

**SELF MEDICATION WITH ANTIBIOTICS PRIOR TO SEEKING  
TREATMENT AMONG ADULT PATIENTS ATTENDING  
OUTPATIENT DEPARTMENT AT GATUNDU SUB-COUNTY  
HOSPITAL, KIAMBU COUNTY, KENYA**

**BY**

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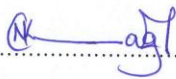
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KENYATTA UNIVERSITY**

**FEBRUARY, 2016**

**DECLARATION**


This thesis is my original work and has not been presented for a degree in any other University or any other award.

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
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## **DEDICATION**

This work is dedicated to my wife Wanjiru, my sons Ngigi, Chege and Njoroge for their humility and patience during the study period

## **ACKNOWLEDGEMENT**

I glorify God for the successful completion of this survey. Special thanks to my supervisors Dr. Philip Mwangi and Dr. Jonathan Wala for their tireless work, guidance and encouragement.. I appreciate the Department of Community Health in the school of Public Health for the support offered. I acknowledge the administration of Gatundu Sub-County Hospital for allowing me to carry out the survey in the institution. I would like to express my deep gratitude to my two research assistants. The respondents are appreciated for accepting to participate in this survey. Finally I thank all who contributed to the success of this study, whom I have not mentioned in person.

## TABLE OF CONTENTS

|  |                                     |
|--|-------------------------------------|
| DECLARATION .....  | <b>Error! Bookmark not defined.</b> |
| DEDICATION .....   | ii                                  |
| ACKNOWLEDGEMENT .....  | iv                                  |
| TABLE OF CONTENTS .....  | v                                   |
| LIST OF TABLES .....   | viii                                |
| LIST OF FIGURES .....  | ix                                  |
| DEFINITION OF TERMS.....   | x                                   |
| ABBREVIATIONS AND ACRONYMS .....                                   | xi                                  |
| ABSTRACT .....   | xii                                 |
| <b>CHAPTER ONE: INTRODUCTION .....</b>                             | <b>1</b>                            |
| 1.1 Background to the study.....                                   | 1                                   |
| 1.2 Statement of the problem .....                                 | 4                                   |
| 1.3 Justification .....  | 7                                   |
| 1.4 Research questions .....                                       | 7                                   |
| 1.5 Objectives of the study.....                                   | 8                                   |
| 1.5.1 Broad objectives.....  | 8                                   |
| 1.5.2 Specific objectives .....                                    | 8                                   |
| 1.6 Significance of the study.....                                 | 9                                   |
| 1.7 Delimitations and Limitation of the study .....                | 10                                  |
| 1.8 Conceptual framework .....                                     | 12                                  |
| <b>CHAPTER TWO: LITERATURE REVIEW .....</b>                        | <b>13</b>                           |
| 2.1 Introduction.....  | 13                                  |
| 2.2 Prevalence of self- medication with antibiotics .....          | 14                                  |
| 2.3 Factors associated with self- medication with antibiotics..... | 15                                  |

|  |           |
|--|-----------|
| 2.4 Antibiotics used in self-medication.....         | 17        |
| 2.5 Sources of antibiotics .....                     | 18        |
| 2.6 Antibiotic dosages.....                          | 19        |
| <b>CHAPTER THREE: MATERIALS AND METHODS .....</b>    | <b>20</b> |
| 3.1 Study design.....                                | 20        |
| 3.2 Location of study.....                           | 20        |
| 3.3 Variables .....                                  | 20        |
| 3.3.1 Dependent variable.....                        | 20        |
| 3.3.2 Independent variables.....                     | 21        |
| 3.4 Study population .....                           | 21        |
| 3.5 Sample size determination .....                  | 21        |
| 3.6 Sampling technique.....                          | 22        |
| 3.7 Inclusion criteria.....                          | 23        |
| 3.8 Exclusion criteria .....                         | 23        |
| 3.9 Research instruments .....                       | 23        |
| 3.10 Pretesting of instrument .....                  | 23        |
| 3.11 Validity and reliability .....                  | 24        |
| 3.12 Data collection technique.....                  | 24        |
| 3.13 Data analysis .....                             | 24        |
| 3.14 Ethical considerations .....                    | 25        |
| <b>CHAPTER FOUR: DATA ANALYSIS AND RESULTS .....</b> | <b>26</b> |
| 4.1 Demographic characteristics .....                | 26        |
| 4.2 Prevalence of self-medication.....               | 31        |
| 4.3 Factors associated with self-medication.....     | 32        |
| 4.4 Commonly used antibiotics in SMA.....            | 40        |

|  |           |
|--|-----------|
| <b>CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS.....</b> | <b>42</b> |
| 5.1 Discussion .....   | 42        |
| 5.2 Conclusions.....   | 48        |
| 5.3 Recommendations from this study to policy makers. ....           | 49        |
| 5.4 Recommendations for further research .....                       | 49        |
| <b>REFERENCES.....</b>   | <b>50</b> |
| <b>APPENDICES .....</b>  | <b>59</b> |
| Appendix i: Consent information.....                                 | 59        |
| Appendix ii: Consent form.....                                       | 60        |
| Appendix iii: A map of study area .....                              | 61        |
| Appendix iv: Interview guide.....                                    | 62        |
| Appendix v: List of antibiotics.....                                 | 65        |
| Appendix vi: Approval from graduate school.....                      | 67        |
| Appendix vii: Ethical approval from KUERC .....                      | 68        |
| Appendix viii: Permit from NACOSTI.....                              | 69        |
| Appendix ix: Research authorisation from Kiambu County.....          | 70        |
| Appendix x. Permission from Gatundu Sub County hospital .....        | 71        |

**LIST OF TABLES**

|            |  |    |
|------------|--|----|
| Table 4.1  | Age of respondents                             | 26 |
| Table 4.2  | Sex of respondents                             | 27 |
| Table 4.3  | Marital status of the respondents              | 27 |
| Table 4.4  | Respondents' occupation                        | 29 |
| Table 4.5  | Prevalence of self-medication with antibiotics | 31 |
| Table 4.6  | Responses according to age                     | 33 |
| Table 4.7  | Responses according to sex                     | 33 |
| Table 4.8  | Responses according to marital status          | 34 |
| Table 4.9  | Education status of respondents                | 34 |
| Table 4.10 | Occupation of respondents                      | 35 |
| Table 4.11 | Religion of respondents                        | 36 |
| Table 4.12 | Membership to insurance scheme                 | 36 |
| Table 4.13 | Multivariate logistic regression analysis      | 37 |
| Table 4.14 | Reasons for indulging in self-medication       | 38 |
| Table 4.15 | Ailment treated during SMA                     | 38 |
| Table 4.16 | Respondents advised on SMA                     | 39 |
| Table 4.17 | Sources of advice for SMA                      | 39 |
| Table 4.18 | Sources of antibiotics                         | 41 |
| Table 4.19 | How respondents established the dosage         | 41 |

**LIST OF FIGURES**

|            |  |    |
|------------|--|----|
| Figure 1.1 | Conceptual framework                       | 12 |
| Figure 4.1 | Educational levels of the respondents      | 28 |
| Figure 4.2 | Medical insurance schemes                  | 30 |
| Figure 4.3 | General prevalence of self-medication      | 31 |
| Figure 4.4 | Number of times respondents self-medicated | 32 |
| Figure 4.5 | Antibiotics used on self-medication        | 40 |

**DEFINITION OF TERMS**

|                          |  |
|--------------------------|--|
| <b>Adverse reactions</b> | This is an unwanted effect caused by the administration of a drug.   |
| <b>Antibiotic</b>        | This is a drug used in the treatment and prevention of bacterial infection.                                |
| <b>Drug</b>              | Any substance that is taken or consumed for the purpose of providing cure or to manage a disease condition |
| <b>OTCs</b>              | These are drugs available from pharmacies without health workers' prescription.                            |
| <b>Pharmacist</b>        | Is a member of healthcare team who is an expert in medicines and their use.                                |
| <b>Resistance</b>        | Is the reduction in effectiveness of a drug in curing a disease.   |
| <b>Self-care</b>         | Is what people do to themselves to establish and maintain health, prevent and deal with illness.           |
| <b>Self-medication</b>   | Obtaining and consuming drugs without the advice of a health worker.                                       |

**ABBREVIATIONS AND ACRONYMS**

|             |   |
|-------------|---|
| <b>FIP</b>  | Federation International Pharmaceutique |
| <b>FDA</b>  | Food and Drug Administration            |
| <b>GSH</b>  | Gatundu Sub-County Hospital             |
| <b>MOH</b>  | Ministry of Health                      |
| <b>MOPC</b> | Medical Out-patient Clinic              |
| <b>NHIF</b> | National Health Insurance Fund          |
| <b>OTC</b>  | Over the Counter                        |
| <b>SMA</b>  | Self medication with antibiotics        |
| <b>SP</b>   | Sulfadoxine/Pyrimethamine               |
| <b>SOPC</b> | Surgical Outpatient Clinic              |
| <b>WHO</b>  | World Health Organization               |
| <b>WSMI</b> | World Self Medication Industry          |

### ABSTRACT

Self-medication encompasses the use of the medicines by the users for self perceived health problems or the continuing use of medications formally prescribed earlier. The scope of the definition includes treatment of family members especially to minors and elderly. Self-medication with antibiotics is a global problem, the prevalence rates are high all over the world, up to 68% in European countries while much higher in the developing countries with rates going as high as 92% in the adolescents of Kuwait. A study done at Kenyatta National Hospital showed that 53.5% of the respondents had practiced self-medication with antibiotics. Self-medication with antibiotics masks the signs and symptoms of underlying disease and hence complicates the problem, creating drug resistance and delaying diagnosis. The study explored the existence of SMA in the sub county and the antibiotics used. The study compares the prevalence of self-medication with antibiotics among patients in Gatundu Sub County with the results of other studies done elsewhere. The main objective of the study was to establish the extent of self-medication with antibiotics among patients seeking treatment at Gatundu Sub-County Hospital. The study was cross sectional. The sample size was 382 patients identified through stratified sampling, simple random and systematic random sampling technique drawn from the outpatient department. Data was collected from the outpatient department using an interview guide. Data was analyzed using SPSS (statistical package for social sciences). Descriptive statistics such as frequencies and percentages were used to analyze categorical data. Statistical significance level was set at 0.05. The data is presented in pie charts, tables and bar graphs. The prevalence of self-medication with antibiotics was 48% prevalence which was lower than other studies done in Northern Nigeria (50.3%), Sierra Leone (68.9%), Ghana (70%), Uganda (65.1%) Sudan (76%), India (62.67%), and in Kenya at Kenyatta National Hospital, 53.5%. Those aged between 18-24 years had a proportion of 45.8% and those who had college/university education (45%). Males (35%) had a higher proportion than females (30.9%). Self-medication with antibiotics was significantly associated with age ( $p=0.0005$ ) and lack of medical insurance cover ( $p=0.0198$ ). Only 20% of the respondents had a medical insurance cover. Sixty percent of the respondents gave the reason for self-medication as cost cutting measure. The source of antibiotic was from community pharmacy (81%). Amoxicillin (36%) was the most used drug in self-medication with antibiotics. In conclusion self medication with antibiotics exists. Common source of antibiotics used in self-medication with antibiotics was community pharmacy. Respondents knew antibiotics dosage from pharmacy attendants. The study therefore recommends that health education interventions on self-medication with antibiotics practices should target people of all ages, sex, education and community at large. There is need to recruit more members to have a medical insurance cover. Community pharmacies should not dispense antibiotics without prescriptions to patients. Interventions to decrease self medication with antibiotics should emphasize on reducing access in obtaining antibiotics without prescription.

## CHAPTER ONE: INTRODUCTION

### 1.1 Background to the study

Self-medication is defined as obtaining and consuming drugs without the advice of a health worker for treatment of medical conditions (Mandavi and Kapur, 2008). Self-medication also encompasses the use of the medicines by the users for self perceived health problems or the continuing use of medications formally prescribed earlier. The scope of the definition includes treatment of family members especially to minors and elderly (WHO, 2011). Medicines for self-medication are often referred to as Over the Counter (OTC) drugs. These are available from pharmacies without a doctor's prescription (Pwar *et al.*, 2009). The FDA (2006) defines OTCs as a drug product marketed for use by the consumer without the intervention of a health care professional in order to obtain the product. Regarding the classification of medicines, it seems that people do not distinguish between prescription medicines and OTC medicines (Bjornsdottir *et al.*, 2009). It is important to note that antibiotics are not part of OTC drugs and a prescription is required before dispensing. In some countries including Kenya, OTC products are also available in supermarkets and other outlets. Medicines that require a doctor's prescription are called prescription products (FIP/WSMI, 2011). Many patients in developed and developing countries treat most of the medical conditions by self- medication (Fuentes and Villa, 2008). Self-care behaviour is not new, but rather it is the oldest and most widely used of all forms of behaviour that affect the health of individuals. In the future, more information will become available to help the consumer in matters concerning self-care and self-medication.

Many studies conducted in different parts of the world such as the United States (Bent, 2008), the United Kingdom (Oborne, 2005), Spain (Carrasco-Garrido, 2008), Germany (Uehleke, 2001), France (Orriols, 2009), Mexico (Balbuena, 2009) Singapore (Chui, 2005), Turkey (Gul, 2007), Pakistan (Zafar, 2008), Jordan (Sawair, 2009), Kuwait (Awad, Al-Rabiy and Abahussain, 2008), Egypt (Sallam, 2009) and Sudan (Awad, 2005) vary in their findings of the percentage of patients who practise self-medication, with prevalence rates that range from about 13% to 92%.

There is a threat that infectious bacterial diseases are becoming incurable as a result of a growing resistance to antibiotics (Chalker, 2011). A study by Sarhroodi *et al.*, (2010) found a causal relationship between the practice of self medication with antibiotics and development of resistance and urge for a more restricted use. The inappropriate use of antibiotics for the treatment of infections is a worldwide problem that has implications on the cost of treatment and the development of resistant bacterial strains (Malhotra *et al.*, 2007). According to the WHO (2001), inappropriate use of antibiotics includes improper antibiotic selection, inadequate antibiotic dosage and insufficient duration of use. In Kenya, SMA exists among the population, although legislation mandates presentation of doctor's prescription for dispensing and purchase of antibiotic (Misati, 2012).

Findings of unexpectedly high levels of development of drug resistance in human populations living in geographically remote areas, and with very low levels of antibiotic exposure raise the question about the role of other factors in favouring the emergence and spreading of antibiotic resistance (Bartoloni *et al.*, 2004).

The frequency of resistance to ampicillin, chloramphenicol, oxytetracycline, and trimethoprim ranged between 45 and 96%, while the frequency of resistance to rarely used antibiotics such as cefazolin, ciprofloxacin, and gentamicin, was less than 10% in Kenya, Zimbabwe and Ghana (Nys *et al.*, 2004).

According to WHO (2000), in order to use a non-prescription product safely and effectively, the patient must do a number of activities normally carried out by a physician treating a patient with a prescription drug. These activities include accurate recognition of the symptoms, setting of therapeutic objectives, selection of a product to be used, determination of an appropriate dosage and dosage schedule, taking into account the person's medical history, contraindications, concomitant diseases and concurrent medications, and monitoring of the response to the treatment and of possible adverse effects. When a failure in performing any of the activities occurs, adverse effects of medication invariably develop.

This study was needed to clarify why, in certain settings, the spread and maintenance of self medication with antibiotic can occur regardless of the existing law regulating the access to antibiotics. The survey was carried out at Gatundu Sub-County hospital which is a level 4 hospital according to the Ministry of Health grading. The hospital has a bed capacity of 144. It is located within Gatundu South Sub County, Kiambu County. The catchment area covers Gatundu South and Gatundu North sub counties. The hospital also receives patients from Ruiru, Githurai and Juja. The hospital offers curative, preventive and promotive services and has 203 health workers. The hospital is located in a trading centre which has many community pharmacies which allow easy accessibility to drugs. The area is proximal to the Nairobi City County. There is no study done in the

Sub County to explore this problem to compare SMA prevalence with other places in Kenya.

Gatundu Sub County is no exception to this as it shares many factors found in areas with high prevalence. Despite the seriousness of the problem of self-medication with antibiotics, no known study has investigated this issue in Gatundu Sub County. This will close the knowledge gap on SMA in this region.

## **1.2 Statement of the problem**

Self-medication exposes patients to serious risks which lead to a major public health concern of drug resistance. Emerging pathogen resistance to antibiotics, caused by self-medication, is a real global problem (Awad *et al.*, 2005). Despite public awareness and concern of health care providers, global irrational use of antibiotics is on the rise ranging from 50% to almost 100% (Gaash, 2008, Filho *et al.*, 2004, Zafar *et al.*, 2008).

Counterfeit products have complicated self-medication with antibiotics due to the easy availability of counterfeit antibiotics. Counterfeiting of drugs as a problem was first mentioned at the WHO conference of experts on the 'Rational use of the drugs' held in Nairobi in 1985 (WHO, 2005).

Self-medication with antibiotics has been associated with late diagnosis of several conditions and this affects the outcome of the treatments. It has been reported that 70% to 80% of cancer of cervix cases are diagnosed late stages (MOH, 2013) due to delay as patients self-medicate in the hope of getting better.

A study done in France by Buccellato (2011) revealed that the risk of adverse reactions (17.6%) can be serious and result in hospitalisation. Strange enough, out of 89%

university students in Turkey who knew that self-medication with antibiotic was unhealthy, 45% still practiced it (Buke *et al.*, 2005). Likewise, 87% of the university students were practicing self-medication with antibiotics in Karachi, Pakistan despite being aware of the dangers of self-medication (Zafar *et al.*, 2008). Forty-two percent of the participants were also aware that self-medication with antibiotics might result in adverse effects.

In a multicentre study to determine the prevalence of antibiotic resistant from urban areas in Kenya, Mexico, Peru and the Philippines, and non-urban locations in Curacao, Venezuela, Ghana, Zimbabwe and the Philippines, ciprofloxacin resistance was in the range between 1–63%. The highest percentage was found in the urban populations of Asia and South America. In Peru and the Philippines the prevalence of gentamicin resistance was more than 20%. Cefazolin resistance was the highest in the urban Philippines at 25% (Nys *et al.*, 2004).

In a study by Bii *et al.* (2005) that characterized antibiotic resistance from Kenya indicated resistance rates to tetracycline, ampicillin and co-trimoxazole were 70.7%, 65.9% and 68.3%, respectively. Brooks *et al.* (2003) also found a high level of resistance to the antibiotics most commonly prescribed in Kenyan hospitals. Further investigation revealed that 74% of persons with bloody diarrhoea received antibiotics to which their isolate was not susceptible.

In Kenya there is no record on the national prevalence rate of SMA. But a research done in Kisumu City, Western Kenya showed that 74% of patients had practiced self-medication with antibiotics prior to visiting a health unit (Kimoloi *et al.*, 2013) while

another done by Misati (2012) at Kenyatta National Hospital showed that 53.5% had self-medicated with an antibiotic.

The potential risks of self-medication practices include: drug resistance, incorrect self-diagnosis, delays in seeking medical advice when needed, infrequent but severe adverse reactions, dangerous drug interactions, incorrect manner of administration, incorrect dosage, incorrect choice of therapy, masking of a severe disease (Talevi, 2010) and risk of dependence and abuse (Chalker, 2011).

Excessive and inappropriate use of antibiotics has led to recurrent infection and increased emergence of antibiotic resistance which is a global problem with a strong impact on morbidity and mortality (Shubha, Savkar, and Manjunath, 2013) Therefore, self-medication with antibiotics when prevalent, has many risks to the individual patient and causes a large societal burden in terms of health work and emergence of drug resistance. Moreover, drugs used as home remedies may be counterfeit with variable quality and the doses may be incorrect (Fadara and Tamuno, 2011). Furthermore, the practice of self-medication with antibiotics can frequently generate an additional burden and increase expenditure in an already impoverished population (Nokes *et al.*, 2000). Infections are often self-medicated with antibiotics which could sometimes be under dose. While this may provide immediate relief of some symptoms such as inflammation and pain, it may mask some symptoms that are already latently present, and may lead to resistance, complications and other side effects of long-term use of the antibiotic (Souza, 2011).

Most important of all, self-medication masks the signs and symptoms of underlying disease hence complicating the problem, creating drug resistance and delaying diagnosis (Ashina *et al.*, 2006).

### **1.3 Justification**

Gatundu Sub-County hospital is located in a trading centre which has many private community pharmacies which lead to easy accessibility to antibiotics. Literature review shows that no similar study has been done in Gatundu Sub-County.

Easy availability of the drugs over the counter facilitates self-medication. Antibiotic resistance is a global problem with a strong impact on morbidity and mortality. Excessive use of antibiotics contributes to antibiotic resistance. The study explored the existence of SMA in the sub county and the antibiotics used. Despite the awareness of risks of self-medication with antibiotics, people still go ahead to buy drugs. The study was expected to compare the prevalence of self-medication with antibiotics among patients in Gatundu Sub County and the findings of other similar studies done elsewhere. Gatundu Sub County is proximal to the Nairobi County and share a number of characteristics, it was necessary to compare the prevalence of SMA with findings of studies done in Nairobi. This study will generate interventions that will reduce the practice of SMA and its implications to the Gatundu-Sub County.

### **1.4 Research questions**

- i. What is the prevalence of self-medication with antibiotics among patients attending GSH?

- ii. What are the factors associated with self-medication with antibiotics among patients attending GSH?
- iii. Which antibiotics are used in self-medication among patients attending GSH?
- iv. What are the sources of antibiotics used in self-medication among patients attending GSH?
- v. How did respondents know the dosage of antibiotics used in self medication with antibiotics?

## **1.5 Objectives of the study**

### **1.5.1 Broad objectives**

To establish the extent of self-medication with antibiotics among adult patients seeking treatment at Gatundu Sub-County Hospital for the past one year.

### **1.5.2 Specific objectives**

- i. To establish the prevalence of self-medication with antibiotics among patients attending GSH.
- ii. To find out the factors associated with the occurrence of self-medication with antibiotics among patients attending GSH.
- iii. To determine the antibiotics used in self-medication among patients attending GSH.

- iv. To establish the sources of antibiotics used in self-medication among patients attending GSH.
- v. To find out how respondents knew the dosage of antibiotics used in self-medication with antibiotics among patients attending GSH.

### **1.6 Significance of the study**

There is no research work available in Gatundu Sub County on self-medication. The findings of this study filled the research and knowledge gap. This study generated information that may be useful in policy development and review of policies on licensing of drugs. The study shows the prevalence of the self-medication with antibiotics. The County Health Management Team can use the results of this study as a basis for identifying approaches for community mobilization and training of health workers. It is hoped that self-medication with antibiotics pattern will be clearly described in order to implement effective intervention measures.

The public health department can use the generated information to educate the people on dangers of self-medication and come up with appropriate strategies to create awareness so that patients can change behaviour and eventually reduce self-medication with antibiotics to its barest minimum. Due to self-medication doctors should anticipate adverse reactions, drug interactions, masking of symptoms and drug resistance. This should drive doctors to explore thoroughly on this area to identify those taking self – medication.

This study will also be of paramount importance to the Pharmacy and Poisons Board to keep abreast with the problem of SMA in Gatundu Sub County.

## **1.7 Delimitations and Limitation of the study**

### **1.7.1 Delimitations of the study**

The survey was restricted to the practice of self-medication among adult patients. Patients below 18 years were not included in the study due inability to give consent. Results obtained were derived from the responses of the community members and not professional health workers. The participants were selected from the outpatients clinics in the hospital using stratified sampling, simple random and systematic random sampling and the results were a representation of the general population in the county. Patients who attended outpatient clinics in the hospital were expected to give information in respect to factors associated with SMA. The Gatundu Sub-County hospital outpatient clinics had a high volume of patients and this enabled the researcher to collect data from all the subjects from the proposed sample size within the limited time of survey. Patients visiting the hospital due to their illnesses may have had a prior knowledge of SMA unlike a person in the community who may not have had an experience with an illness.

### **1.7.2 Limitation of the study**

The research was done in a limited duration of one month. Patients who continued to practice the self-medication at home and did not visit the hospital during the period of study were not sampled. The identification of the actual antibiotic taken may not have

been accurately recalled. A list of antibiotics was provided to the patients to help them recall drugs used.

## 1.8 Conceptual framework

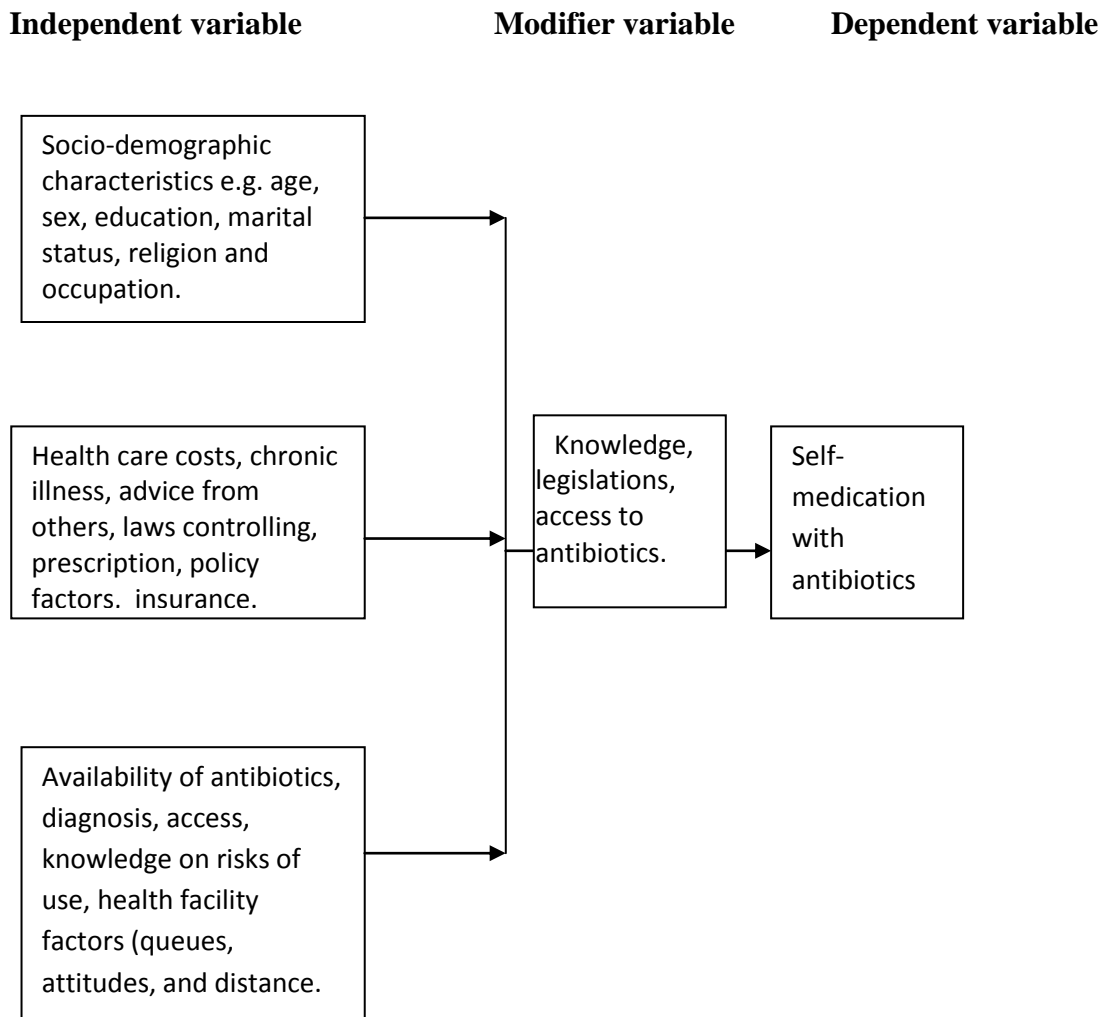


Figure 1.1 Conceptual framework by the researcher formulated from literature review.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 Introduction

The practice of self-medication with antibiotics is a major problem worldwide in both developed and developing countries and is even more common than the use of prescribed medication (Fuentes and Villa, 2008). Self-medication with antibiotics is therefore a global problem. Recent developments in aggressive marketing policies and strategies of the pharmaceutical companies contribute to a wide spread availability of OTC Medicines (Hussain and Khanum, 2008).

The World Health Organization (2011) reports that rational use of medicines occurs when patients receive adequate medication for their clinical needs, at doses corresponding to individual requirements, and at the lowest possible cost for the patient and the community. The concept of self-medication which encourages an individual to look after minor ailments with simple and effective remedies has been adopted worldwide (Afolabi, 2012).

Self-medication is a universal phenomenon and practiced worldwide by all, from infants to elderly with different frequency (Klemenc *et al.*, 2010). Self-medication is very common among individuals in many developing countries, and despite the growing research interest on the topic, not much is known about its major determinants (Awad, 2005).

The practice of self-medication with antibiotics is common worldwide in both developed and developing countries and may even be more common than the use of prescribed

medication as reported from a study done in Chile (Fuentes and Villa, 2008). Self-medication with antibiotics is often seen as gaining personal independence from established medicine, and it can be seen as a human right and is related to the right to refuse professional medical treatment (Flanigan, 2012).

Many studies have confirmed significant prevalence rates on the enormity of the problem situation. Self-medication prevalence rate of 47.6% has been reported among infants in Nigeria (Dayani *et al.*, 2009), 76% in Karachi (Zafar *et al.*, 2008) and as high as 92% in the adolescents of Kuwait (Abahussain *et al.*, 2005).

## **2.2 Prevalence of self- medication with antibiotics**

Self-medication with antibiotics is a global problem, the prevalence rates are high all over the world, up to 68% in European countries (Bretagne *et al.*, 2006) while much higher in the developing countries with rates going as high as 92% in the adolescents of Kuwait (Abahussain *et al.*, 2005). In Nigeria self-medication prevalence rate among the infants was at 47.6% (Dayani *et al.*, 2009) whereas another study done in Nigeria by Osemene and Lamikanra (2012) showed a prevalence of 53.8% on self-medication with antibiotics. The prevalence of self-medication with antibiotics is higher in low and middle income countries (Henry *et al.*, 2006). In the large pharmaceutical market of the UK and Germany, 20.7% and 17.7% respectively of the total pharmaceutical market is accounted for by self-medication products (Almasdy and Sharrif, 2011). Prevalence of self-medication was reported to be 76% in Karachi (Zafar *et al.*, 2008). In Kenya there is no record on the national prevalence rate. But a research done in Kisumu City, Western Kenya showed that 74% of patients had practiced self – medication with antibiotics prior

to visiting a health unit (Kimoloi *et al.*, 2013) while another done by Misati (2012) at Kenyatta National Hospital showed that 53.5% had self- medicated with an antibiotic.

### **2.3 Factors associated with self- medication with antibiotics**

Medical knowledge about diseases and medication has been shown to influence self-medication practice (Almasdy and Sharrif, 2011). Other factors that have been reported in Iran that influence self-medication include age, gender, family and professional status, availability of drugs and pharmaceutical promotional activities (Sarhroodi, 2010). High level of education and knowledge of drugs and their clinical indications contribute to the increased trend of self-medication. A study conducted by Sawalha, (2008) in Palestine showed that increased potential to manage certain illnesses through self-care has contributed to the self- medication with antibiotics.

A study done by Al-Bakri (2005) in Jordan showed that the most common type of symptom treated using antibiotics was common cold. This raises questions about the appropriateness of antibiotic use because such health problems are mostly non-bacterial in origin, where antibiotics are not supposed to be used. The failure of a health care system, when there is irregular distribution of health resources such as drugs has been mentioned as a factor in self-medication (Kahabuka *et al.*, 2012).

Individuals may purchase insufficient amounts of antibiotics because of economic constraints (Kamat and Nichter, 2004). These issues lead to the risk of development of bacterial resistance as well as lack of therapeutic effect, treatment failure, toxicity and side effects (Kelesidis, 2007).

The interaction that occurs between the patient and health care provider often is telling and listening. Unfortunately, there is not a one-to-one communication between telling and knowing and doing. Patients take information and process it with their own cognitive ability, which is based upon their interpretation of their own experiences and henceforth make a personal decision on self-medication (Sawalha, 2008). Self-medication with antibiotics is a choice of treatment for common medical conditions as reported from a study done in Kuwait (Abdelmonein *et al.*, 2008).

The cost of visiting the physician and the limited purchasing power is the reason for use of non-prescribed antibiotics by people practising SMA (Byarugaba, 2010). A study done by Geest (2006) showed that lay people, particularly family members, relatives or friends are popular advisors. The advice given by lay people is mainly based on their experience in using either prescribed or non prescribed antibiotics. Many people resort to the practice SMA instead of contacting professional health care workers because of long waiting periods in hospitals (Major *et al.*, 2007), minor ailments cost to save money and time, lack of accessibility, shortage of doctors, or a feeling that their ailment is beyond the knowledge of western trained doctors (Schwenkglens, 2007).

A study done in Ethiopia showed that prior experience and the non-seriousness of the illness were the top two reported factors for self-medication and access to literature was the top ranked source of information (Abay *et al.*, 2010).

Counterfeit drugs and generic antibiotic has been an issue which has greatly influenced the practice of self-medication with antibiotics due to their cost and availability (Bird, 2008). Generic product substitution has been associated with notable monetary savings

for society in several settings including in making decision on drug choice in SMA (Anderson *et al.*, 2007).

#### **2.4 Antibiotics used in self-medication**

There exist similarities in the medical conditions that are treatable with self-medication with antibiotics across European countries; however, there are significant differences in the share that self-medication products contribute toward the total pharmaceutical market (Awad *et al.*, 2005). Irrational drug use and especially self-medication with antibiotics is common throughout the world (Phalke & Durgawale, 2006). A study conducted by World Health Organization (2011) in India concluded that 53% of Indians take antibiotics (ciprofloxacin, amoxicillin and cefprozil) without prescription.

A study done in Iran concluded penicillin containing antibiotics as most widely used for self-medication. In a study by Sarahroodi *et al.* (2010) 81% of medical and 91.5% of non-medical respondents used antibiotics of this class. Among penicillin, amoxicillin was the most commonly used antibiotic (40.5% of medical and 74.3% of non-medical students) in both groups under study. Argument of frequent use of amoxicillin was supported by low-cost of this drug and its wide-spread prescription by health care providers and thus might be well-known to public as per study done in Jordan (Al-Azzam *et al.*, 2007).

According to Pahuja *et al.* (2011) azithromycin was used by 29.8% of the respondents in India. In Greece a report by Eystathios *et al.* (2010) showed that commonly used antibiotics in self-medication were amoxicillin 18.8%, amoxicillin/clavulanic acid 15.4% and cefaclor 9.7%. A study done at Kenyatta hospital showed that amoxicillin is

the most commonly self-medicated antibiotic (81.4%), co-trimoxazole 47.2% and co-amoxiclav 25.1% (Misati, 2012).

The continued practice of SMA has led to antibiotic resistance leading to infectious bacterial diseases becoming incurable (Chalker, 2011). For a long time now antibiotics such as ampicillin, co-trimoxazole, chloramphenicol and tetracycline have been used for treatment of shigellosis, but their use is increasingly compromised by the emergence of resistance. High prevalence of resistance to ampicillin (82%), chloramphenicol (73%), co-trimoxazole (88%) and tetracycline (97%) was detected in *Shigella* isolated from children in Tanzania (Navia *et al.*, 2009). In another study, the frequency of resistance to ampicillin, chloramphenicol, oxytetracycline, and trimethoprim ranged between 45% and 96%, while the frequency of resistance to rarely used antibiotics, cefazolin, ciprofloxacin, and gentamicin, was less than 10% in Kenya, Zimbabwe and Ghana (Nys *et al.*, 2004). Increasing prevalence of resistance has been reported in many pathogens over the years in different regions of the world including developing countries (Byarugaba, 2005).

## **2.5 Sources of antibiotics**

There are many sources of antibiotics without prescription more so in developing countries including from community pharmacies, drug stores, small kiosk, and left over antibiotics from relatives and previous prescriptions (Haak and Radyowijati, 2010). A study in India reported that people commonly keep their old prescriptions script for future medication because the scripts are not retained by pharmacies (Kotwani, 2010).

People may prefer to purchase antibiotics in pharmacies because of quality assurance of the antibiotics and advice provided by pharmacy personnel (Puspitasari *et al.*, 2011)

In a Jordanian study, about 53% self-medication with antibiotics was dispensed by community pharmacies whereas another study by Sihavong *et al.* (2006) found it as high as 91% in Lao People's Democratic Republic. A study in European Union reported usage of leftover antibiotics for self-medication in up to 46% of participants (Grigoryan *et al.*, 2007).

## **2.6 Antibiotic dosages**

In a study done in Iran the selection of antibiotics and dosage for self-medication was based on medical knowledge among medical staff (50%) and on a previous suggestion by a doctor (32.6%) for the nonmedical students (Sarahroodi *et al.*, 2010).

## **CHAPTER THREE: MATERIALS AND METHODS**

### **3.1 Study design**

This was a cross-sectional survey.

### **3.2 Location of study**

The survey was carried out at Gatundu Sub-County hospital which is a level 4 hospital according to the Ministry of Health Kenya grading. The hospital has a bed capacity of 162. It is located within Gatundu South Sub County, Kiambu County. The catchment area covers Gatundu South and Gatundu North Sub Counties. The hospital also receives patients from Ruiru, Githurai and Juja. The sub- County has one functional community health unit. The hospital offers curative, preventive and promotive services and has a total of 203 health workers. The hospital is located in a trading centre which has private community pharmacies which lead to easy accessibility to drugs. The Sub-County has 177 km square and total population of 107, 049 persons.

### **3.3 Variables**

#### **3.3.1 Dependent variable**

The dependent variable was self-medication with antibiotics. This was determined as the report of taking drugs without a prescription for the past one year among the patients.

### 3.3.2 Independent variables

This included the socio-demographic characteristics such as the age, sex, marital status, education, occupation and religion. Other variables included availability of drugs, health care costs, and cost cutting and patients' busy day's program, diagnosis, insurance, community practises, knowledge of risk of antibiotic use, health facility factors such as attitudes, distance, queues, policy factors, and laws.

### 3.3.3 Modifier variables

Modifier variables are knowledge, access to antibiotics and legislation.

### 3.4 Study population

The study population included patients above eighteen years of age attending outpatient attending outpatient department and clinics at GSH.

### 3.5 Sample size determination

Fischer *et al.* (1998) formula was used to determine the sample size.

$$n = \frac{z^2 pq}{d^2}$$

Where:

n = desired sample population (where population is more than 10,000)

z = confidence level at 95% (standard value of 1.96)

p = proportion of the target population estimated to have a particular characteristic being measured.

d = degree of accuracy

$$q = 1-p$$

p – In this case p was estimated to be 0.535. This was according to a study by Misati (2012) at Kenyatta National Hospital.

$$q = 1 - 0.535 = 0.465$$

$$\text{Thus } n = \frac{1.96 \times 1.96 \times 0.535 \times 0.465}{0.0025} = 382$$

The patients were interviewed from Monday throughout the week for one month until the sample size was achieved.

### **3.6 Sampling technique**

A stratified sampling was done with the strata being outpatient department, dental clinic, surgical clinic and medical outpatient clinic. A simple random method was used to identify the first subject every morning then followed by systematic random sampling used to select the subjects of the survey from the clinics until the desired sample size was achieved for a period of one month. The outpatient monthly workload was 6754 whereas that of other specialised clinics (Dental clinics was 540, SOPC 270, and MOPC 272). Therefore the sample was shared proportionally 329 subjects from outpatient and 53 subjects from specialised clinics in the ratio of 25:2:1:1 which was derived from total number of patients served in those clinics. The total population of patients treated every month was average of 6754 patients divided by 329 subjects result to an interval of 20 patients. Every day, computer generated numbers were used to do simple random sampling to identify the first subject to be interviewed. Thereafter every 20<sup>th</sup> patient was eligible for the interview. In the clinics only the 21<sup>st</sup> patient was interviewed. This was done on daily basis until sample size was achieved for one month.

### **3.7 Inclusion criteria**

Patients attending out patient at GSH who were above 18 years of age, residents of Gatundu Sub-County and those who gave informed consent.

### **3.8 Exclusion criteria**

Those patients attending outpatient at GSH but were below 18 years, patients who were not residents of Gatundu Sub-County, patients admitted in the ward and patients who were not willing to participate in the study.

### **3.9 Research instruments**

Data was collected using interview guide. The interview guide consisted of open and closed ended questions. The instrument contained questions on demographic information, factors that influenced self-medication, antibiotics used in SMA and sources of the antibiotics.

### **3.10 Pretesting of instrument**

Pretesting of the interview guide was done at GSH to test the validity and reliability of the instruments. Thirty nine interview guide tools were used for this purpose. This helped to find out whether there was ambiguity, include or delete words in the interview guide. The exercise was helpful because it provided an opportunity to make changes to the instrument. The research assistants were recruited and trained on how to carry out an interview using the instrument. The research assistants were patient attendants who were working at GSH. They were also trained on how to identify the antibiotics and given a

list of antibiotics as a reference guide. Thirty nine patients participated in pretesting of the tool at Gatundu Sub-County hospital for validity and reliability.

### **3.11 Validity and reliability**

The data collection instrument was validated during the pretesting and the necessary corrections done accordingly. The instruments were able to measure what was expected. The consistency of the data collection tool was confirmed and eventually considered reliable.

### **3.12 Data collection technique**

We interviewed the subjects using an interview guide. Before carrying out the interview the participants were required to give consent. The interview was carried out at the outpatient department and clinics. An attached list of antibiotics was used to help participants identify the antibiotics used. This was to minimise no error occurred when identifying the antibiotics. The data collection was conducted over one month. The author of the thesis provided supervision to the research assistants to ensure quality of data collected and detect early any problem related to data collection.

### **3.13 Data analysis**

We checked, cleaned and coded the data from the interview guide. The data was then entered in excel sheet and analyzed using SPSS (statistical package for social sciences) software version 21. Descriptive statistics such as frequencies, percentages was used to present data. Chi square test was applied to compare various variables of those who practiced SMA and those who did not practise in order to find the statistical significance.

To determine the factors associated with self-medication, multivariable logistic regression analyses and chi-square calculations were performed using SPSS, version 21. A p-value of  $< 0.05$  was taken as statistically significant in all cases. Analysis was carried out using descriptive and inferential statistics at 95% confidence intervals. Results were presented in pie charts, bar chart, tables and graphs.

### **3.14 Ethical considerations**

Ethical approval to carry out survey was sought from the Kenyatta University Ethics Review Committee (appendix vii). A research permit was obtained from the National Council of Science, Technology and Innovation (appendix viii). The Kiambu county administrators allowed the survey to be carried out in their territory (appendix ix). The administration of Gatundu hospital was requested to allow the survey to be carried out in the institution (appendix x). Before carrying out the interview, consent was obtained from the patients (appendix i and ii). Nobody was coerced or deceived in any way to participate in the study. Patients' names were not entered in the interview guide but instead code numbers were used. Information obtained was handled with a lot of confidentiality.

## **CHAPTER FOUR: DATA ANALYSIS AND RESULTS**

This chapter presents the results of the survey. Out of 382 respondents interviewed 20 interview guide tools got spoilt. The analysis was done as per the specific objectives of the study. The chapter has been organized into demographic characteristics, prevalence of SMA, antibiotics used, sources of antibiotics, and how respondents knew the dosage. Descriptive statistics such as frequencies, percentages was used to present data. Chi square test was applied to compare various variables of those who practiced SMA and those who did not practise in order to find the statistical significance. To determine the factors associated with self-medication, multivariate logistic regression analysis was performed using SPSS, version 21. The results are presented in pie chart, tables and bar graphs.

### **4.1 Demographic characteristics**

Several demographic characteristics were assessed and below are the results.

#### **4.1.1 Age of the respondents.**

The age of the respondents was categorised in groups ranging from 18-24 years, 25-34 years, 35-44 and those above 45 years.

**Table 4.1 Age of respondents**

| <b>Age in years</b> | <b>Frequency</b> | <b>Percentage</b> |
|---------------------|------------------|-------------------|
| 18-24               | 48               | 13.3              |
| 25-34               | 130              | 35.9              |
| 35-44               | 66               | 18.3              |
| Above 45            | 118              | 32.5              |
| <b>Total</b>        | <b>362</b>       | <b>100</b>        |

Majority of respondents (35.9%) were between 25-34 years old and only 13.3% were between 18-24 years (Table 4.1).

#### 4.1.2 Sex of respondents

**Table 4.2 Sex of respondents**

| <b>Sex</b>   | <b>Frequency</b> | <b>Percentage</b> |
|--------------|------------------|-------------------|
| Male         | 116              | 32                |
| Female       | 246              | 68                |
| <b>Total</b> | <b>362</b>       | <b>100</b>        |

From the Table 4.2, many respondents (68%) were females while males were 32%.

#### 4.1.3 Marital status.

The marital status of the respondents was classified as married (72.7%) and the single comprised of those never married (13.3%), divorced (2.2%), widowed (10.1%) and separated (1.6%) as shown in Table 4.3.

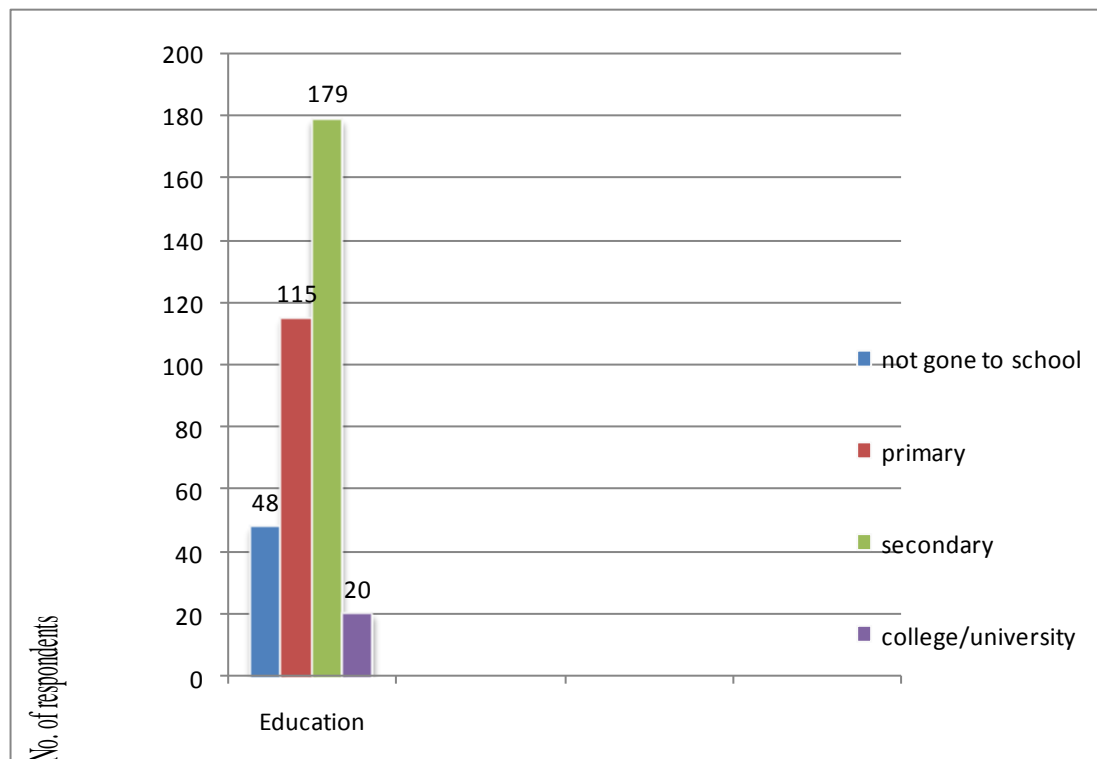
**Table 4.3. Marital status of the respondents**

| <b>Marital status</b> |                      | <b>Frequency</b> | <b>Percentage</b> |
|-----------------------|----------------------|------------------|-------------------|
| Married               |                      | <b>263</b>       | <b>72.7</b>       |
| Single                | <i>Never married</i> | 48               | 13.3              |
|                       | <i>Divorced</i>      | 8                | 2.2               |
|                       | <i>Widowed</i>       | 37               | 10.1              |
|                       | <i>Separated</i>     | 6                | 1.5               |
| <i>Subtotal</i>       |                      | <b>99</b>        | <b>27.3</b>       |
| <b>Total</b>          |                      | <b>362</b>       | <b>100</b>        |

Majority of respondents were married comprising of 72.7%, the single had a total of 27.3%.

#### 4.1.4 Education levels of the respondents

Education levels were categorised into four: those who had not gone to school, primary, secondary and college/university (Figure 4.1).



**Figure 4.1 Education levels of the respondents.**

From Figure 4.1 the respondents who had secondary education were 49.4% (179), those with primary education were 31.8% (115), and those who had not gone to school were 13.2% (48) and 5.6% (20) had gone up to college/University.

#### 4.1.5 Occupation of the respondents.

The respondents were required to mention their occupation which was broadly categorised into unemployed and employed.

**Table 4.4 Respondents' occupation**

| <b>Occupation</b> |                          | <b>Respondents</b> | <b>Percentage</b> |
|-------------------|--------------------------|--------------------|-------------------|
| Unemployed        |                          | <b>203</b>         | <b>56</b>         |
| Employed          | <i>Formally Employed</i> | 107                |                   |
|                   | <i>Business</i>          | 52                 |                   |
|                   | <b>Sub total</b>         | <b>159</b>         | <b>44</b>         |
| <b>Total</b>      |                          | <b>362</b>         | <b>100</b>        |

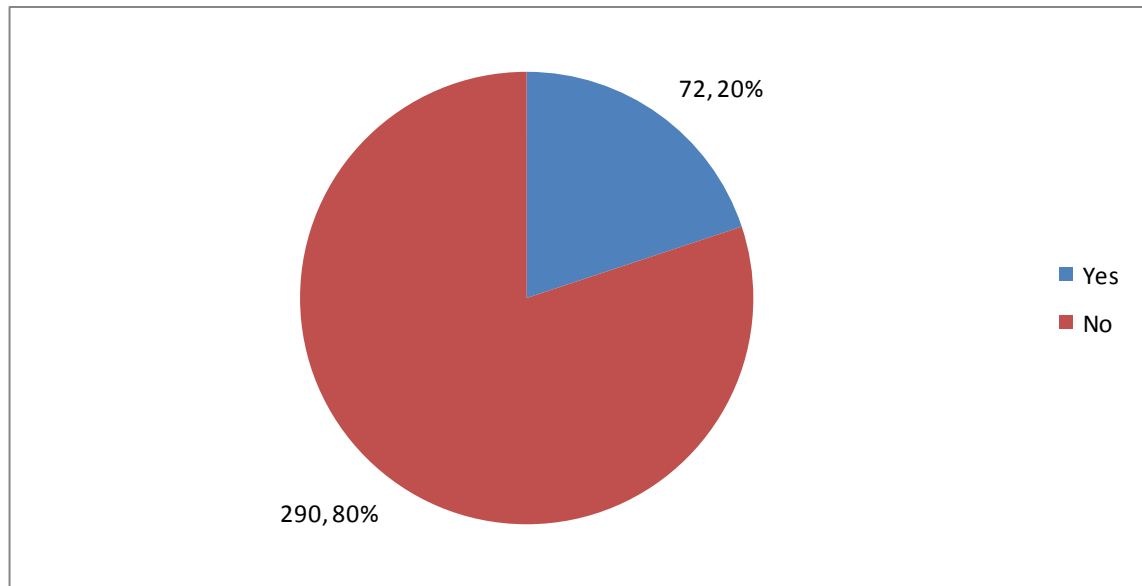
Majority of the respondents (56%) were not employed while those who were formally employed were 44% (Table 4.4).

#### 4.1.6 Religion of the respondents

The respondents were required to state their religion and all the respondents were Christians. The Sub –County is dominated by Christians.

#### 4.1.7 Membership to medical insurance scheme

The research participants were asked whether they are members of any medical insurance.



**Figure 4.2 Medical insurance schemes**

From Figure 4.2, eighty percent of the respondents had no medical insurance scheme and only 20% were covered by the insurance.

#### 4.1.8 Type of medical insurance

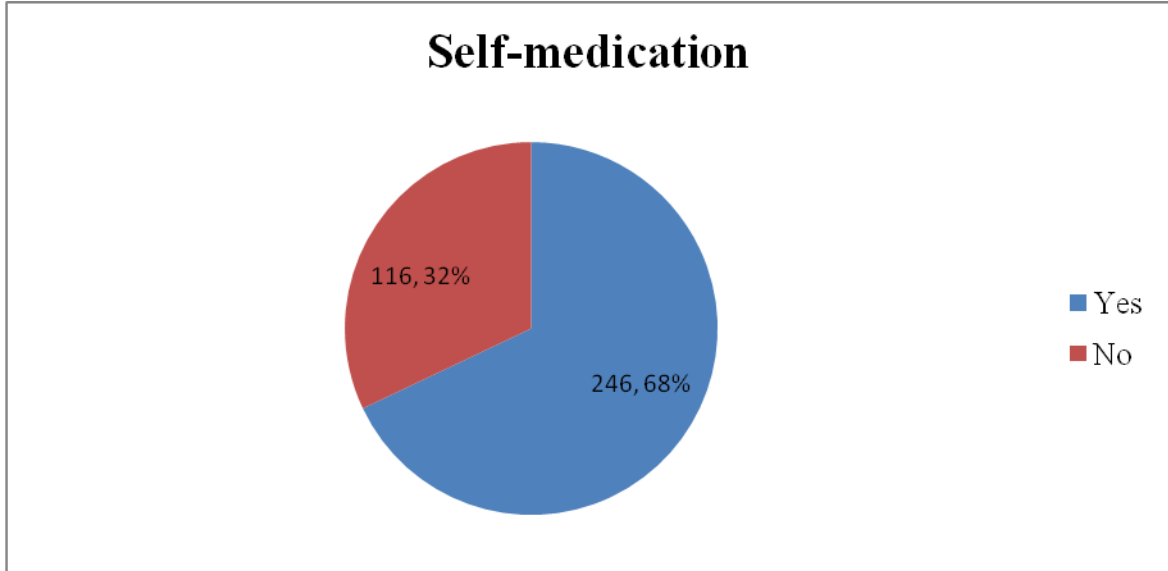
The respondents were asked to state the type of medical insurance cover.

All the respondents had NHIF scheme only.

## 4.2 Prevalence of self-medication

### 4.2.1 General prevalence of self-medication

The participants were asked whether they had ever taken any drug without prescription.



**Figure 4.3 General prevalence of self-medication**

From Figure 4.3, sixty eight percent of the respondents had generally practiced self-medication whereas thirty two percent had not practiced self-medication.

### 4.2.2 Prevalence of self – medication with antibiotics

The respondents were required to say whether they had ever taken any antibiotic without prescription.

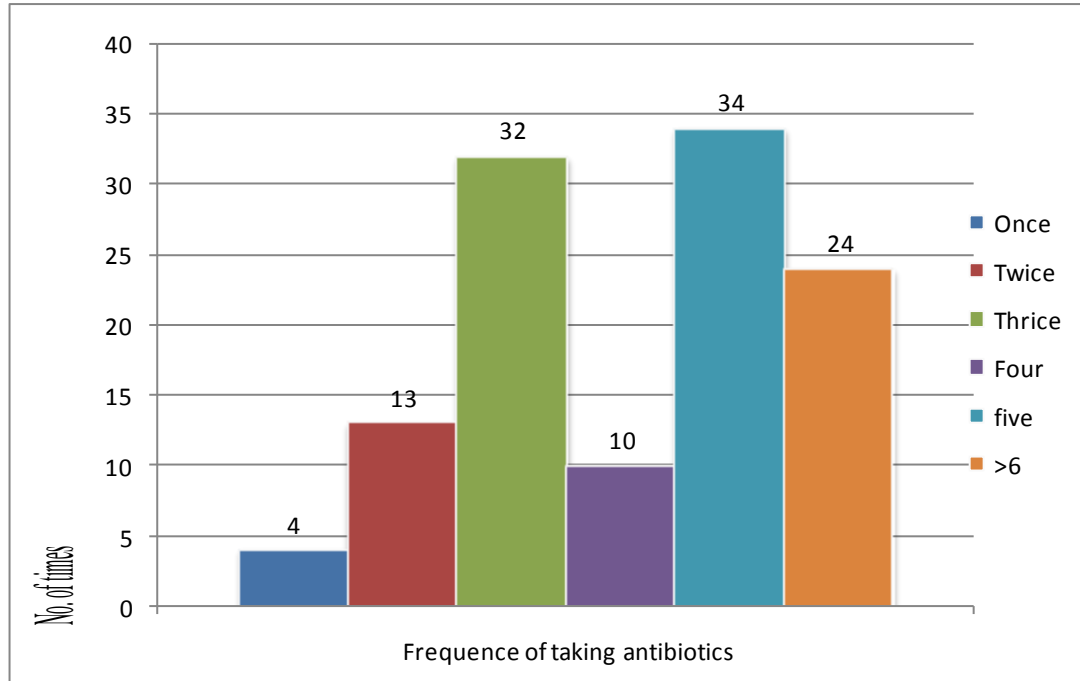
**Table 4.5 Prevalence of self – medication with antibiotics**

| Self medication with antibiotics | Responses | Percentage |
|----------------------------------|-----------|------------|
| Yes                              | 117       | 47.6       |
| No                               | 129       | 52.4       |
| <b>Total</b>                     | 246       | 100        |

Table 4.5 shows that among those who practiced self medication 47.6% had used antibiotics while 52.4% had used other drugs.

### 4.2.3 Number of times respondents self medicated

This question required the respondents to state the number of times they had practiced self-medication in the last one year.



**Figure 4.4 Number of times respondents self medicated.**

From Figure 4.4, majority of the respondents, 34 (29%) had used antibiotics five times in the past one year, 32 (27.4%) three times, 24 (20.5%) more than six times, 13 (11.1%) twice, 10 (8.6%) four times and 4 (3.4%) once.

## 4.3 Factors associated with self-medication

### 4.3.1 Responses according to age

The age of the respondents was categorised in groups ranging from 18-24 years, 25-34 years, 35-44 years and those above 45 years.

**Table 4.6 Responses according to age**

| Age of respondents | Self-medicated | Not self-medicated | n          | x <sup>2</sup> | p value  |
|--------------------|----------------|--------------------|------------|----------------|----------|
| 18-24 years        | 22 (45.8%)     | 26 (54.2%)         | 48         | 7.8123         | p=0.0005 |
| 25-34              | 36 (27.7%)     | 94 (72.3%)         | 130        |                |          |
| 35-44              | 26 (39.4%)     | 40 (60.6%)         | 66         |                |          |
| Above 45           | 33 (28%)       | 85 (72%)           | 118        |                |          |
| <b>Total</b>       | <b>117</b>     | <b>245</b>         | <b>362</b> |                |          |

Table 4.6 indicates that 45.8% of the respondents who were aged between 18 to 24 years practiced self-medication. Age was significantly associated with self medication ( $p < 0.05$ ).

#### 4.3.2 Sex of Respondents.

**Table 4.7 Responses according to sex**

| Sex          | Self-medicated | Not self-medicated | N          | x <sup>2</sup> | p value  |
|--------------|----------------|--------------------|------------|----------------|----------|
| Male         | 41 (35%)       | 75 (65%)           | 116        | 0.7138         | p=0.3981 |
| Female       | 76 (30.9%)     | 170 (69.1%)        | 246        |                |          |
| <b>Total</b> | <b>117</b>     | <b>245</b>         | <b>362</b> |                |          |

More males (35%) had practiced self-medication with antibiotics than females (30.9%).

Sex had no significant relationship with self-medication ( $p > 0.05$ ).

### 4.3.3 Marital status respondents

The respondents were asked to identify their marital status which was broadly grouped into single and married. The single group comprised those never married, divorced, widowed and separated.

**Table 4.8 Responses according to marital status**

| Marital status |                      | Self medicated | No self-medicated | n          | x <sup>2</sup> | p value  |
|----------------|----------------------|----------------|-------------------|------------|----------------|----------|
| Married        |                      | 82 (31.2%)     | 181 (68.8%)       | 263        | 0.5731         | p=0.4490 |
| Single         | <i>Never married</i> | 17 (35.4%)     | 31 (64.6%)        | 48         |                |          |
|                | <i>Divorced</i>      | 5 (62.5%)      | 3 (37.5%)         | 8          |                |          |
|                | <i>Widowed</i>       | 10 (27%)       | 27 (73%)          | 37         |                |          |
|                | <i>Separated</i>     | 3 (50%)        | 3 (50%)           | 6          |                |          |
|                | <b>Sub total</b>     | <b>35(35%)</b> | <b>64(65%)</b>    |            |                |          |
| <b>Total</b>   |                      | <b>117</b>     | <b>245</b>        | <b>362</b> |                |          |

Married people had lower proportion (31.2%) than the single people (35%) who practiced self-medication. Chi square was used to evaluate association between the single and the married verses self medication. Marital status had no significant association with self -medication.

### 4.3.4 Education status of those who self medicated with antibiotics.

Respondents were asked their level of education.

**Table 4.9 Education status of the respondents.**

| Education          | Self-medicated | Not self-medicated | n          | x <sup>2</sup> | p value  |
|--------------------|----------------|--------------------|------------|----------------|----------|
| Not gone to school | 12 (25%)       | 36 (75%)           | 48         | 3.0857         | p=0.3786 |
| Primary            | 35 (30.4%)     | 80 (69.6%)         | 115        |                |          |
| Secondary          | 61 (34.1%)     | 118 (65.9%)        | 179        |                |          |
| College/University | 9 (45%)        | 11 (55%)           | 20         |                |          |
| <b>Total</b>       | <b>117</b>     | <b>245</b>         | <b>362</b> |                |          |

From Table 4.9, a lower proportion of college/university (45%) practiced self-medication with antibiotics compared to those who did not. Respondents who practiced SMA with a secondary education were 34.1%, primary (30.4%) and only 25% had not gone to school. Those with college/university higher proportion of practicing self medication. Education had no significant relationship with self-medication ( $P > 0.05$ ).

#### 4.3.5 Occupation of those who self –medicated with antibiotics

The occupation was broadly categorised into unemployed and the employed. The employed were further classified into formally employed, businessperson and farmers.

**Table 4.10 Occupation of the respondents.**

| Occupation   |                         | Self-medicated  | Not Self-medicated | n          | $\chi^2$ | p value |
|--------------|-------------------------|-----------------|--------------------|------------|----------|---------|
| Unemployed   |                         | <b>64 (32%)</b> | <b>139 (68%)</b>   | <b>203</b> | 3.841    | P=0.855 |
| Employed     | <i>Formally</i>         | 41(38%)         | 66 (62%)           | 107        |          |         |
|              | <i>Employed</i>         |                 |                    |            |          |         |
|              | <i>Businessperson</i>   | 12 (24%)        | 40 (76%)           | 52         |          |         |
|              | <b><i>Sub total</i></b> | <b>53 (33%)</b> | <b>106 (67%)</b>   |            |          |         |
| <b>Total</b> |                         | <b>117</b>      | <b>245</b>         | <b>362</b> |          |         |

From Table 4.10, high proportion of employed respondents (33%) practised self-medication whereas the unemployed group had 32%, Chi-square was used to calculate the association of occupation and SMA. Occupation had no significant association with self-medication ( $p > 0.05$ ).

#### 4.3.6 Religion of those who used antibiotics

Respondents were required to state their religion.

**Table 4.11 Religion of the respondents**

| Religion  | Self medicated | Not self-medicated | n   |
|-----------|----------------|--------------------|-----|
| Christian | 117 (32.3%)    | 245 (65.7%)        | 362 |
| Others    | 0              | 0                  | 0   |
| Total     | 117            | 100                | 362 |

The association could not be evaluated as all respondents were Christians.

#### 4.3.7 Membership to insurance scheme

**Table 4.12 Membership to insurance scheme**

| Whether member of insurance scheme | Self-medicated | Not self-medicated | n   | x <sup>2</sup> | p value              |
|------------------------------------|----------------|--------------------|-----|----------------|----------------------|
| Yes                                | 15 (20.8%)     | 57 (79.2%)         | 72  | 5.421          | p=0.0198<br>(p<0.05) |
| No                                 | 102 (35.2%)    | 188 (64.8%)        | 290 |                |                      |
| Total                              | 117            | 245                | 362 |                |                      |

From Table 4.12, only 20.8% of respondents who are members of medical insurance scheme practiced self-medication with antibiotics. Medical insurance scheme was significantly associated with self medication (p<0.05).

### 4.3.8 Multivariate logistic regression analysis

**Table 4.13 Multivariate logistic regression analysis**

| Variable       |                        | SMA        | None SMA    | OR 95% CI        | p-value |
|----------------|------------------------|------------|-------------|------------------|---------|
| Age in years   | 18-24                  | 22 (45.8%) | 26 (54.2%)  | 1                | -       |
|                | 25-34                  | 36 (27.7%) | 94 (72.3%)  | 0.574(0.43-0.78) | 0.902   |
|                | 35-44                  | 26 (39.4%) | 40 (60.6%)  | 0.812(0.72-0.91) | 0.056   |
|                | >45                    | 33 (28%)   | 85 (72%)    | 0.565(0.51-0.73) | 0.721   |
| Sex            | Male                   | 41 (35%)   | 75(65%)     | 1                | -       |
|                | Female                 | 76 (30.9%) | 170 (69.1%) | 0.827(0.78-0.93) | 0.54    |
| Education      | None                   | 12 (25%)   | 36 (75%)    | 1                | -       |
|                | Primary                | 35 (30.4%) | 80 (69.6%)  | 1.13(0.9-1.97)   | 0.46    |
|                | Secondary              | 61 (34.1%) | 118 (65.9%) | 1.314(0.92-2.4)  | 0.05    |
|                | College/<br>university | 9 (45%)    | 11 (55%)    | 1.57(1.2-2.5)    | 0.317   |
| Marital status | Never Married          | 17 (35.4%) | 31 (64.6%)  | 1                | -       |
|                | Married                | 82 (31.2%) | 181 (68.8%) | 0.821(0.63-1.6)  | 0.64    |
|                | Divorced               | 5 (62.5%)  | 3 (37.5%)   | 1.725(1.3-2.53)  | 0.05    |
|                | Widowed                | 10 (27%)   | 27 (73%)    | 0.713(0.42-1.31) | 0.721   |
|                | Separated              | 3 (50%)    | 3 (50%)     | 1.462(1.1-2.34)  | 0.9     |
| Occupation     | Unemployed             | 64 (32%)   | 139 (68%)   | 1                | -       |
|                | Formally employed      | 41 (38%)   | 66 (62%)    | 1.138(0.91-1.97) | 0.64    |
|                | Business person        | 12 (24%)   | 40 (76%)    | 0.75(0.43-1.45)  | 0.702   |
| Insurance      | Yes                    | 15 (20.8%) | 57 (79.2%)  | 1                | -       |
|                | No                     | 102(35.2%) | 188 (64.8%) | 1.732(1.21-2.63) | 0.048   |

From Table 4.13, females were 0.8 times likely to practice self medication with antibiotics compared to males. College and university students were 1.5 times likely to practice SMA compared to those who never went to school. The respondents without insurance cover are 1.7 times likes to practice self-medication. The results from multivariate logistic regression analysis show lack of medical insurance was statistically significantly associated with self-medication with antibiotics.

#### 4.3.9 Reasons for indulging in self medication

The respondents were required to state the reasons why they practiced self-medication.

**Table 4.14 Reasons for indulging in self medication**

| <b>Reasons for SMA</b>  | <b>Frequency</b> | <b>%</b>   |
|---|------------------|------------|
| Lack of clinician   | 0                | 0          |
| Busy day's program  | 16               | 13.5       |
| Cost cutting  | 70               | 60         |
| Long delays in health facility                                | 28               | 24         |
| Previous experience of medical treatment of the same symptoms | 0                | 0          |
| Ignorance   | 3                | 2.5        |
| <b>Total</b>  | <b>117</b>       | <b>100</b> |

Table 4.14 shows that majority of those who practiced self –medication with antibiotics (60%) gave reasons for the practice as to reduce medical cost, 24% said there are long delays in health facility while 13.5% did so because of busy day's program.

**Table 4.15 Ailment treated during SMA**

| <b>Ailment treated by SMA</b> | <b>frequency</b> | <b>%</b>   |
|-------------------------------|------------------|------------|
| Cough or cold                 | 38               | 32.4       |
| Diarrhoea and vomiting        | 17               | 14.5       |
| Toothache                     | 16               | 13.7       |
| Abdominal pain                | 22               | 18.8       |
| Wound                         | 13               | 11.1       |
| Urinary tract infections      | 7                | 6          |
| Chest pain                    | 4                | 3.5        |
| <b>Total</b>                  | <b>117</b>       | <b>100</b> |

From Table 4.15, various respondents gave their complaints for taking antibiotics as follows: Cough 32.4%, abdominal pain 18.8%, diarrhoea and vomiting 14.5%, toothache 13.7%, wound 11.1%, urinary tract infections 6% and chest pain 3.5%

#### 4.3.10 Patients who were advised on self medication with antibiotics

The respondents were required to say whether they were advised by other people to take self-medication.

**Table 4.16 Respondents advised on SMA**

| Advised      | Self-medication | No self-medication | n          | x <sup>2</sup> | p value |
|--------------|-----------------|--------------------|------------|----------------|---------|
| Yes          | 36 (31.9%)      | 77 (68.1%)         | 113        | 0.016          | 0.8999  |
| No           | 81 (32.5%)      | 168 (67.5%)        | 249        |                |         |
| <b>Total</b> | <b>117</b>      | <b>245</b>         | <b>362</b> |                |         |

From Table 4.16 few respondents (31.9%) had been advised to take medication without prescription while 68.1% were advised but did not self-medicate. Advice had no significant association with self-medication. ( $p > 0.05$ )

#### 4.3.11 Respondents sources of advice for self medication

The respondents' sources of advice were as tabulated below.

**Table 4.17 Sources of advice for SMA**

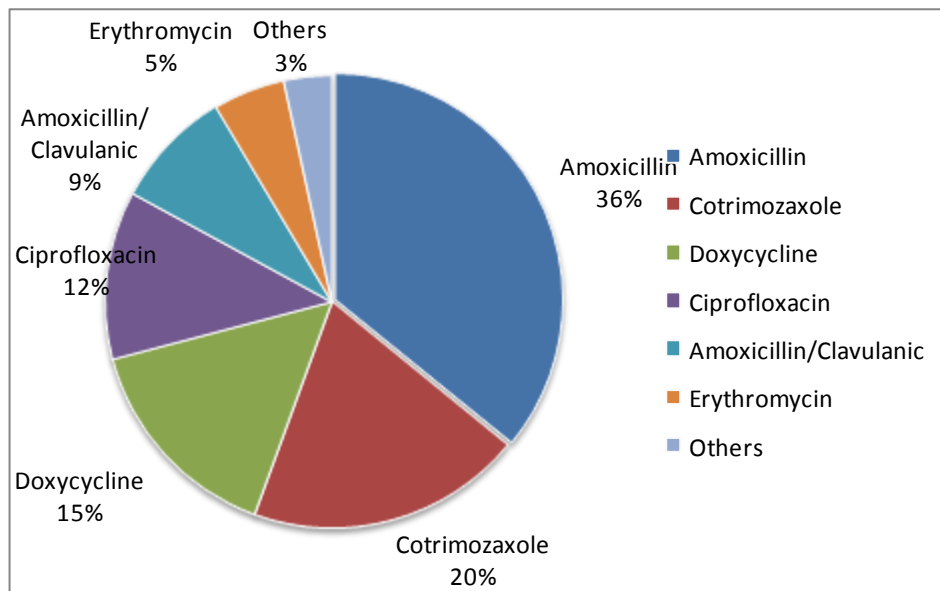
| Source of advice | Frequency | Percentage |
|------------------|-----------|------------|
| A relative       | 16        | 44         |
| Colleague        | 12        | 33         |
| Neighbour        | 2         | 6          |
| Advertisement    | 1         | 3          |
| Health workers   | 5         | 14         |
| <b>Total</b>     | <b>36</b> | <b>100</b> |

From Table 4.17, those advised to take an antibiotic the majority of the respondents (44%) said their source of advice was from a relative, 33% from colleagues, 14% from a health worker, 6% from a neighbour and 3% from advertisement (Table 4.17).

#### 4.4 Commonly used antibiotics in SMA

##### 4.4.1 Antibiotics used in self-medication

The respondents were asked to mention the antibiotics they had used without prescription. A list of antibiotics was provided to help the patients recall.



**Figure 4.5 Antibiotics used on self medication**

Figure 4.5 shows the commonly used antibiotics are amoxicillin (36%), cotrimoxazole (20%), doxycycline (15%), ciprofloxacin (12%), amoxicillin/clavulanic (9%), erythromycin (5%), others (3%) that included norfloxacin, cephalexin and azithromycin.

#### 4.4.2 Sources of antibiotics

The respondents were asked to mention the source of the antibiotics they took.

**Table 4.18 Sources of antibiotics**

| Sources            | Reponses   | Percentage |
|--------------------|------------|------------|
| Community Pharmacy | 95         | 81         |
| Health workers     | 13         | 11         |
| Given by a friend  | 9          | 8          |
| Shops              | 0          | 0          |
| <b>Total</b>       | <b>117</b> | <b>100</b> |

From Table 4.18, majority of respondents who practiced self-medication with antibiotics got the drugs from community pharmacy (81%), others got drugs from health workers (11%), while 8% got the drugs from friends.

#### 4.4.3 How respondents knew the dosage

The respondents were asked how they knew the dosage of the antibiotics.

**Table 4.19 How respondents established the dosage**

| Responses                    | Frequency  | Percentage |
|------------------------------|------------|------------|
| Used a previous prescription | 27         | 23         |
| Enquired from the seller     | 84         | 72         |
| Informed by a friend.        | 3          | 2.5        |
| Read on the packaging        | 3          | 2.5        |
| <b>Total</b>                 | <b>117</b> | <b>100</b> |

Table 4.19 shows seventy two percent had enquired the dosage from the seller while twenty three percent used previous prescription to know the dosage as shown in Table 4.19.

## **CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Discussion**

The survey was done in one month period to patients who were attending outpatient clinics. The survey revealed that the prevalence of SMA was 48%. The commonly used antibiotic in self-medication was amoxicillin. The main source of antibiotics was from community pharmacy. The main reason for practicing SMA was a cost cutting measure.

This survey was limited to self-medication with antibiotics only. The survey was not extended to other classification of drugs. This limitation did not affect the validity of the findings. A list of antibiotics was used to reduce the recall bias.

#### **5.1.1 Demographic characteristics**

Majority of the respondents in this study were aged between 25 and 34 years at 35.9%. This was comparable with a study done by Mateti *et al.* (2011) in India which had 39% of the respondents with the same age who practiced self-medication with antibiotics. Females comprised 68% of the total respondents who participated in this survey. This was contrary to a study done by Alghanim (2011) in Saudia Arabia which had 44% of respondents being females. Majority of the respondents (72.7%) were married and this is comparable to a study done by Waleed (2004) which had 74% of married persons. Forty nine percent of the respondents had secondary education which is comparable to a study done by Afolabi (2008) which had a finding of 43.9% of the respondents. Forty four percent of the respondents were employed which is consistent to a survey done by (2011) in Indonesia with a proportional of 46%. Only 20% of the respondents had an insurance medical scheme (all were insured by NHIF scheme). This is contrary to a

survey done in Sweden and Finland by Rizwani (2011) among Pakistani students (which had 28.3% of the participants who didn't have insurance cover.

### **5.1.2 Prevalence and factors associated with self-medication with antibiotics**

The prevalence of general self-medication is at 68% which is comparable to a study done in Islamabad by Muhammad (2013) with a prevalence rate of 64%. Self – medication with antibiotics had a prevalence of 48% which is lower than other studies done in Northern Nigeria with a findings of 56.8% and 50.3% (Olayemi, Musa, 2010; Fadara and Tamuno, 2011), Sierra leone 68.9% (Afolabi, Macarthy and Osemene, 2014), Ghana 70% (Donkor *et al.*, 2012) Uganda 65.1% (Jacqueline *et al.*, 2011), Sudan 76%, (Awad and Eltayeb, 2007), India 62.67%, (Aditya and Rattan, 2013) and in Kenya at Kenyatta National Hospital, 53.5% (Misati, 2012). Grigoryan *et al.* (2006) reported that Substantial variation in the prevalence rates of self-medication with antibiotics among the European regions suggests that socioeconomic factors play a role, as do disparities in health care systems such as reimbursement policies, access to health care, acquisition of antibiotics from pharmacies and drug dispensing policies.

Those aged between 18-24 years had the highest proportion of 45.6%. This was consistent to a study done in Nigeria by Osemene and Lamikana (2012) with a comparable finding of 44%. This could be due to the easy access to information from the internet. Geissler *et al.* (2000) observed that the youth is especially exposed to the media and the increased advertising of pharmaceuticals which poses a larger threat to the young population. However, such an attitude and practice is unacceptable and indicates that even the young people are ignorant of the magnitude of this problem and lacked complete knowledge. If the young people could know exactly how detrimental self-

medication with antibiotics could be instead of just having perception that it is wrong, the prevalence rates would be much lower (Zafar *et al.*, 2008). The prevalence of self-medication with antibiotics decreased with age probably because of knowledge and being responsible about individual healthcare.

Males had a higher proportion of respondents at 35% compared to females at 30.9% which was similar to findings from a research by Saleem *et al.* (2011) in Perinthalmanna. This showed a high prevalence in males. I speculate that this can be attributed to the fact that males are more private to health needs than females. Divorced people were 62.5% of those who self-medicated with antibiotics. Those with secondary education were 34.1%. In this study the respondents who had not 'gone to school' were 10.2% meaning that educated people were 89.8% cumulatively which is comparable to a study by Waleed (2004) which associated self-medication with a high rate of education at 78%. Another study conducted in Nigeria by Omlase *et al.*, (2007) reported a similar finding with a very low proportion of only 14% of uneducated individuals self-medicated. This relationship between self-medication and education could be attributed to ease of access to information from many sources including the internet.

The unemployed had a lower proportion of 32% among those who practiced SMA. This is inconsistent with a survey done by Askarian (2013) which had a finding of 7.4% being unemployed. Among those who didn't have a insurance cover, 35.2% proportion practised SMA which was relatively lower than a survey (46.3%) done by Askarian (2013) in Southern Iran. Lack of medical insurance scheme is significantly associated with self-medication with antibiotics.

The findings of this survey indicated that age had an independent significant association with the practice of self-medication. This was contrary to a study by Afolopi (2008) which showed that age and self-medication with antibiotics had no significant association. The respondents between ages 35-44 years taking self-medication with antibiotics were at 39.4% which is comparable to study done by Osemene and Lamikanra (2012) in Nigeria which had findings of a similar age group at 34.6%. Education did not have a significant association with SMA. The highest proportion among those who practiced SMA was those who had college/university education level. Palke and Durgawale (2006) reported that 42% were illiterate and majority of them belonged to class IV (43.17%). This finding contradicts other study conducted in Sudan (Awad, 2005), which reported that the level of education of patients has an impact on the practice of self-medication. Majority of the respondents (60%) indulged in self-medication for the reason of cost cutting. A similar result was shown in a study done by Donkor *et al.* (2012) in Ghana where 41% gave the reason for their self medication being less expensive. Palke and Durgawale (2006) reported that major reasons for practicing self medication were economic (58.5%) or non availability of health care facility (29.3%). This indicates that self-medication is driven by financial and other related factors.

Some 26.6% of the respondents suffered from a chronic illness, with hypertension taking the lead with 8 cases. The survey found out that chronic illness is not significantly associated with self-medication with antibiotics. This was contrary to a study which had associated health related variables such as chronic illnesses with self-medication with antibiotics (Stasio, 2008).

Thirty two percent had been advised on self-medication, with 44% of the respondents' advice being given by relatives. Majority of respondents (32.4%) had complaints of cough which was comparable to findings by Pahuja *et al.*, (2010) and Heidarifar

(2013) that showed equally high rate of cough (respiratory) complaints among those self medicating with antibiotics in Nigeria while those with abdominal pain comprised 18.8%.

The respondents knew the dosage from those working in the community pharmacies (72%). Majority of the respondents (45%) said they would self-medicate because of delays in hospitals, findings which are comparable to research done by Awad *et al.* (2005) where 39% respondents gave a reason that there is 'no time wasting in chemists'.

### **5.1.3 Commonly used antibiotics**

Commonest antibiotics used, was amoxicillin with 46 (36%) respondents. This corroborated with a study done by Donkor *et al.* (2012) in Accra Ghana and another one done in United Arab Emirates by Abasaheed *et al.* (2009) where amoxicillin had a high prevalence rate of 46% in both countries. Study done in Europe by Goossens *et al.* (2005) reported that Greece had one of the highest outpatient antibiotic uses in Europe with cephalosporins and macrolides being the most frequently used antibiotics. Argument of frequent use of *Amoxicillin* was supported by low-cost of this drug across the globe and its wide-spread prescription by health care providers and thus might be well-known to public (Al-Azzam *et al.*, 2007, Sarahroodi *et al.*, 2010).

The second commonest antibiotics used was cotrimoxazole 20%, ciprofloxacin 12%, doxycycline 15% and erythromycin (5%) which compares closely with a research by Awad *et al.* (2005) in Sudan that had a result of 3.3%. The findings of this study show the patterns of antibiotics used for SMA which indicate inappropriate uses, confirm the risks of SMA that should be addressed.

#### **5.1.4 Sources of antibiotics**

Majority of respondents (81%) got the antibiotics from a community pharmacy. This was consistent with a research done by Awad *et al.* (2005) in Sudan which showed that 68.8% got the drugs from a community pharmacy. Another study done by Mrinmoy *et al.* (2014) in India had similar results with 79.5% of respondents obtaining the drugs from chemists. Other studies with similar results were done in Palestine (Sawalha, 2008) Egypt (Sallam, 2009) and Jordan (Yousef, 2008). All of these studies show that majority of the respondents obtained their antibiotics from community pharmacies rather than from friends, health workers and shops. This is similar to another study which mentioned pharmacies as a source of antibiotics for SMA done by Berzanskyte, Valinteliene, and Haaijer-Ruskamp (2006) in Lithuania found in Northern Europe.

Other studies consistent with this findings include reports from other countries such as Egypt (Sallam, 2009) Palestine (Sawalha , 2008), Sudan (Awad, 2006) and Jordan (Yousef, 2008), which indicate that community pharmacies in these countries play a major role in the wide prevalence of self-medication among the population. Mrinmoy, (2014) reported in a study done in India that has the source of medicine for self-medication was community pharmacy at 79.3%. Community pharmacies are the main

source of antibiotics for self-medication despite the legislations which are put in place governing the dispensing of antibiotics. The pharmaceutical supply chain is complex system is aimed with ensuring the right drug reaches the right people (diagnosis) at the right time and in the right condition (Keiser, 2005). While the stakeholders and organizational structure vary by geography, type of medication, and other factors, a core component of any functioning health system is effective drug regulatory infrastructure (WHO, 2000). Generally, it would be necessary in order to enforce strict antibiotic policies to decrease the risk of resistance. For example, the Chilean Ministry of Health has strictly restricted the purchase of antibiotics without medical prescription in Chile since 1999 and the action resulted in a 43% decrease in antibiotic use in the outpatient setting (Bavestrello *et al.*, 2002).

Self-medication with antibiotics is possible via several sources; they are legally available over the counter, antibiotics initially prescribed by physicians are saved and subsequently used without medical consultation, antibiotics are obtained through friends or relatives, and they can be acquired via Internet (Grigoryan *et al.*, 2006).

## **5.2 Conclusions**

1. Self medication with antibiotics exists. The prevalence of general self medication was 68% whereas that of self-medication with antibiotics was 47.6%.
2. Self medication with antibiotics is significantly associated with age and lack of medical insurance scheme. The young people of 18-24 years practice self-medication with antibiotics more than the other age groups.
3. Amoxicillin was the most self-medicated antibiotic followed by cotrimoxazole.

4. Common source of antibiotics used in self-medication was community pharmacies.
5. Respondents knew drug dosage from community pharmacy attendants.

### **5.3 Recommendations from this study to policy makers.**

1. Health education interventions on self-medication with antibiotics practices should target people of all ages, sex, education levels and community at large.
2. There is need to recruit more members to have a medical insurance cover.
3. Interventions to decrease self medication with antibiotics should emphasize on reducing access in obtaining antibiotics without prescription.
4. Community pharmacies to ensure no antibiotics are sold over the counter without prescription. The community pharmacies should play a great role in reducing the prevalence of SMA.

### **5.4 Recommendations for further research**

More research is required to be done to:

1. To establish whether the commonly self-medicated antibiotics cause antibiotic resistance in bacteria.
2. To establish prevalence for self medication with antibiotics among children less than 18 years.
3. To assess public knowledge and perception on self medication with antibiotics.

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## APPENDICES

### **Appendix i: Consent information**

Dear respondent,

I am Charles Kiragu, a Master of Public Health student from Kenyatta University, carrying out a survey on ‘self- medication with antibiotics prior to seeking treatment among adult patients attending Gatundu Sub-County hospital’, in partial fulfilment for the award of the degree. Participation is voluntary and you can withdraw at any stage. Your name is not required to appear in any of the interview guide.

Kindly allow the researcher and research assistants to interview you.

The information obtained is for study purposes only and you are requested to be honest while giving information to the best of your knowledge. Your signature is required indicating that you have understood the nature of the survey and consented.

Thanks in advance for responding to the interviewer.

Sign.....

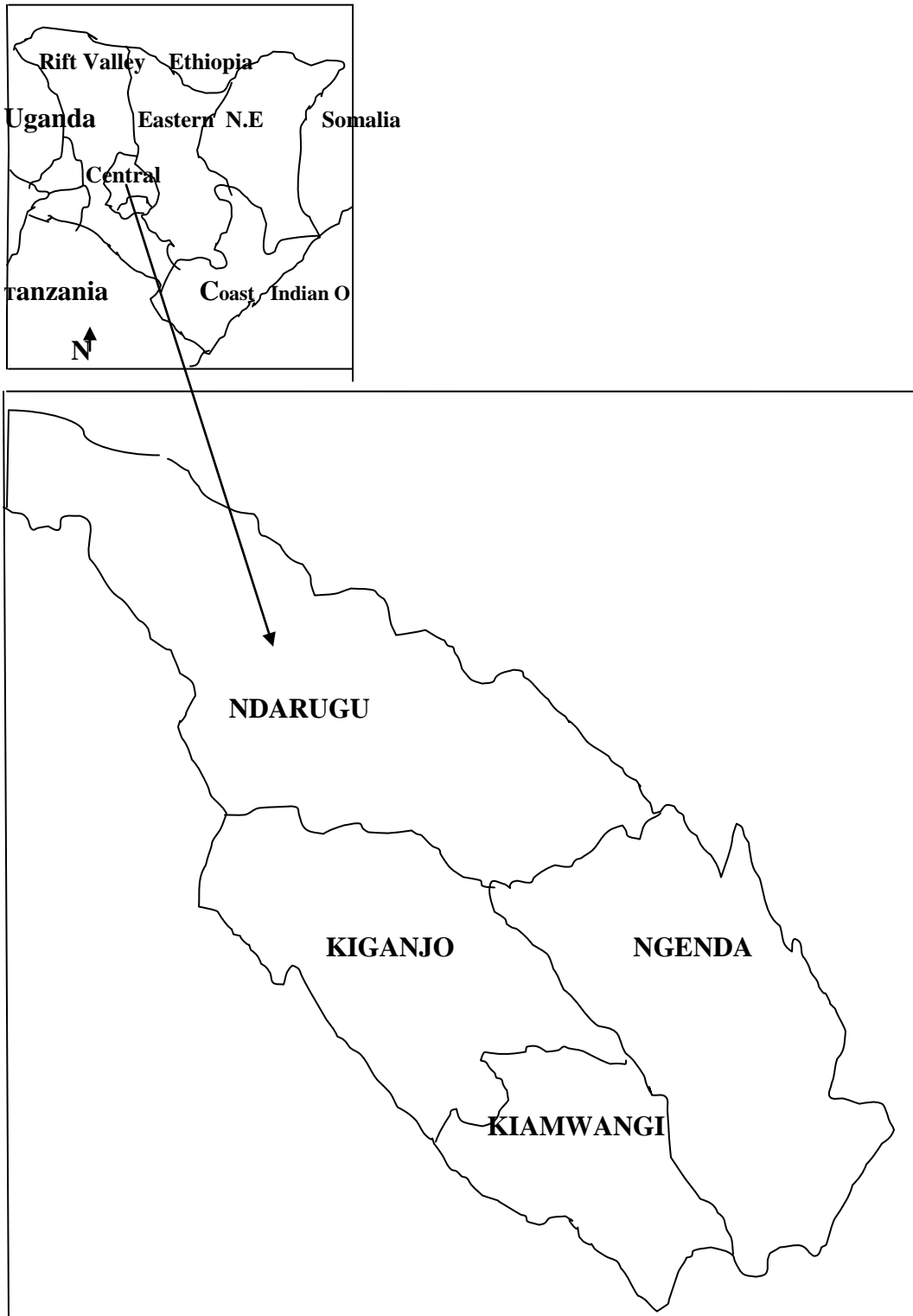
Charles Kiragu.

**Appendix ii: Consent form**

I have understood the nature of the survey and have voluntarily accepted to take part in giving information leading to success of the survey.

Sign ..... date .....

**Appendix iii: A map of study area**



**A map of Gatundu Sub county**

**Appendix iv: Interview guide**

INTERVIEW GUIDE No .....

Survey on self-medication with antibiotics prior to seeking treatment among adult patients attending Gatundu Sub-County hospital.

Instructions

- i. Your name will not be written on this interview guide.
- ii. Respond to all questions from the interviewer.
- iii. Information will be treated with confidence.

1. How old are you?

(A) 18-24 years (B) 25-34 years (C) 35-44 years (D) Above 45 years

2. Your sex Male ..... Female.....

3. What is your marital status?

(A) Married (B) Single (C) Divorced (D) Widowed (E) Separated

4. What is your level of education?

(A) Not gone to school (B) Primary (C) Secondary (D) College/University

5. What is your occupation?

(A) Unemployed (B) Employed (C) Business person (D) Others (specify)

6. What is your religion?

(A) Christian (B) Muslim (C) Atheist (D) Others (specify).....

7. Are you a member of any health insurance scheme? (A) Yes... (B) No .....

If yes, specify .....

8. Have you ever treated yourself (self- medicated) with any drug?

(A) Yes (B) No

9. If yes, have you ever self-medicated yourself with any antibiotic? (use the list attached)

(A) Yes (B) No

10. How many times have you treated yourself for the last one year?

11. What is your main reason(s) for indulging in self-medication?

(A) Lack of clinician

(B) Busy day's program

(C) Cost cutting

(D) Long delays in health facility

(E) Previous experience of medical treatment of the same symptoms

(F) Any other (specify)

12. Did somebody advice to you about self-medication?

(A) Yes (B) No

If yes, who proposed to you?

(A) A relative. (B) Colleague (C) Neighbour (D) An advertisement (E) Any other (specify).....

13. For which complaint(s) did you self- medicate? .....

14. Would you recommend other patients to self -medicate?

(A)Yes (B) No

If yes, what are the reason(s) for not recommending? .....

If no, what are the reasons?

(A) It's dangerous (B) Doesn't know diagnosis ( C) Any other (specify)...

15. Which antibiotic have you ever used for self-medication for the past year? (Use the list attached)

.....

16. Where did you get the drugs from?

(A) Community Pharmacy (B) Shops. (C) Health workers.

(D) Given by a friend (E) Any other (specify)

17. How did you know the dosage of the drug?

(A) Used a previous prescription

(B) Enquired from the seller

(C) Informed by a friend.

(D) Read on the packaging

(E) Any other (specify).....

**Appendix v: List of antibiotics**

1. Amoxicillin
2. Amoxicillin/clavunate
3. Ampicillin
4. Azithromycin
5. Cloxacillin
6. Cefazolin
7. Cefaclor
8. Cefprozil
9. Ceftriaxone
10. Cefuroxime
11. Cephalexin
12. Ciprofloxacin
13. Chloramphenicol
14. Clarithromycin
15. Cotrimoxazole (septrin)
16. Demeclocycline
17. Doxycycline
18. Enoxacin
19. Erythromycin
20. Gentamycin
21. Isoniazid
22. Kanamycin
23. Levofloxacin

24. Lincomycin
25. Metronidazole
26. Minocycline
27. Neomycin sulfate
28. Norfloxacin
29. Ofloxacin
30. Oxacillin
31. Oxytetracycline
32. Penicillin V
33. Pyrazinamide
34. Rifampin
35. Silver sulfadiazine
36. Tetracycline
37. Any other antibiotic not listed above.

**Appendix vi: Approval from graduate school**

**KENYATTA UNIVERSITY  
GRADUATE SCHOOL**

E-mail: [dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)

Website: [www.ku.ac.ke](http://www.ku.ac.ke)

P.O. Box 43844, 00100  
NAIROBI, KENYA  
Tel. 8710901 Ext. 4550

Our Ref: Q57/25527/2013

DATE: 14<sup>th</sup> December, 2014

The Principal Secretary,  
Higher Education, Science & Technology,  
P.O. Box 30040,  
**NAIROBI**

Dear Sir/Madam,


**RE: RESEARCH AUTHORIZATION FOR NGIGI CHARLES KIRAGU- REG. NO. Q57/25527/2013**

I write to introduce Mr. Ngigi Charles Kiragu who is a Postgraduate Student of this University. He is registered for M.PH degree programme in the Department of Community Health.

Mr. Kiragu intends to conduct research for a M.PH proposal entitled, "Evaluation of Self-Medication With Antibiotics Prior to Seeking Treatment Among Patients at Gatundu District Hospital, Kiambu County, Kenya."


Any assistance given will be highly appreciated.

Yours faithfully,

  
**MRS. LUCY N. MBAABU**  
**FOR: DEAN, GRADUATE SCHOOL**

ST/ewm

## Appendix vii: Ethical approval from KUERC



**KENYATTA UNIVERSITY**  
**ETHICS REVIEW COMMITTEE**

Email: [chairman.kuerc@ku.ac.ke](mailto:chairman.kuerc@ku.ac.ke)  
[secretary.kuerc@ku.ac.ke](mailto:secretary.kuerc@ku.ac.ke)  
[ercku2008@gmail.com](mailto:ercku2008@gmail.com)  
 Website: [www.ku.ac.ke](http://www.ku.ac.ke)

P. O. Box 43844 - 00100 Nairobi  
 Tel: 8710901/12  
 Fax: 8711242/8711575

Our Ref: KU/R/COMM/51/411  
 Date: 26<sup>th</sup> February, 2015

Charles Kiragu Ngigi  
 Kenyatta University  
 P.O Box 43844-00100, Nairobi

Dear Kiragu,

APPLICATION NUMBER PKU/277/I273- "EVALUATION OF SELF MEDICATION WITH ANTIBIOTICS PRIOR TO SEEKING TREATMENT AMONG PATIENTS AT GATUNDU DISTRICT HOSPITAL, KIAMBU COUNTY, KENYA" - VERSION 2.

---

1. **IDENTIFICATION OF PROTOCOL**  
 The application before the committee is with a research topic, "Evaluation of Self Medication with Antibiotics Prior to seeking Treatment among Patients at Gatundu District Hospital, Kiambu County, Kenya" version 2. Received on 7<sup>th</sup> January 2015, discussed on 17<sup>th</sup> February, 2015.

2. **APPLICANT**  
 Charles Kiragu Ngigi

3. **SITE**  
 Gatundu District Hospital, Kiambu County, Kenya

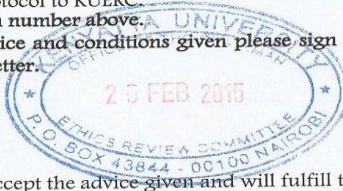
4. **DECISION**  
 The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines AND APPROVED that the research may proceed for a period of ONE year from 25<sup>th</sup> February, 2015.

5. **ADVICE/CONDITIONS**

- i. Progress reports are submitted to the KU-ERC every six months and a full report is submitted at the end of the study.
- ii. Serious and unexpected adverse events related to the conduct of the study are reported to this board immediately they occur.
- iii. Notify the Kenyatta University Ethics Committee of any amendments to the protocol.
- iv. Submit an electronic copy of the protocol to KUERC.

When replying, kindly quote the application number above.

If you accept the decision reached and advice and conditions given please sign in the space provided below and return to KU-ERC a copy of the letter.



**PROF. NICHOLAS K. GIKONYO**  
 CHAIRMAN ETHICS REVIEW COMMITTEE

I Charles Kiragu accept the advice given and will fulfill the conditions therein.

Signature: [Signature] Dated this day of 3/3/2015 2015.  
 cc. Vice-Chancellor

**Appendix viii: Permit from NACOSTI**

**NATIONAL COMMISSION FOR SCIENCE,  
TECHNOLOGY AND INNOVATION**

Telephone: +254-20-2213471,  
2241349, 310571, 2219420  
Fax: +254-20-318245, 318249  
Email: secretary@nacosti.go.ke  
Website: www.nacosti.go.ke  
When replying please quote

9<sup>th</sup> Floor, Utalii House  
Uhuru Highway  
P.O. Box 30623-00100  
NAIROBI-KENYA

Ref: No.

Date:  
**19<sup>th</sup> March, 2015**

**NACOSTI/P/15/0336/4582**

Charles Kiragu Ngigi  
Kenyatta University  
P.O. Box 43844-00100  
NAIROBI.

**RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on *“Evaluation of self medication with antibiotics prior to seeking treatment among patients at Gatundu District Hospital, Kiambu County, Kenya,”* I am pleased to inform you that you have been authorized to undertake research in **Kiambu County** for a period ending **18<sup>th</sup> December, 2015**.

You are advised to report to **the Medical Superintendent, Gatundu District Hospital, the County Commissioner, the County Director of Education and the County Coordinator of Health, Kiambu County** before embarking on the research project.

On completion of the research, you are required to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

  
**DR. S. K. LANGAT, OGW**  
**FOR: DIRECTOR GENERAL/CEO**

Copy to:

Medical Superintendent  
Gatundu District Hospital.

The County Commissioner  
Kiambu County.



## Appendix ix: Research authorisation from Kiambu County

MINISTRY OF INTERIOR AND CO-ORDINATION OF NATIONAL GOVERNMENT  
COUNTY COMMISSIONER, KIAMBU



Telephone: 066-2022709  
Fax: 066-2022644  
E-mail: [countycommissionerkiambu@kenya.go.ke](mailto:countycommissionerkiambu@kenya.go.ke)  
When replying please quote

County Commissioner  
Kiambu County  
P.O. Box 32-00900  
**KIAMBU**

ED.12/1/VOL II/170

24<sup>th</sup> March, 2015

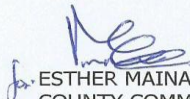
Charles Kiragu ngigi  
Kenyatta University  
P.O. Box 43844-00100  
**NAIROBI**

**RE: RESEARCH AUTHORIZATION**

Reference is made to National Commission for Science, Technology and Innovation letter Ref. No. NACOSTI/P/15/0336/4582 dated 19<sup>th</sup> March, 2015.

You have been authorized to conduct research on "*Evaluation of self medication with antibiotics prior to seeking treatment among patients at Gatundu District Hospital, Kiambu County, Kenya*" for a period ending **18<sup>th</sup> December, 2015**.

You are requested to share your findings with County Director of Education upon completion of your research.

  
ESTHER MAINA  
COUNTY COMMISSIONER  
**KIAMBU COUNTY**

Cc County Director of Education  
**KIAMBU COUNTY**

Medical Superintendent  
**GATUNDU DISTRICT HOSPITAL**

National Commission for Science, Technology and Innovation  
P.O. Box 30623-00100  
**NAIROBI**

## Appendix x. Permission from Gatundu Sub County hospital



### MINISTRY OF HEALTH

Telegram: "MEDICAL" Gatundu  
 Telephone: Thika 067-74024  
 When replying please quote  
 Email Address

GATUNDU LEVEL IV HOSPITAL  
 P.O BOX 84 - 01030  
 GATUNDU  
 gatundul4h@gmail.com

Ref:GTD/GEN/37/VOL.1/25

CHARLES KIRAGU NGIGI  
 KENYATTA UNIVERSITY  
 REG. NO. Q57/25527/2013

**RE: AUTHORITY TO CARRY OUT RESEARCH ON EVALUATION OF SELF-MEDICATION  
 WITH ANTIBIOTICS IN THE OUTPATIENT DEPARTMENT**

You are hereby allowed to conduct the above research having obtained relevant authorization from Kenyatta University and having paid research fee.

You are required to adhere to all existing regulations relating to ethics in research and specifically confidentiality of client/patient . You are expected to deposit a copy of your research finding with the hospital upon completion of the study.

Best Wishes

KARIUKI J.G.  
 FOR MEDICAL SUPERINTENDENT  
 GATUNDU DISTRICT HOSPITAL

MEDICAL SUPERINTENDENT  
 GATUNDU DISTRICT HOSPITAL  
 P. O. Box 84 - 01030  
 TEL: 0786 916 894  
 GATUNDU