tanzania is estimated to be 44,240, 371 million chickens which comprising 42,470,756 traditional chickens and about 1,769,615 commercial birds (broiler and layers chicken) (National bureau of statistic, 2007/2008). According to the National Sample Census of Agriculture of 2002/2003, out of 4, 901,837 households in Tanzania, (62%) keep chickens and of these, (99%) of which are indigenous chickens. Based on that statistic, there is no doubt that the poultry industry may be a major source of household income generation.

According to 2002 data of Food and Agriculture Organization of the United Nations it was estimated that there were nearly sixteen billion chickens in the world, counting a total of 15,853,900,000. Furthermore figures from the Global Livestock Production and Health Atlas for 2004 shows the following; China (3,860, 000,000), United States (1,970,000,000), Indonesia (1,200,000,000) Brazil (1,100,000,000), India (648,830,000), Mexico (540,000,000) and Nigeria (143,500,000)

## 2.1 Awareness of poultry keepers on antimicrobial withdrawal periods

Withdrawal period is the period required to elapse between the last dose administered and when animal's product can be taken for human consumption. Until the withdrawal period has elapsed, the animal or its products must not be used for human consumption. The time that must elapse after the last treatment of a veterinary medicine before an animal can be slaughtered, or the animal product can be taken, for human consumption is calculated from data collected in scientific studies. These studies determine how rapidly the marker residue is depleted from edible issues and edible products and how quickly the levels of the marker

residue fall to below the MRLs. Sometimes an "uncertainty factor" is included in the determination to allow for inconsistencies in the data and differences between individual animals. A withdrawal period is set for each veterinary medicinal product intended to be used in food producing species so that the residues in each food will be below the relevant MRL and, therefore, ensure no risk to consumer health. (VMD, 2009).Withdrawal period for a veterinary medicine is there for a purpose to ensure consumer safety

Awareness of poultry keeper on withdrawal periods of antimicrobial drugs has a significant contribution to the absence of drug residues in chicken products. Furthermore involvement of the drug regulatory institution may have contribution towards awareness of farmers on withdrawal periods. The study conducted in Ghana established that where no regulatory legislation or mechanisms are in place for drug approval and use or for a residue monitoring it is possible to have the occurrence of drug residues in chicken products (Turkson, 2001).

Under a certain circumstances withdrawal periods might not be adhered to despite the awareness. A study carried out in Uganda to assess the possible contribution of the knowledge, attitudes and practices of poultry farmers to the presence/levels of sulfonamide residues in chicken eggs revealed that (95%) of the farmers never observed withdrawal periods although 80% of them knew the importance of withdrawal periods (James *et al.*, 2005).

Similar observations were reported in Uganda (Sasanya *et al.*, 2005), Sudan and Ghana (Annan-Prah *et al.*, 2012; Sirdar *et al.*, 2012c).

Non adherence to antibiotic withdrawal periods is the major causatives of antimicrobial residues in foods of animal origin (Donoghue, 2003; Doyle, 2006; Passantino and Russo, 2008; Young *et al.*, 2010).The non-compliance to withdrawal period by farmers could be associated with many reasons including fear of losses. Most of the poultry keepers are subsistence farmers and since there is frequent occurrence of diseases which needs regular

uses of drugs, observing withdrawal period could lead to more losses. The other reason which could be considered is lack of awareness to farmers on the possible side effects of antimicrobials and other drugs to humans.

Furthermore, some farmers thought adherence to withdrawal period is a voluntary issue rather than regulatory one. It is therefore important for regulatory authorities to make it clear to producers that observation of drug withdrawal periods shall not be left a voluntary issue but mandatory one (Löhren *et al.*, 2009). Administration of drugs to foodproducing animals requires not only consideration of effects on the animal but also the effects on humans who ingest food from these animals. In the present study, the 70% detection of antimicrobial residues in chicken meat suggests that the public hasbeen ingesting low level of antibiotics continuously in the animal products (Mmbando, 2004).

**2.2 Awareness of farmers on antimicrobial residues and health effect**

Antimicrobials are used by the poultry industry to enhance growth and feed efficiency and to reduce bacterial disease but lack of proper application and handling can lead to occurrence of residues in food of animal origin particularly meat and eggs (Donoghue, 2003). In poultry, antimicrobials are used to treat and to prevent bacterial infections. Antimicrobial classes used to treat poultry are similar to those used in human medicine and include aminoglycosides, tetracyclines, beta-lactams, quinolones, macrolides, polypeptides, amphenicols and sulphonamides (Stolker & Brinkman, 2005). Chickens treated with antibiotics and their edible products are required to be held for specific withdrawal period until all residues are depleted to safe level before the animal tissue can be used as food for human consumption (KuKanich et al., 2005).

Antimicrobial residues may have a direct toxic effect on consumers, for example allergic reactions in hypersensitive individuals (Dayan, 1993; Ormerod, Reid & Main, 1987; Woodward, 1991). It has become necessary, therefore, that regulations are in place to ensure that antimicrobial residues are not present in animal products for human consumption at levels that may affect human health detrimentally.

In Tanzania, legislations regarding antibiotic drug application in farm animals as well as monitoring and control of their residues are not adequately enforced (Nonga *et al.*, 2009). The inadequacy has probably led to the reported high rates of antimicrobial residues in poultry products. For example, 100% of screened eggs were positive for antimicrobial residues in a study conducted in Morogoro, 2010 (Nonga *et al.*, 2010). Another study also conducted in Morogoro, 2009 indicated that 50% of broiler tissues were positive while 70% of the chicken farms visited were positive to antimicrobial residues (Nonga *et al.*, 2009). In addition, studies conducted in the same region reported elevated levels of antimicrobial residues in milk, beef and chicken meat (Kurwijila *et al.*, 2006).

Internationally recognised organisations such as the World Health Organisation (WHO), Food and Agriculture Organisation (FAO), Veterinary Medicine Directorate (VMD) of the European Union (EU), as well as the Food and Drug Administration in the USA (FDA), have set maximum tolerance levels or acceptable daily intakes (ADIs) for humans, and withholding times for pharmacologically active substances, including antimicrobial agents, prior to marketing (Al- Ghamdi *et al.*,2000). Surveillance systems should be in place in conjunction with these regulations to ensure that these standards are met and that analyses can detect antimicrobials at less than the maximum residue levels.

### 2.3 Use of antimicrobials in poultry

Antimicrobial are used largely for three purposes in poultry: therapeutic use to treat sick chicken, prophylactic use to prevent infection in chicken, as growth promoters to improve feed utilization and production. In general, therapeutic treatment involves treatment of individual chicken over a short period with doses of antimicrobial exceeding the minimal inhibitory concentration of the known or suspected pathogen. Sometimes with intensively farming, therapeutic treatment is delivered by feed or drinking water, however this treatment can be of doubtful efficacy in some situations, as sick chicken often do not drink or eat. Prophylactic treatment involves moderate to high doses of antimicrobial, often given in feed or water for a defined period to a group of chicken. Antibiotics used as growth promoters tend to be given in feed at sub therapeutic levels over extended periods to entire flocks and are available for

purchase over the counter by feed manufacturers and farmers. It is important to note that sub therapeutic levels generally still exceed the minimal inhibitory concentration of enteric organism such as Clostridium perfringens and Enterococcus spp. (Van den Bogaard & Stobberingh et al., 1999).

Concern about use of antibiotics in food producing animals and the possible impact on human health covers two major issues: the antibiotic agents that are used; the way in which they are used. There is a concern that antibiotics that are important in human medicine should not be used therapeutically in food producing animals, particularly for mass medication. Prophylactic use presents a problem on two grounds: the antibiotic agents used lack of definition of what is the appropriate duration of prophylactic use. Growth promotant used is probably the area of highest concern, as some of the antibiotics used are now regarded as compromising the efficacy of some key human antibiotics and the duration of treatment may be for the whole of the treated animals (Barton, 2000).

### 2.4.1 Commonly used antimicrobial in chicken

The study done in Sudan (Mohamed, 2010) in commercial laying hens shows that almost all the antibiotic classes were found in the Sudanese market for purchase either as separate products or as product with a combination with multivitamins and minerals, the most commonly used antibiotic was Oxytetracycline 24.5% in current use and 22.9% used in the last three months.

These findings agree with (Mitema et al., 2001), which shows that oxytetracycline appears to be widely used on poultry farm in Africa.

The popularity of tetracycline and sulfonamides emanates from their availability at affordable price in different proportions as a single parent drug or in combinations with other different antibiotic agents, vitamin and minerals. The popularity of tetracycline and sulfonamides in poultry industry was also reported in other studies conducted in Morogoro, Tanzania (Nonga *et al.*, 2009) and in other countries such as Kuwait, Saud Arabia, Sudan and Kenya (Al-Ghamdi *et al.*, 2000; Al-Mazeedi *et al.*, 2010; Sirdar, 2010).

The most frequently used antimicrobial drugs by poultry keepers in Dar es Salaam city belong to the group of tetracycline and sulfonamides. Furthermore, some prohibited antimicrobial agents like furazolidone were found in some veterinary drug stores and poultry farms (Mubito, *et al*., 2014).

Other commonly used antimicrobials is tylosin (18.7%) which is used to treat infectious coryza and mycoplasma infections in poultry, the broad-spectrum enrofloxacin (14.3%) and colistin (14.3%) which is used to treat diarrhea (Reinhardt et al., 2005)

**2.4 Regulatory controls of antimicrobial use**

Controls vary from country to country for example, in Australia there are three points of control of antibiotic use in food producing animals first, all importations are controlled by a permit system, second at the registration level, and there are strict regulatory guidelines over which antibiotics can be used in food producing animals. Since 1970, antibiotics intended for animal use have been assessed for their potential to compromise human health. As a results fluoroquinolones, amphenicols, colistin and gentamicin have not been registered for use in food producing animal because of concerns about antibiotic resistance and the registration of carbadox was withdrawn in the late 1980s and of nitrofurans in 1992 because of concerns about carcinogenicity (Linda et al., 1999). Finally, there is control of use legislation that restricts antibiotics registered for therapeutic or prophylactic use to registered veterinary surgeons, but allows over the counter sales to farmers or stock feed companies of products registered for use as growth promoters.

Agricultural use of antibiotics in the USA and Canada is also regulated. There are three categories of use: as feed antibiotics; as over the counter drugs as veterinary prescription drugs. Feed antibiotics include antibiotics used as growth promoter and those used for sub-therapeutics (including prophylactic and some growth promoter) and therapeutic purposes (Prescott, 1997). Feed antibiotics are licensed for specific uses such as for meat chickens or young pigs or calves or feedlot cattle.

In the UK and other EU countries, antibiotics are authorised as either veterinary medical productsor zootechnical feed additives. Veterinary medicinal products and growth promoters are subject to assessment for safety, including residues (veterinary medicines) and the risk of emergence of antibiotic resistance, cross resistance to therapeutic antibiotics and selection for transferable resistance (both veterinary medicines and growth promoters (Rutter, 1997). Other European countries outside the EU have their own regulations.

China has regulated the use of antibiotics in animal feeds since 1989 and only non-medical antibiotics are permitted as feed additives. Antibiotics used include monensin, salinomycin, destomycin, bacitraci, colistin, kitasamycin, enramycin and virginiamycin. However in practice, other antibiotics such as tetracyclines are used and the mycelial by products from the production of antibiotics are incorporated into animal feeds (Jin, 1997). Russia also restricts feed antibiotics to non-medical drugs; bacitracin, grizin and virginiamycin are registered for use in this way (Panin et al., 1997)

**2.5 Potential hazards of drugs residue to human being**

The antibiotic residues when taken above the MRL can cause a number of health hazards and these include the emergence of resistant strains of bacteria in birds which may be passed via food chain to humans, production of harmful effects from direct toxicity or from the allergic reactions (hypersensitivity reactions) in persons already sensitized to them (Ladefoged, 1996).

Some drugs and/or their metabolites possess carcinogenic potential e.g. meat preserved with sodium nitrate and contains sulphamethazine residues, may develop a triazine complex that has a considerable carcinogenic potential (Ladefoged, 1996). Other effects are like prolonged ingestion of tetracycline in food has detrimental effects on teeth and bones in growing children. It is pertinent to mention that except for some tetracyclines; most therapeutic antibiotics are relatively heat stable and resist both pasteurization and cooking process (Booth and Harding, 1986).

There have been also several reports on drug residues to destroy useful microflora of gastrointestinal tract, especially in children and hence lead to enteritis problems (Ladefoged, 1996).

The heavy reliance on antimicrobials, animal production has resulted in bacterial resistance to many modern used for life-threatening diseases in human. As a consequence the transfer of antimicrobial resistance from food animals to humans or the presence of antimicrobial residues in food of animal origin is now perceived to be a threat to human health (Hughes and Heritage, 2007)

**2.6 Empirical Studies**

Various empirical studies on awareness of antimicrobial withdrawal periods in poultry particularly in laying hens have been conducted over the years. Various scholars such as James 2005, Nonga et al., 2009, zwald et al., 2004 and Mohamed, 2010 were concerned on awareness of antimicrobial residues in laying hens.

In 2010 Mohamed in his study on Antibiotic residues in commercial layer hens Khartoum state. The study showed that there is a serious lack of knowledge about the dangers of using antibiotics in animals and their potential impacts on human health. This leads the author to conclude that all Sudanese consumers are at risk for antimicrobial residues in eggs.

James et al. 2005 in his study on the use of sulfonamides in layers in Kampala district, Uganda and Sulfonamide residues in commercial eggs, the results showed that Ninety-five percent of the farmers never observed withdrawal periods although 80% of them knew the importance of withdrawal periods. However, farmers noted that they play a great role in ensuring a safe food supply. Most farmers attributed the non-observance of withdrawal periods to poverty and fear to lose their investments

Nonga et al., 2009 assessed usage of Antimicrobial Residues in Broiler Chickens in Morogoro Municipality, Tanzania the results showed that ninety percent of the respondents had knowledge on antimicrobial withdrawal period. However, 95% of farmers slaughtered their chicken before withdrawal period because they were afraid of losses and were unaware of the effects of antimicrobial residues in humans.

In his study, Zwald et al., 2004 to dairy farmers in Minnesota, Michigan, Wisconsin and New York in USA on the antibiotic use, the results showed that veterinary extension services have a significant impact on awareness to withdrawal periods on drugs. The primary sources of information about antibiotic use, dosage and withdrawal times were veterinarians and that other prominent sources of information were personal experiences and product labels.

Also Turkson PK, (2008), designed his study to assess the extent of drug and antibiotic use in small and large commercial poultry producers in Ghana, and the extent of the knowledge, perceptions and practice of drug withdrawal period in poultry production. In all, 483 poultry farmers in Greater Accra, Ashanti and Central regions were interviewed using a prepared questionnaire. The results showed that nonobservance on withdrawal periods in Ghana were mainly economic or ignorance and lack of knowledge. The study brought out issues on withdrawal period and drug management practices that will help reduce or avoid residues in eggs and meat, and need to be tackled seriously.

Other studies have reported the presence of antibiotic residues in milk and beef (Karimuribo *et al*., 2005; Kurwijila *et al*., 2006), in beef (Mmbando, 2004) and had less important on the awareness on antimicrobial withdrawal period in laying hens in Tanzania.

## 2.7 Research gap

Empirical reports on awareness of antimicrobial withdrawal period in laying hens in developing countries especially Tanzania is quite limited. Among the available few studies in Tanzania do not touch directly on the awareness of antimicrobial withdrawal periods on commercial layer keepers, instead they present issues on dairy animals and broilers. It is upon these premises that this study is designed to fill these gaps in the body of poultry farmers.

# CHAPTER THREE

# METHODOLOGY

## 3.1 Study Area

The study was conducted in Ilala Municipal which is one of the three municipals in Dar es Salaam City. The Municipal was established as an autonomous body in year 2000. It covers 210 sq.km of land

The municipal is divided into 3 divisions, 22 wards and 65 sub-wards, 9 villages and 37 hamlets with a total of 3450 poultry keepers and 163,500 Chickens.

The population census conducted in 2002 indicated that Ilala has a population of 634,924 peoples (National Bureau of Statistics, 2003). Therefore Ilala municipal has been chosen for this study because of having highest number of poultry keepers (3450) with highest number of chicken (163,500) in Dar es Salaam city. That being the case there is no doubt that eggs and meat produced from Ilala are also supplied in large area of Dar es Salaam.

## 3.2 Study design

The study used descriptive cross sectional survey design to assess awareness of poultry keepers on antimicrobial withdrawal periods, antimicrobial usage and source of information on antimicrobial withdrawal period in chicken in Ilala Municipal.

## 3.3 Study population

Small scale poultry keepers in Ilala Municipal (both women and men) who keep 100 chicken or more were involved in the study

### 3.3.1 Inclusion criteria

The small scale poultry keepers (both women and men) who keep 100 chicken and more were included in the study

### 3.3.2 Exclusion criteria

Small scale poultry keepers who keep chicken less than 100 were excluded from this study

## 3.4 Sample size

The sample size in this study was obtained from the single proportion formula.

The estimated proportion (p) was 80% (James et al, 2005), the margin of error on p estimated as 5% and considered at 95% confidence level.

Using $n = \frac{z^2 p(100-p)}{å^2}$

- $\frac{1.96^2 80(100-80)}{5^2}$ = 245small scale poultry keepers.
- Z is the point of the normal distribution corresponding to the level of significance.
- P is the estimated proportion of small scale poultry keepers who are aware of antimicrobial withdrawal period in chicken.
- **å** is the margin of error
- No response rate 10%

Setting the margin of error on p as 5% and considering a 95% confidence level in the estimate of the proportion of small scale poultry keepers and adding 10% of no response rate, the above formula yields a minimum required sample size of about 269 small scale poultry keepers.

## 3.5 Sampling method

A two level multistage sampling technique was employed as follows:

***Stage I***

This stage involved selection of study wards within Ilala Municipal. The wards were obtained by simple random sampling. The selected wards were namely; Kitunda, Kivule, Kipawa, Segerea, Pugu, Majohe, Msongola, Gongo la Mboto, Chanika and Ukonga.

***Stage II***

This stage involved obtaining poultry keepers from each of the selected study ward in stage I. within a ward; the list of poultry keepers was used as a sampling frame from which respondents was randomly picked by using a table of random number.

### 3.6 Data Collection Techniques

Despite the fact that there are many techniques to collect data, depending on research design and the methodologies employed this study used interview and observation in gathering information.

#### 3.6.1 Interview

The study used face -to- face interview to the selectedpoultry keepers to obtain data regarding type of antimicrobials used, awareness on recommended antimicrobial withdrawal period, antimicrobial residues and related health hazards and sources of informationon antimicrobial withdrawal periods and drug residues to poultry keepers in Ilala.

#### 3.6.2 Observation

Observational guide was employed to establish the type of antimicrobials used during the time of survey, labels, packets/sachets and empty bottles of antimicrobials were collected and the data was recorded.

### 3.7 Data collection tools

A structured questionnaire (Appendix III) was used to obtain the information on awareness of antimicrobial withdraw periods and drug residues to the small scale poultry keeper in Ilala.

#### 3.7.1 Questionnaire

A questionnaire instrument was designed by the researcher and administered to the selected small scale poultry keepers in the study area with the help of one recruited research assistant with a diploma qualifications/certificate on animal health. The set questionnaire was made up of five parts namely: Socio-demographic information, awareness on antimicrobial residues

and recommended antimicrobial withdrawal periods, sources of information on antimicrobial withdrawal periods to poultry keepers and awareness of small scale farmers on health hazards of antimicrobial residues.

### 3.8 Pretesting of data collection tools

The preliminary study survey was done to test the clarity, sequence of the questions and the discussion guides proposed as well as estimated time for each questionnaire. Few small scale poultry farmers (5% of the study sample size) from other wards which were not selected in the study were visited. The questionnaire used in the study was translated into 'Kiswahili', the national language understood by majority of Tanzanians.

### 3.9 Data management

Data handling and control of the quality

Monitoring of questionnaires filling was the main obligation of the researcher in order to ensure that data collected were of good quality. Nevertheless, the researcher was making clarifications on questions that were unclear to the research assistant in order to ensure the data quality. Generally supervision of questionnaire filling minimized the chances of having poor data that don't answer the research objectives. Manual data cleaning was done to check for accuracy and completeness of the Questionnaires

### 3.10 Data processing and analysis

The collected data on questionnaires were processed, edited and coded using Microsoft word2007.Open ended questions were coded and categorized before data analysis. Data were analyzed by using statistical package for social science (SPSS version 15). Frequency distribution and two-way tables were used to summarize the data. Associations between several factors were measured using Chi-square test and fisher exact test for proportions. All the analysis was two- tailed and P value $< 0.05$ was considered to be significant.

### 3.10 Ethical consideration

The institutional ethical approval for the proposed study was sought from the Directorate of Research and Publication of the Muhimbili University of Health and Allied Sciences. The permission to conduct the study was sought from the Executive Director of the Ilala Municipal Council. Participation in the study was on voluntary basis given that information for participation and significance of the study was clearly explained orally to participating SSF. Individual informed consent was sought from participants and data was under the custody of the researcher.

# CHAPTER FOUR

# RESULTS

## 4.1 Demographic Characteristics of study participants

The study involved 269 Small scale poultry keepers in Ilala Municipality. This represents 100% of all participants who were supposed to participate in the study. Among 269 respondents, 38.7% were males and 61.3% were females. The study further shows that 84.8% of the respondents were the owner of the project and the rest were the family member and attendants, being the owner of their projects, aided in the provision of right information regarding to the antimicrobial use and withdrawal periods. (See Table.1).

The mean age of the respondents was 43 ±7.2.The largest proportions of the respondents were small scale poultry keepers (63.6%), followed by employee (23%) and petty business (8.2%), this presents that different people are involved in commercial chickens production. (As presented in Table 1).

**Table 1: Demographic characteristics of study participants**

| Characteristic | Female (%) | Male (%) | Total (%) |
|---|---|---|---|
| Sex | 165 (61.3) | 104 (38.7) | 269 (100) |
| Age Group (Years) | | | |
| 31-40 | 65 (39.4) | 28 (26.9) | 93 (34.6) |
| 41-50 | 78 (47.3) | 65 (62.5) | 143 (53.2) |
| 51+ | 22 (13.3) | 11 (10.6) | 33 (12.2) |
| Total | 165(100) | 104 (100) | 269(100) |
| Level of education | | | |
| No formal education | 10 (6.1) | 10 (9.6) | 20 (7.4) |
| Primary | 71 (43.0) | 12 (11.5) | 83 (30.9) |
| Secondary | 36 (21.8) | 6 (5.8) | 42 (15.5) |
| Certificate level | 15 (9.1) | 34 (32.7) | 49 (18.2) |
| Diploma | 15 (9.1) | 21 (20.2) | 36 (13.4) |
| Degree | 18(10.9) | 21 (20.2) | 39 (14.5) |
| Total | 165 (100) | 104 (100) | 269 (100) |
| Occupation | | | |
| Poultry farmers | 108(65.5) | 63 (60.6) | 171 (63.6) |
| Employed | 34 (20.6) | 28 (26.9) | 62 (23.0) |
| Petty business | 13 (7.9) | 9 (8.7) | 22 (8.2) |
| Others | 10 (6.1) | 4 (3.8) | 14 (5.2) |
| Total | 165(100) | 104 (100) | 269 (100) |
| Position in the project | | | |
| Owner | 139 (82.2) | 89 (85.6) | 228 (84.8) |
| Family member | 12 (7.1) | 9 (8.7) | 21 (7.8) |

| | | | | |
|---|---|---|---|---|
| Worker | 14 (8.3) | 6 (5.7) | 20 (7.4) | |
| Total | 165 (100) | 104 (100) | 269 | (100) |

### 4.2 Awareness of poultry keepers on recommended antimicrobial withdrawal periods

Among 269 (100%) respondents, 199 (74.0%) were not aware of antimicrobial withdrawal periods while 70 (26%) of the respondents were aware on antimicrobial withdrawal periods. It was observed that those respondents who had knowledge on awareness of antimicrobial withdrawal periods, they got that knowledge from livestock officers thus it is strongly encouraged to strengthen extension services to the poultry keepers who are not aware on the subject matter. (See Table 2).

**Table 2: Awareness of poultry keepers on withdrawal periods and Source of information for withdrawal periods**

| **Variable** | **Frequency** | **Percentage (%)** |
|---|---|---|
| Awareness on withdrawal period (N=269) | | |
| Aware | 70 | 26.0 |
| No aware | 199 | 74.0 |
| Total | 269 | 100 |
| Source of information for withdrawal periods (N=70) | | |
| Livestock officers | 43 | 61.5 |
| Drug sellers | 9 | 12.8 |
| Label of product | 18 | 25.7 |
| Total | 70 | 100 |

### 4.3 Awareness of poultry keepers on antimicrobial residues in chicken product

Among 269 (100%) respondents, 205(76.2%) were not aware of antimicrobial residues. This is supported by 220 (81.8%) farmers who were reported selling and eating eggs during the course of treatment or immediately after last dose of treatment.

(See Table3)

**Table 3: Awareness of poultry keepers on antimicrobial residues**

| Variable | Frequency | Percentage |
|---|---|---|
| Awareness on antimicrobial residues (N=269) | | |
| Aware | 64 | 23.8 |
| No aware | 205 | 76.2 |
| Total | 269 | 100 |
| Consuming eggs during treatment (N=269) | | |
| Yes | 220 | 81.8 |
| No | 49 | 18.2 |
| Total | 269 | 100 |

### 4.4 Awareness of poultry keepers on health hazards of antimicrobial residues

When poultry keepers in the study area were asked if they knew any health hazards of drug residues to consumers, 215 (79.9%) respondents said that they knew nothing regarding any effects, while 54 (20.1%) said that there were possible effects when eggs and meat from chickens treated with antibiotics were consumed. (See Table 4).

**Table 4: Awareness of poultry keepers on health hazards of antimicrobial residues**

| Variable | Frequency | Percentage |
|---|---|---|
| Awareness on health hazards | | |
| Aware | 54 | 20.1 |
| No aware | 215 | 79.9 |
| Total | 269 | 100 |

### 4.5 Commonly used veterinary antimicrobials in chicken production

The study shows that common chicken diseases which necessitated the farmers to frequently use antimicrobials were chronic respiratory disease, coccidiosis, infectious coryza and fowl typhoid. Chronic respiratory disease was reported to be the most important disease that occurred in chickens (81.4%) followed by Coccidiosis (48.3%), Infectious coryza (19.3%) and fowl typhoid (15.6%). (Figure 3)

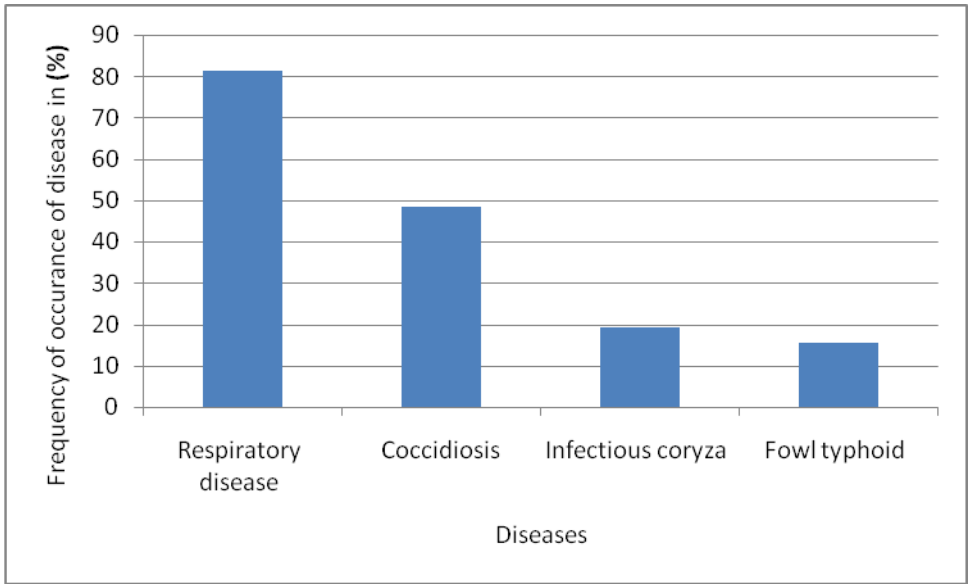

**Figure 3: Common chicken's diseases as reported by poultry keepers in Ilala Dar es salaam**

Several types of antimicrobial were reported to be commonly used by poultry keeper's and belonged to the group of tetracyclines and sulphonamides as shown below.

Oxytetracycline 75.1%, Tylosin 52.0%.Enrofloxacin 49.4%, Sulphadiazine 29.7%,Duoxycycline24.2% and Norfloxacin 13.0%.

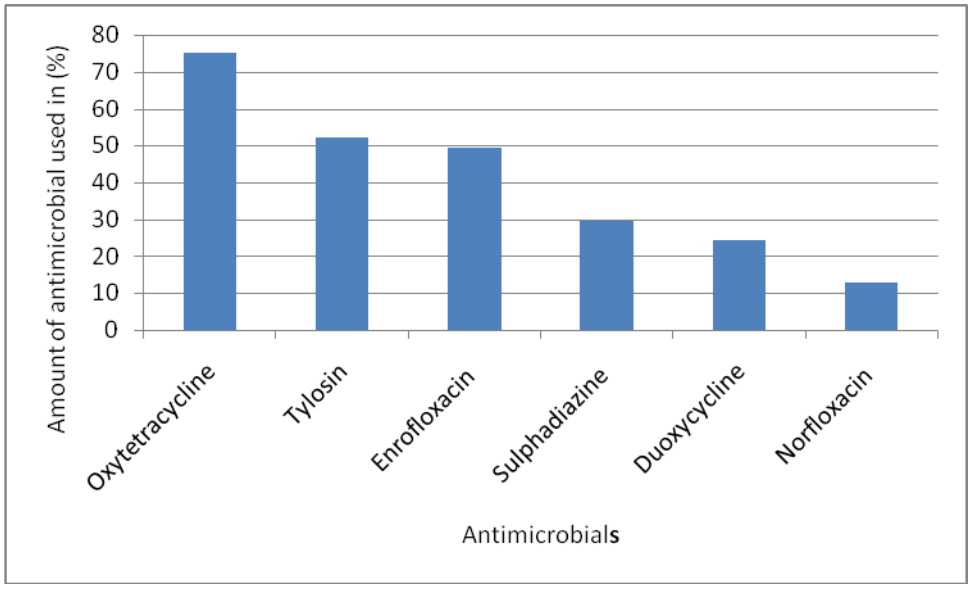


**Figure 4: Commonly used Veterinary antimicrobials in chickens**

## 4.6 Association between age of respondents and awareness of antimicrobial withdrawal periods

The results obtained from this study showed that the age of respondents had no significance association to the awareness on withdrawal periods since at $X^2 = 1.913$,$P$=0.384. However it was observed that the respondents who were at the age (41-50) years formed a largest proportion between respondents who were aware of what the different we see it was just by chance as presented on Table 5.

### 4.7 Association between sex of respondents and awareness on antimicrobial withdrawal periods

Findings from this study indicates that the sex of respondents had no statistical association to the awareness on withdrawal periods *P*=0.572. This shows that awareness of respondents on antimicrobial withdrawal periods might be caused by other reasons (See Table 5).

### 4.8 Association between level of education of poultry keepers and awareness on antimicrobial withdrawal periods

The results showed that there was a significant association between the level of education and awareness on antimicrobial withdrawal periods as shown by the statistical computation of *P=0.001*. It further symbolizes that the higher the level of education, the higher the awareness of poultry keepers on antimicrobial withdrawal periods in Ilala municipal (See Table 5).

### 4.9 Association between awareness of poultry keeper and their main occupation

Thirty two percent of the respondents who were aware of the recommended antimicrobial withdrawal period were petty business. However, the number of respondents who were aware of the antimicrobial withdrawal period was very few compared to poultry keepers. The relationship between occupation and awareness of antimicrobial withdrawal period had showed to have no statistical significance *P* = 0.237(See Table 5).

**Table 5: Association between various demographic characteristics of respondents and awareness on antimicrobial withdrawal periods**

| **Variable** | **Awareness of poultry keepers on antimicrobial withdrawal period** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Aware | | Not aware | | Total | | $x^2$ (chi-square) | P-value |
| | No. | % | No. | % | No. | % | | |
| Age (years) | | | | | | | | |
| 31-40 | 24 | 26 | 71 | 74 | 93 | 100 | | |
| 41-50 | 40 | 28 | 103 | 72 | 143 | 100 | | |
| 51+ | 6 | 18 | 27 | 82 | 33 | 100 | | |
| Total | 70 | 26.02 | 199 | 73.98 | 269 | 100 | 1.913 | 0.384 |
| Sex | | | | | | | | |
| Male | 25 | 24.03 | 79 | 75.96 | 104 | 100 | | |
| Female | 45 | 27.3 | 120 | 72.7 | 165 | 100 | | |
| Total | 70 | 26.02 | 199 | 73.98 | 269 | 100 | 1.347 | 0.572 |
| Level of education | | | | | | | | |
| No formal education | 3 | 15 | 17 | 85 | 20 | 100 | | |
| primary & secondary level | 20 | 16 | 105 | 84 | 125 | 100 | | |
| Certificate & Diploma level | 24 | 28 | 61 | 72 | 85 | 100 | | |
| Degree level | 23 | 59 | 16 | 41 | 39 | 100 | | |
| Total | 70 | 26.02 | 199 | 73.98 | 269 | 100 | 15.521 | 0.001 |
| Occupation | | | | | | | | |
| Poultry keepers | 46 | 27 | 125 | 73 | 171 | 100 | | |
| Employee | 13 | 21 | 49 | 79 | 62 | 100 | | |
| Petty business | 7 | 32 | 15 | 68 | 22 | 100 | | |
| Others | 4 | 29 | 10 | 71 | 14 | 100 | | |
| Total | 70 | 26.02 | 199 | 73.98 | 269 | 100 | 2.815 | 0.237 |

### 4.10 Association between level of education of poultry keepers and awareness on human health hazards of antimicrobial residues

The results showed that there was a significant association between the level of education and awareness of health hazards of antimicrobial residues as shown by the statistical computation of *P=0.001*. It further symbolizes that the higher the level of education, the higher the awareness of poultry keepers on awareness of health hazards on antimicrobial residues in Ilala municipal. (See Table 6)

**Table 6: Association between level of education of poultry keepers and awareness on health hazards of antimicrobial residues**

| **Education level** | **Awareness on health hazards** | | |
|---|---|---|---|
| | **Yes (%)** | **No (%)** | **Total (%)** |
| No formal education | 2 (10.0) | 18 (90.0) | 20 (100) |
| primary & secondary level | 16 (12.8) | 109 (87.2) | 125 (100) |
| Certificate & Diploma level | 18 (21.2) | 67 (78.8) | 85 (100) |
| Degree level | 18 (46.2) | 21 (53.8) | 39 (100) |
| Total | 54 (20.1) | 215 (70.9) | 269 (100) |

$X^2$= 16.663 P = 0.001

# CHAPTER FIVE

# DISCUSSION

This survey aimed at assessing awareness of poultry keeper on recommended antimicrobial withdrawal periods in Ilala Municipality to obtain information that will be informative for public health and policy.

## 5.1 Introduction

Use of antimicrobial agents in food producing animals has recently become an important public health issue (Jafari et al., 2007). This is due to the fact that these agents are being increasingly used in animal production. These drugs are widely used to treat animals as well as to enhance feed efficiency, promote animal growth and improve productivity. In addition, antimicrobials are widely used for disease prophylaxis and treatment, an important measure when raising chickens under intensive husbandry methods of production (Gustafson and Bowen, 1997). This practice however, carries many disadvantages. Many reports have indicated that microbial resistance to these agents and the resistance may possibly be transferred to human pathogens (Soggard, 1973; Roberts, 1996). Internationally recognized organizations like World Health Organizations (WHO) and Food and Agriculture Organizations (FAO) have set tolerance or Maximum residue limits (MRLs), acceptable daily intakes (ADIs) for humans and withholding times for pharmacologically active substances including antimicrobial agents prior to marketing (WHO/FAO, 1988).

In the present study the results shows that 199 (74%) of the respondents was not aware on the issue of antimicrobial withdrawal period and 215 (79.9%) were not aware if there is any health hazards the consumer can succumb if they consume chicken products which contains antimicrobial residues.

The main sources of information on the recommended veterinary antimicrobial withdrawal period, antimicrobial residues and associated human health hazards due to drug residues were advice from livestock officers, drug sellers and information on the label of the sachets or bottles. The commonly used antibiotics included Oxytetracycline, Tylosin, Enrofloxacin, Sulphadiazine, Duoxycycline and Norfloxacin.

**5.2 Awareness of poultry keepers on withdrawal period in laying hens**

The study shows that most of the respondents199 (74%) were not aware of drug withdrawal periods and those who were aware of the recommended antimicrobial withdrawal periods and antimicrobial residues were the one who got advice and treat their chicken by using private veterinary practitioners.

The results found to be in line with the one carried out in Sudanese poultry farm by (Mohamed, 2010) which shows that 75% of the farmers did not understand the concept of withdrawal period but differ with the study done in Morogoro, Tanzania (Nonga et al., 2009) where 80% knew about the withdrawal period, but still sold eggs during this period.

The findings of awareness on withdrawal period are contrary to those established in a study conducted in Uganda where 80% of poultry farmers new the importance of withdrawal period; however 95% of them never observed withdrawal period (James *et al.,* 2005).

Also the level of education was found to play a big role in creating awareness of poultry keepers on recommended antimicrobial withdrawal period and residues, since those who have high level of education could ask questions from veterinary service deliverer and also they are most likely to get information through reading the packaging materials or package inserts.

The age of the poultry keepers had statistically not shown to have association with the awareness on drug withdrawal periods. However, those who were at the age of 51-60 years seem to be aware, this might be because they have keeping chicken for a very long time so they got experience which enable them get aware of the drugs withdrawal periods.

The sex of poultry keepers did not show association with the awareness on drug withdrawal periods. This is probably because they share the personnel who delivered animal health services.

### 5.3 Awareness of poultry keepers on health hazards of antimicrobial residues to consumer

The findings from the current study show that 215 (79.9%) of the respondents were not aware on health hazards of drug residues to consumer. The level of education of respondents had showed a significant association with awareness of human health hazards associated with antimicrobial residues. Those who have high level of education were most likely to ask for information from the private veterinary practitioners and also they can get information through reading publications, packaging materials and package inserts.

This result correlate with previous studies which suggest that, almost 85% poultry farmers in Morogoro were unaware of possible effects of drugs residues in human health (Nonga *et al.*, 2009). Another study conducted in Khartoum, Sudan reported that poultry farmers lack knowledge about antimicrobial residues and the risk associated by the consumption of residues (Sirdar *et al.*, 2012c). Consulted efforts are needed to create awareness on detrimental public health consequences associated with misuse of antibiotics.

Mubito, *et al*., 2014 found similar situation in Dar es Salaam where about 90% of poultry farmers have no knowledge of antimicrobial restriction and adverse effects of residues to public health

### 5.4 Sources of Information on recommended veterinary antimicrobial withdrawal period

The study showed that the main sources of information on antimicrobial withdrawal period were private veterinary practitioners, sellers of veterinary shops, farmer’s workshops and through reading publication, packaging materials and package inserts.

In view of the fact that the main source of information on antimicrobial withdrawal period was from veterinary practitioners, no wonder large proportion of small scale poultry keepers of Ilala Municipal were unaware of antimicrobial withdrawal period because about 90% of them they treat their chicken without consulting veterinary practitioners. Furthermore drug leaflets/package inserts are written in English language which may not be understood by users.

The similar kind of observation was made in the study conducted in Minnesota, Michigan, Wisconsin and New York which revealed that the primary sources of information about antibiotic use, dosage and withdrawal times were from veterinarians (Zwald *et al.*, 2004).

### 5.5 Awareness of poultry keepers on antimicrobial residues in chickens

The study shows that most of poultry keepers were not aware on the issue of antimicrobial residues. However the level of education of poultry keepers had showed a statistical significant association with the awareness on antimicrobial residues. Those who had relatively higher level of education were likely to read various publications of which can make them aware of the antimicrobial residues.

Nevertheless, those at higher level of education are likely to enquire information from the personnel who administers drugs on the real health effects of the drug residues.

A study conducted by Sirdar and others revealed similar situation in Khartoum, Sudan which reported that poultry farmers lack knowledge about antimicrobial residues and the risk associated by the consumption of residues (Sirdar *et al.*, 2012c).

### 5.6 Commonly used veterinary antimicrobial drugs in chickens

The study revealed that the commonly used antimicrobial agents were tetracycline and sulfonamides. The two anti-microbials have long history worldwide for application in poultry production both for therapy, prophylaxis or sometimes used for growth promotion. Tetracycline is very active against mycoplasma, Gram positive and Gram negative bacteria (Sirdar, 2010). On other hand, sulfonamides are used in chicken for treatment and prevention

of coccidiosis which is the most important disease affecting chicken industry worldwide (Donoghue, 2003; Sirdaret *al.*, 2012b). The popularity of tetracycline and sulfonamides emanates from their availability at affordable price in different proportions as a single parent drug or in combinations with other different antibiotic agents, vitamin and minerals.

The result is in line with the one conducted in Saudi Arabia by (Al-Ghamdi et al., 2000) who also found higher usage of tetracycline's in chickens

Similarly, A study on types of antimicrobials, reasons of use and awareness of small holder farmers on antimicrobial withdrawal period in Mororgoro, Tanzania by (Nonga et al., 2009) show that there was higher usage of Tetracyclines.

A study done in Sudan 2010 in commercial laying hens shows that almost all the antibiotic classes were found in the Sudanese market for purchase either as separate products or as product with a combination with multivitamins and minerals, the most commonly used antibiotic was Oxytetracycline 24.5% in current use and 22.9% used in the last three months.

A study done in Ghana by Turkson (2008) shows that, among the antibacterials, the tetracyclines formed the largest class (35.7%, n=831), followed by the nitrofurans (23.1%), penicillinstreptomycin combinations (18%), and sulphonamides and sulphonamide combinations (8.3%).

The possible reasons for highly usage of Tetracycline's might be low cost, readiness availability in veterinary shops and easy access of the drugs by farmers themselves without any restrictions.

### 5.7 Study limitations

The study is subject to all limitations that apply to private sponsored studies where self-administered questionnaires are used as a tool to obtain data.

# CHAPTER SIX

# CONCLUSSION AND RECOMMENDATIONS

## 6.1 Conclusion

The study found that most frequently used antibiotic drugs belong to the group of tetracycline and sulfonamides. Furthermore the study had showed that there is widespread misuse of antimicrobial agents by small scale poultry keepers in Ilala Municipal, Tanzania, this possibly reflecting lack of awareness of small scale poultry keepers on recommended antimicrobial withdrawal period, antimicrobial residues and possible human health hazards associated with drug/antimicrobial residues.

In view of the fact that large proportion of small scale poultry keepers in Ilala Municipal are not aware of the recommended antimicrobial withdrawal period and human health hazards of drug residues it is most likely that they might not adhere to the recommended veterinary antimicrobial withdrawal periods. Failure to observe the recommended antimicrobial withdrawal periods by poultry farmers in Ilala is likely to expose consumers to products containing residues above tolerable limits

## 6.2 Recommendations

General findings obtained from the study raises a need for educational programme on the use and misuse of antimicrobials in chickens and the public health impact of antimicrobial residues in foods from animal origin to various stake holders such as producers of poultry products, consumers and regulatory authorities.

It is also recommended to provide education on importance of recommended antimicrobial withdrawal periods to the poultry keeper so as to enable them to adhere to the recommended withdrawal periods which will consequently results to production of poultry product which are free from antimicrobial residues.

Lastly a subsequent study should be done to determine adherence of small scale poultry keepers on the recommended veterinary antimicrobial withdrawal periods.

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# APPENDICES

## Appendix 1: Informed Consent Form - English Version

**MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES**

**DIRECTORATE OF RESEARCH AND PUBLICATIONS, MUHAS**
**INFORMED CONSENT FORM**

ID-NO | | | | | | | | | | |

**Introduction**

Greetings! My name is Rukia Saidi,I am a Master of Public Health (MPH) student at Muhimbili University of Health and allied Sciences. I am conducting a research on; Awareness of small scale poultry keepers on recommended antimicrobial withdrawal period in chicken in Ilala Municipal, Dar es Salaam region.

**Purpose of the study**

This study has the purpose of collecting information on awareness on antimicrobial residue and recommended veterinary antimicrobial withdrawal periods among small scale poultry kippers in Ilala Municipal, Dar es Salaam region. You are being asked to participate in this study because you have particular knowledge and experiences that may be important to the study.

**What Participation Involves**

If you agree to participate in this study the following will occur:

1. You will sit with a trained interviewer and answer questions about awareness on antimicrobial residue and recommended veterinary antimicrobial withdrawal periods among small scale poultry keeper and finally your comments on what should be done to improve knowledge on antimicrobial residue and antimicrobial withdrawal periods. The interviewer will be recording your responses in the questionnaire.
2. No identifying information will be collected from you during this interview, except your age, level of education, marital status and your current occupation.
3. You will be interviewed only once for approximately 30 minutes in a private setting.

**Confidentiality**

I assure you that all the information collected from you will be kept confidential. Only people working in this research study will have access to the information. We will be compiling a report, which will contain responses from several small scale layers farmers without any reference to individuals. We will not put your name or other identifying information on the records of the information you provide.

**Risks**

You will be asked questions about knowledge/awareness on antimicrobial residue and antimicrobial withdrawal periods. Some questions could potentially make you feel uncomfortable. You may refuse to answer any particular question and may stop the interview at anytime.

**Rights to Withdraw and Alternatives**

Taking part in this study is completely your choice. If you choose not to participate in the study or if you decide to stop participating in the study you will not get any harm. You can stop participating in this study at any time, even if you have already given your consent. Refusal to participate or withdrawal from the study will not affect the quality of service to your chickens that is delivered by livestock officers.

**Benefits**

There will be no direct benefit to you, however the information you provide will help to increase our understanding on knowledge and practices of small scale poultry keepers on antimicrobial residue and drug withdrawal periods and prepare effective education interventions/programs to the general public on issues related to drug residues in food of animal origin. Individual benefit may include advice on good animal husbandry practice that would make you maximize your profit.

**In Case of Injury**

We do not anticipate that any harm will occur to you or your family as a result of participation in this study.

**Who to contact**

If you have questions about this study, you should contact the study Coordinator or the **Principal Investigator, RUKIA SAIDI,** Muhimbili University of Health and Allied Sciences (MUHAS), P.O. Box 65001, Dar es Salaam (Tel. no. 0717 210782 or 0767 210782 ). If you have questions about your rights as a participant, you may call **Dr. Joyce Masalu, Acting Chairman of the College Research and Publications Committee,** P. O. Box 65001, Dar es Salaam. Tel: 2150302-6 and **Dr.** LMB Rongo **who is the supervisor** of this study (Tel. 0754 575709)

**Certification of consent.**

I have been invited to take part in the study on knowledge and practices on antimicrobial residues and recommended veterinary drugs withdrawal periods among small scale poultry keepers. I have read the foregoing information or it has been read to me and have understood. My questions have been answered to my satisfaction. I agree to participate in this study.

**Signature**

Do you agree?

Participant Agrees [__]

Participant disagree [__]

Signature (or thumbprint) of participant …….

Signature of witness (if participant cannot read) …….

Signature of research assistant ……..

Date consent signed ……

**Appendix 2: Informed Consent Form,(Swahili Version)**

**Afya ya Jamii na Sayansi ya Jamii Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili**

Namba ya utambulisho: ☐☐☐

**Ridhaa ya kushiriki kwenye utafiti.**

Salaam! Mimi naitwa Rukia Saidi Natoka Chuo Kikuu cha Afya na Sayansi Shirikishi cha Muhimbili na ninafanya utafiti kuchunguza uelewa wa wafugaji wadogo wa kuku juu ya kuwepo mabaki ya vijiuasumu/dawa za mifugo kwenye mayai na na nyama,muda wa kuisha dawa za mifugo kwenye mayai na nyama.

**Lengo la utafiti.**

Utafiti huu una lengo la kukusanya taarifa juu ya uelewawa wafugaji wadogo wa kuku juu ya kuwepo mabaki ya dawa za mifugo kwenye mayai na nyama na muda wa kuisha dawa za mifugo kwenye mayai na nyama ya kuku katika Manispaa ya Ilala Mkoani Dar es Salaam. Unaombwa kushiriki katika utafiti huu kwa vile unauelewa na uzoefu ambao unaweza kuwa muhimu kwenye utafiti.

**Nini kinahitajika ili kushiriki**

Kama unakubali kushiriki katika utafiti huu yafuatayo yatafanyika:

6. Utakaa na afisa atakayekuhoji na kujibu maswali kuhusu uelewa na hatua ambazo wafugaji wanazichukua juu ya kuwepo mabaki ya dawa za mifugo katika mayai na nyama, muda wa kuacha kutumia mayai na nyama kufuatia matibabu ya mwisho kama inavyopendekezwa na hatimaye juu ya nini kingefanyika kuongeza uelewa kwenye

suala hilo. Afisa anayekuhoji atakuwa anaweka taarifa ya kile unachosema kwenye dodoso.

7. Hapatachukuliwa taarifa ya kukutambulisha wakati wa mahojiano haya isipokuwa umri wako, kiwango chako cha elimu na kazi yako ya sasa.

**8.** Utahojiwa mara moja tu kwa takribani dakika thelathini (30).

Ninakuhakikishia kwamba taarifa zote zitakazopatikana kutoka kwako zitakuwa siri.Ni watafiti pekee wanaofanya katika utafiti huu ndio watakaoweza kuzifahamu taarifa hizo. Tutafanya majumuisho ya ripoti yetu kutokana na majibu yenu pasipo kuweka taarifa za mtu mmoja mmoja. Hatutaweka jina lako wala taarifa yoyote inayokutambulisha wewe katika rekodi ya taarifa ulizotoa.

**Hatari**

Utaulizwa maswali kuhusu uelewana hatua ambazo wafugaji wa kuku wanachukua juu ya kuwepo kwa mabaki ya dawa za mifuogo katika mayai na nyama na muda wa kuacha kutumia mayai na nyama baada ya matibabu ya mwisho kwa kuku. Huenda baadhi ya maswali hutapendezwa nayo. Unaweza kukataa kujibu swali lolote na kukatisha ushiriki wako katika mahojiano haya muda wowote.

**Haki ya kujitoa au vinginevyo**

Ni uamuzi wako kushiriki katika utafiti huu. Kama umechagua kutoshiriki katika utafiti huu hapatakuwa na hatua yeyote itakayochukuliwa dhidi yako. Unaweza kusitisha ushiriki wako katika utafiti huu muda wowote hata kama ulishatoa ridhaa ya kushiriki. Kukataa kushiriki au kujitoa katika utafiti hakutaathiri ubora wa huduma inayotolewa kwa mifugo yako.

**Faida**

Hapatakuwa na faida ya moja kwa moja kwako, hatahivyo taarifa utakazotupa zitasaidia kuongeza uelewa wetu juu ya uelewa wa wafugaji wadogo wa kuku wa mayai kuhusu kuwepo kwa mabaki ya dawa za mifugo katika mayai na muda wa kuacha kutumia mayai kufuatia dozi ya mwisho ya dawa na kuandaa mpango wa uelimishaji jamii juu ya masuala yahusuyo mabaki ya dawa za mifugo kwenye chakula kitokanacho na mifugo. Faida za pekee zinaweza kuwa ushauri juu ya ufugaji bora wa kuku ambao utakuwezesha kuongeza uzalishaji hivyo kupata faida zaidi.

**Endapo utapata madhara au la.**

Hatutarajii kama patatokea madhara yoyote kwako au kwa familia yako ambayo yatasababishwa na matokeo ya ushiriki wako katika utafiti huu.

**Nani wa kuwasiliana naye**

Kama utakuwa na maswali juu ya utafiti huu, utaombwa kuwasiliana na mratibu wa utafiti au mtafiti mkuu**, RUKIA SAIDI,** Chuo Kikuu Cha Afya ya Jamii na Sayansi Shirikishi (MUHAS), S.L.P 65001, Dar es Salaam (Simu. na. 0717 210782 au 0767 210782). Kama una maswali kuhusu haki yako kama mshiriki, unaweza kumpigia simu Dr.Joyce Masalu**, Kaimu Mwenyekiti wa Kamati ya Chuo ya Utafiti na Uchapishaji,** S.L.P 65001, Dar es Salaam. Simu: 2150302-6 na **Dkt.** LMB Rongo **ambaye ni msimamizi wa utafiti huu** (Simu. 0754 757509).

**Kuthibitisha ridhaa.**

Nimekaribishwa kushiriki katika utafiti wa uelewa wa wafugaji wa kuku wa mayai na nyama kuhusu kuwepo mabaki ya dawa za mifugo kwenye mayai na nyama nakuacha kutumia mazao hayo wakati wa matibabu na mara tu baada ya dozi ya mwisho ya matibabu ya kuku. Nimesoma taarifa au imesomwa kwangu na kuielewa. Maswali yangu yamejibiwa na nimeridhika hivyo ninakubali kushiriki katika utafiti huu.

**Saini**

Unakubali?

Mshiriki anakubali [__]

Mshiriki anakataa [__]

Saini (au alama ya kidole gumba) ya mshiriki ……

Saini ya shahidi (kama mshiriki hawezi kusoma) …….

Saini ya mtafiti ……..

Tarehe ambayo fomu ilisainiwa ……..

**Appendix 3: Questionnaires, English Version**

## A QUESTIONNAIRE TO SMALL SCALE POULTRY FARMERS AWARENESS ON ANTIMICROBIAL WITHDRAWAL PERIODS AND DRUG RESIDUES

Muhimbili University of Health and Allied Sciences

School of Public Health and Social Sciences

Socio-demographic information / Personal particulars of the respondent

Respondent's ID No. ……..

Interviewer initials […….]

Residence of respondent 1.Name of ward.....

Number of chicken kept ……

1. How old are you now?..... (Age in complete years). Year of birth ……
2. Sex of respondent 1. Male …… 2. Female ……
3. What is the highest level of education you have completed?
    1. None ☐
    2. Primary ☐
    3. Secondary ☐
    4. Certificates level ☐
    5. Diploma level ☐
    6. Degree level ☐
4. Position in the project: 1.Owner ..... 2.Family member..... 3. Worker.....4.Others (Mention).....

5. What is your current main occupation?

1. Small scale poultry farmer .....
2. Employee .....
3. Petty business .....
4. None .....
5. Others ..... Specify.....

6. What is your current marital status?

1. Single (never married) ☐
2. Married ☐
3. Cohabiting or has a regular partner ☐
4. Divorced/ separated ☐
5. Widowed ☐

**Common diseases encountered in chickens and commonly used antimicrobials**

7. What major diseases of chickens do you encounter on your farm? Mention them in order of importance.

1……

2……..

3……

8. How do you manage the disease problem to your chickens?

1. Treat them once they get sick ☐
2. Vaccination ☐
3. Practising good husbandry ☐
4. Others

9. Do you provide prophylaxis to your chickens?

Yes ☐ No ☐

10. Do you treat your chickens once they fall sick?

Yes ☐ No ☐

11. If the answer is yes, who administers drugs to your chickens once, they fall sick?

1. Poultry keepers ☐
2. Livestock officer ☐

If the person administering the drugs is not the respondent, then go to number 12

12. What is the level of education of the personnel who administers drugs?

1. None ……
2. Primary 1-4 …….
3. Primary 5-7 …….
4. Secondary form 1-4 …….
5. Secondary form 5-6 …….
6. Certificate level .....
7. Diploma level ……..
8. Degree level ……..
9. Others ....., specify and state duration ……

13. What type of antimicrobials do you use to treat your chickens? (Researcher can ask for empty packaging materials)

1. Oxytetracycline
2. Sulphadizine
3. Enrofloxacin
4. Norfloxacin
5. Others specify

Awareness of poultry keepers on recommended antimicrobial withdrawal periods and sources of information on withdrawal period

14. Do you understand the meaning of drug withdrawal period? (*The researcher should clarify this question*)

Yes ☐ No ☐

15. If answered **Yes**, in question 20, where do you get this information?

1. From veterinary doctors ☐
2. Sellers of veterinary shops ☐
3. Reading information on product labels ☐
4. Private Veterinary practitioner ☐
5. Others, specify……

16. If answered **Yes**, do you follow it? Yes ☐ No ☐

17. If answered **No** in question 16, why do you continue to consume/sell eggs and meat during that period?

1. Fear of loss
2. Don't know the health effects of withdrawal period
3. Other (specify)……

18. In your opinion, which do you think are the best ways of imparting knowledge to the small scale poultry keepers in respect to drug withdrawal periods?

1. Advice from Livestock officers during service delivery
2. Advice from drug sellers during service delivery
3. Workshop/meeting on withdrawal periods with farmers
4. Others (specify)……..

19. In your opinion do you think it is possible that the drug passes from the body of the chicken to the eggs?

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree

20. In your opinion do you think it is feasible to follow the recommended drug withdrawal periods in chicken?

1. Strongly agree ☐
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree

<u>Awareness of poultry keepers on antimicrobial residues and sources of information on antimicrobial residues</u>

21. Do you know the meaning antimicrobial residues in chickens?

Yes ☐ No ☐

22. Do you consume or sell eggs and meat during the course of treatment or immediately after last dose of chicken prophylaxis/treatment?

Yes ☐ No ☐

23. If the answer in question 22 is No, why not consuming or selling chicken during the course of treatment or immediately after last dose of treatment?

1. I am following the drug withdrawal periods recommended by manufacturer

2. Chicken products contains some drug residues during this period

3. Others (specify)……

24. How long do you take before starting to sell/consume the eggs and meat from a chicken undergoing treatment?

1. Waiting according to recommended withdrawal period

2. 2-7 days

3. 7 days and above

25. If the answer in question 22 is No, what do you do with such eggs and meat from a chicken under treatment or immediately after last dose of chicken prophylaxis/treatment?

1. Burying them

2. Used to prepare other animal feeds eg pigs and dogs

3. Other (specify)

26. In you are opinion do you agree that failure to follow withdrawal period in chicken can cause health hazards to consumers?

1. Strongly agree

2. Agree

3. Don't know

4. Disagree

5. Strongly disagree

Awareness of poultry keepers on health hazard associated with antimicrobial residues and sources of information on health hazard associated with antimicrobial residues

27. Do you know any health effects if a person consumes chickens products which contains antimicrobial residues?

Yes ☐ No ☐

28. If answered **Yes** in question 27, list down the health effects which you know

1. Skin irritation/itching
2. Presence of toxic in the body
3. Cancer
4. Antibiotic resistance
5. Others (specify)……..

29. If answered **Yes** in question 27, where did you get the knowledge on the effect of drug residues.

1. Advice from Veterinary doctors
2. Information on package inserts and label ☐
3. Sellers of the veterinary shops ☐
4. Private Veterinary practitioner ☐
5. Others, specify……

30. If the answer is no, what are the reasons for being not aware of the health hazards associated with drug residues in food of animal origin?

1……..

2……..

3……..

31. In your opinion, which do you think are the best ways of creating awareness on potential health hazards associated with consumption of chicken products containing drug residues above the MRL?

1. ……
2. ……
3. ……

32. Have you ever heard someone getting health effects after consuming chickens products which contains drugs residues?

Yes ☐ No ☐

33. If answered **Yes** what were the clinical signs reported?

1. ……..
2. ……..
3. ……
4. ……

**THANK YOU**

**Appendix 4: Questionnaires (Swahili Version)**

DODOSO KWA WAFUGAJI WADOGO WA KUKU JUU YA MATUMIZI YA VIJIUASUMU NA MUDA ULIOPENDEKEZWA WA KUACHA KUTUMIA MAZAO YA KUKU WAKATI WA MATIBABU NA BAADA YA DOZI YA MWISHO YA MATIBABU

Chuo Kikuu cha Afya na Sayansi Shirikishi cha Muhimbili

Kitengo cha Afya ya Jamii na Sayansi za Jamii

Namba ya Utambulisho ya mshiriki. …….

Vifupisho vya mtafiti anayehoji […….]

Makazi ya mshiriki 1.Jina la kata.....

Idadi ya kuku wanaofugwa ……..

Taarifa za kijamii / Maelezo binafsi ya mshiriki

1. Una Umri gani?.....( Umri katika miaka). Mwaka wa kuzaliwa …….
2. Jinsi ya mshiriki 1. ME …… 2. KE ……
3. Nafasi katika mradi: 1.Mmiliki..... 2.Mwanafamilia ..... 3.Mfanyakazi .....Mengine (Taja).....
4. Kiwango chako cha elimu ulichofikia ni kipi?
    1. Hajasoma ……
    2. Shule ya msingi …….
    3. Sekondari …….
    4. Hatua ya cheti .....
    5. Hatua ya Diploma ……..
    6. Kiwango cha shahada ya kwanza …….

5. Kazi yako ya sasa ni nini?

1. Mfugaji mdogo wa kuku wa mayai .....
2. Mwajiriwa .....
3. Mfanyabiashara ndogondogo .....
4. Sifanyi kazi yoyote .....
5. Nyingine ..... fafanua.....

6. Hali ya ndoa ya sasa?

1. Niko peke yangu (Sijaoa au kuolewa) ☐
2. Nimeoa/ nimeolewa ☐
3. Naisha pamoja kama mke na mme/ Nina mpenzi wa kudumu ☐
4. Nimeachika/ tumetengana ☐
5. Mjane ☐

<u>Magonjwa yanayotokea kwa kuku na matibabu.</u>

7. Ni magonjwa gani ambayo yanatokea mara kwa mara kwa kuku wako? Yataje kwa kufuata umuhimu wake.

1.……

2.……..

3.……

8. Unadhibiti vipi magonjwa ya kuku wako ?

1. Ninawatibu pindi wanapougua
2. Ninawapa chanjo
3. Ninafuata njia za ufugaji bora kuzuia magonjwa
4. Nyingine (eleza)……..

9. Je huwa unawapa kinga kuku wako?

Ndiyo ☐ Hapana ☐

10. Je huwa unatibu kuku wako pindi wanapokuwa wanaumwa?

Ndiyo ☐ Hapana ☐

11. Kama jibu katika swali namba 10 ni Ndiyo, nani huwa anawapa dawa kuku wako pindi wanapokuwa wanaumwa?

1. Mtaalamu wa mifugo

2. Mimi mwenyewe

Kama mtu anayewapa dawa kuku wanapokuwa wanaumwa sio mshiriki katika dodoso hili, uliza swali namba 12

12. Ni kiwango gani cha elimu cha mtu anayefanya matibabu kwa kuku wako?

1. Hajasoma ……
2. Shule ya msingi 1-4 …….
3. Shule ya msingi 5-7 …….
4. Kidato cha 1-4 …….
5. Kidato cha 5-6 …….
6. Hatua ya cheti .....
7. Hatua ya Diploma ……..
8. Kiwango cha shahada ya kwanza …….

13. Kuku wako wanatibiwa kwa aina gani ya vijiuasumu? (Mtafiti anaweza kuomba kuona makasha tupu ya dawa)

1. ……

2. ……

3. ……

4. ……

5. ……

Uelewa juu ya muda wa kuacha kutumia mazao ya kuku wakati wa matibabu na vyanzo vya uelewa wa wafugaji wa kuku juu ya muda wa kuacha kutumia mazao ya kuku

14. Je, unajua maana ya muda wa kuacha kutumia mazao ya kuku baada ya dozi ya mwisho ya matibabu? (mtafiti afafanue kuhusu swali hili)

Ndiyo ☐ Hapana ☐

15. Kama jibu ni ndiyo katika swali la 14, unapata wapi taarifa hizi?

1. kutoka kwa madaktari wa mifugo ☐
2. Wauzaji wa dawa za mifugo ☐
3. Maelezo kwenye makasha ya dawa ☐
4. Wataalam wa sekta binafsi za mifugo ☐
5. Vingine, fafanua…….

16. Kama jibu ni ndiyo, katika swali la 14, huwa unafuata maelekezo yanayotolewa?

Ndiyo ☐ Hapana ☐

17 Kama jibu katika swali la 16 ni hapana, kwanini huwa unaendelea kutumia mazao ya kuku wakati wa matibabu au mara tu baada ya dozi ya mwisho ya matibabu?

1. Naogopa kupata hasara
2. Sijui madhara ya kutokufuata muda wa kuacha kutumia mazao ya kuku
3. Nyingine (fafanua)…….

18. Kwa mtazamo wako, nini unadhani ni njia nzuri ya kuwaelimisha wafugaji wa kuku juu ya muda wa kuacha kutumia mazao ya kuku baada ya dozi ya mwisho ya matibabu?

1. Kupewa elimu na wataalam wa mifugo

2. Kupewa elimu na wauzaji wa dawa za mifugo

3. Mafunzo rasmi juu ya muda wa kuacha kutumia mazao ya kuku wakati wa matibatu

4. Mengine (fafanua)……..

19. kuna mantik kufuata muda uliopendekezwa wa kutotumia mazao ya kuku kutoka kwa kuku wa mayai anayetibiwa?

1. Nakubali kabisa

2. Nakubali

3. Sifahamu

4. Sikubali

5. Sikubali kabisa

20. Kuna uwezekana wa mtumiaji wa mayai/nyama ya kuku kupata madhara ya kiafya endapo atakula mayai/nyama wakati kuku anatibiwa.

1. Nakubali kabisa

2. Nakubali

3. Sifahamu

4. Sikubali

5. Sikubali kabisa

<u>Uelewa juu ya mabaki ya vijiuasumu katika mazao ya kuku wakati wa matibabu na mara baada ya matibabu na vyanzo vya uelewa wa wafugaji wa kuku juu ya mabaki ya dawa</u>

21.Je unajua maana ya mabaki ya vijiuasumu katika mazao ya kuku?

1. Ndiyo …….. 2. Hapana ……..

22. Je, huwa unakula au kuuza mayai/nyama wakati wa kipindi cha matibabu au mara tu baada ya dozi ya mwisho ya matibabu/kinga ya kuku?

Ndiyo ☐ Hapana ☐

23. Kama jibu katika swali namba 22 ni hapana, kwa nini huwa huli wala kuuza mazao ya kuku wakati wa kipindi cha matibabu au mara tu baada ya dozi ya mwisho ya matibabu?

1. Nazingatia maelezo ya Dawa juu ya kuacha kutumia mazao ya kuku wakati wa matibabu

2. Mazao ya kuku huwa bado yana dawa za mifugo

3. Nyingine (eleza)…….

24. Huwa unasubiri kwa muda gani kabla ya kuanza kuuza /kula mazao ya kuku kutoka kwa kuku anayetibiwa au mara tu baada ya dozi ya mwisho ya matibabu?

1. Nasubiri kulingana na siku zilizopendekezwa na Mtengenezaji wa dawa

2. Nasubiri siku 2-7

3. Nasubiri siku 7 na kuendelea

4. Mengine (fafanua)

25. kama jibu katika swali namba 22 ni hapana. Huwa Unayafanyia nini mazao ya kuku ambayo yametokana na kuku anayetibiwa au kuku ambaye kamaliza matibabu siku hiyo hiyo?

1. Nayafukia chini

2. Natengeneza chakula cha mifugo km. Nguruwe na mbwa

3. Mengine (fafanua)…….

26. Kuna uwezekano wa dawa kutoka katika mwili wa kuku na kuingia kwenye mayai

1. Nakubali kabisa
2. Nakubali
3. Sifahamu
4. Sikubali
5. Sikubali kabisa

<u>Uelewa wa wafugaji wadogo wa kuku juu ya madhara ya kiafya yatokanayo na mabaki ya dawa za mifugo kwenye mazao ya kuku.</u>

27. Je, unafahamu madhara ya kiafya ambayo mtu anaweza kuyapata endapo atakula mazao ya kuku yenye mabaki ya vijiuasumu vilivyotumika kutibia kuku?

Ndiyo ☐ Hapana ☐

28. Kama jibu la swali na. 27 ni ndiyo, taja madhara hayo.

1. madhara ya ngozi (Allergy)
2. kuwepo na sumu mwilini
3. magonjwa ya saratani
4. Usugu wa vimelea vya magonjwa pindi mtu atumiapo dawa (Vijiuasumu)
5. Mengine (fafanua)

29. kama jibu la swali na. 27 ni Ndiyo, ulipata wapi elimu juuya madhara ya mabaki ya dawa za mifugo kwenye mazao ya kuku.

1. Ushauri kutoka kwa afisa/daktari wa mifugo ☐
2. Maelezo kwenye makasha ya dawa ☐
3. Wauzaji wa maduka ya dawa za mifugo ☐
4. Wataalam wa sekta binafsi ya huduma za mifugo ☐
5. Vyanzo vingine, fafanua……

30. Kama jibu la swali na. 27 ni Hapana, ni vitu gani vinasababisha wafugaji wa kuku kutokuwa na uelewa juu ya madhara ya kiafya yatokanayo na mabaki ya dawa za mifugo kwenye mazao ya kuku?

1……..

2……..

3……..

31. Kwa maoni yako, ni njia ipi unafikiri ni nzuri kwa kuelewesha wafugaji wa kuku juu ya madhara ya kiafya yatokanayo na mabaki ya dawa za mifugo kwenye mazao ya kuku?

1……

2……

3……

32. Je, ulishawahi kusikia mtu amepata madhara ya kiafya baada ya kula mazao ya kukuyenye mabaki ya Vijiuasumu?

Ndiyo ☐ Hapana ☐

33. Kama jibu la swali namba 32 ni ndiyo, mtu huyo alionesha dalili gani?

1. ……..

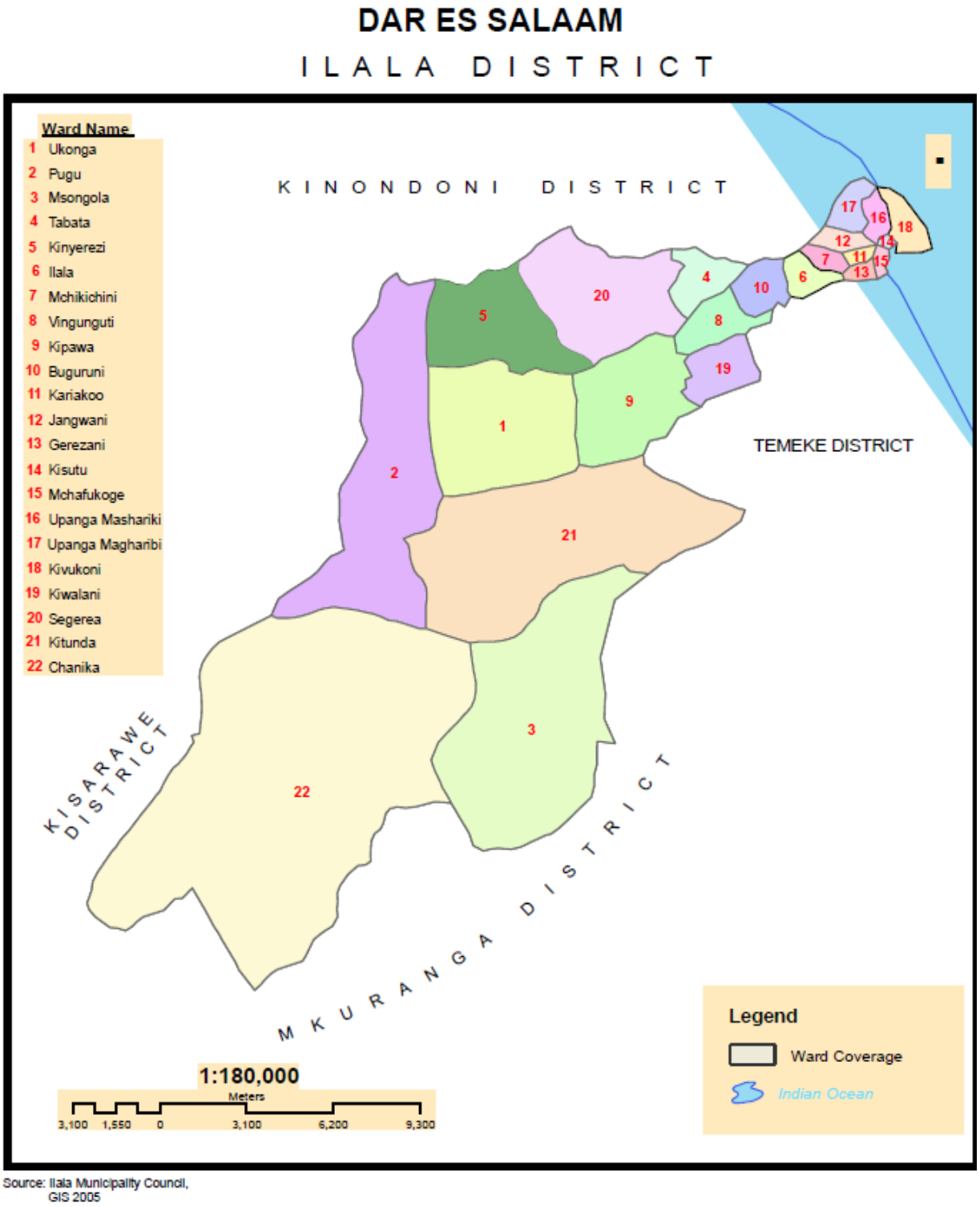
2. ……..

3. ……

4. ……

**AKHSANTE**

**Appendix 5:A map of Ilala Municipal**




Source: Ilala Municipality Council, GIS 2005