

**FACULTY
MEDICINE**

**LUSAKA APEX
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OF



DEPARTMENT OF PUBLIC HEALTH

PROJECT REPORT

**ASSESSEMENT OF KNOWLEDGE AND PERCEPTIONS OF UNDERGRAUTE
STUDENTS (3rd and 4th YEARS) AT LUSAKA APEX MEDICAL UNIVERSITY
TOWARDS ANTIBIOTIC MISUSE AND ITS SIDE EFFECTS**

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DECLARATIONS

STUDENT DECLARATION

I CHISHIMBA CHIBWE, STUDENT NUMBER: PMP/16/02/001022, LUSAKA APEX MEDICAL UNIVERSITY declare that this project report is my original work and has not been presented in any other University/Institution for consideration of any certification. This project report has been complemented by referenced sources duly acknowledged from textbooks and other sources, including the internet, these are specifically accredited and references cited using current Harvard System and in accordance with anti-plagiarism regulations.

Signature C.Chibwe.

Date 12/04/2022

SUPERVISORS DECLARATION

I hereby certify that this project report has been read and evaluated by me. I hereby acknowledge that this project report has been submitted for appraisal with my approval as university supervisor.

Name: Ms . S. Namwawa

Signature.....



Date03/05/2022

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CONTENTS

DECLARATIONS.....	I
ABSTRACT.....	Error! Bookmark not defined.
ACKNOWLEDGEMENTS.....	II
ACRONYMS.....	VI
DEFINITIONS.....	VI
CHAPTER ONE; INTRODUCTION.....	1
1.1 Background	1
1.2 Statement of the problem	2
1.3 Justification of study	2
1.4 Objectives.....	3
1.4.1 General objectives	3
1.4.2 Specific objectives.....	3
1.5 Research questions	3
CHAPTER TWO: LITERATURE REVIEW	4
2.1 Introduction	4
2.2 Empirical Review	5
2.3 Conclusion.....	Error! Bookmark not defined.
CHAPTER THREE: METHODOLOGY	7
3.1 Introduction	7
3.2 Research design.....	7
3.3 Study variables	7
3.4 Study Site	8
3.5 Target population	8
3.6 Criteria.....	8
3.6.1 Inclusion criteria.....	8
3.6.2 Exclusion criteria.....	8
3.7 Sample size.....	8
3.8 Data collection and materials	9
3.8.1 Procedure.....	9
3.8.2 Data collection.....	9
3.8.3 Data management.....	9
3.8.4 Data analysis	9
3.9 Ethical considerations	10

CHAPTER FOUR; RESULTS	10
4.1 Introduction	10
4.2 General information	10
4.3 Social demographic information	10
4.4 Knowledge on Antibiotic Use	12
4.4.1 Association between Knowledge and demographic factors	13
4.5 Attitude of medical students on antibiotics	14
4.5.1 Association Between Attitude of Respondents with Demographic Factors	15
4.5 Practice of medical students toward antibiotics	15
4.6.1 Association between Practices and Demographic Factors	16
CHAPTER FIVE: DISCUSSION	17
5.1 Introduction	17
5.2 Discussion	17
CHAPTER SIX; CONCLUSION AND RECOMMENDATIONS	19
6.1 Limitations	19
6.2 Conclusion.....	19
6.3 Recommendations	20
REFERENCES	20
3.8 WORK PLAN	Error! Bookmark not defined.
BUDGET.....	Error! Bookmark not defined.
APPENDICES.....	21
INFORMATION SHEET	21
APPENDIX II	Error! Bookmark not defined.
1. Sex.....	23
2. Age	23
3. Year of study	23
4. Religion	23
LETTER OF APROVAL TO COLLECT DATA.	Error! Bookmark not defined.

ACRONYMS

AIDS	:	Acquired Immune Deficiency Syndrome.
ARB	:	Antibiotic Resistance
ECDP	:	European Center for disease prevention
HIV	:	Human Immunodeficiency Virus
MRSA	:	Methicillin-Resistant Staphylococcus
KAP	:	Knowledge, Attitude and Practice
SPSS	:	Statistical Package for Social Sciences
VRE	:	Vancomycin Resistant Enterococci
WHO	:	World Health Organization

DEFINITIONS

Knowledge – In this study, this is the fact or state of knowing antibiotics and antibiotic resistance with familiarity gained through experience or association or other means.

Attitude – a settled way of thinking or feeling about antibiotic resistance

Practice – in this study, practice means complying or undertaking measures that prevent or promote development of antibiotic resistance.

ABSTRACT

Introduction

Antibiotic resistance is the ability of bacteria to resist the effects of antibiotics to which they were once sensitive. Antibiotic resistance (ABR) is a global health crisis, its estimated that 700 000 people die from ABR infections in a year, in addition to the increased mortality ABR also puts a burden on the economy in that it leads to prolonged illness which results in longer hospital stays, the need for more expensive medicines and other financial challenges.

Objective

To assess knowledge and perceptions of undergraduate medical students towards antibiotic misuse and its side effects.

Methodology

Results

A total of 120 medical students were successfully enrolled to participate into the study. There were more female participants (77) representing 64.2% than males (43) students representing 35.8%. Majority of the study participants were of the age range 18-25 years of age represented at 65%. The study further showed that majority of study participants were in 3rd year of study (92) representing 76.7%. The study

revealed that undergraduate medical students at LAMU had good knowledge and good attitude towards antibiotic use. However, the study also revealed that undergraduate medical students at LAMU had poor practices towards antibiotics use. Knowledge was associated with sex and year of study of the study participants ($p=0.001$) but was not associated with the age of the medical students. Attitude towards antibiotic use was also related to the sex of the medical student, where more females had a positive attitude than males ($p=0.001$). However, the practices of medical students towards antibiotics were not related to the demographic factors of medical students ($p>0.05$).

The study therefore, showed that having good knowledge does not translate to having good practices.

CHAPTER ONE; INTRODUCTION

This chapter presents the background on the study, provide context and a rationale for the work which was done, in order to orient the reader about the study topic. This section also outlines the problem statement and justifies why this research needed to be conducted as well as the objectives.

1.1 Background

Antibiotics are medicines used to prevent and treat bacterial infections. Penicillin, the first true antibiotic was discovered in 1928 by Alexander Fleming (Hawkey, 1998). After almost a century since the discovery of penicillin, a lot of antibiotics have been developed to treat a lot conditions, including acne, bronchitis, conjunctivitis, ear infections, sexually transmitted diseases, streptococcal pharyngitis, tonsillitis, upper respiratory tract infections, urinary tract infections and various other infections. Research conducted by the world health organization has confirmed the rapid increase in utilization of antibiotics between 2000 and 2015 (Reygaert., 2018) . This increase in use is concerning and the European center for disease prevention (ECDP) has called out unnecessary prescription as one of the leading causes antibiotic resistance (ABR) (World health organization, 2014).

Antibiotic resistance is the ability of bacteria to resist the effects of antibiotics to which they were once sensitive(Reygaert, 2018)ABR is a global health crisis, its estimated that 700 000 people die from ABR infections in a year, in addition to the increased mortality ABR also puts a burden on the economy in that it leads to prolonged illness which results in longer hospital stays, the need for more expensive medicines and other financial challenges (Ndiokubwayo, 2013). The mechanisms of ABR are well described and include enzyme degradation of antibiotic drugs, alteration of bacterial sites that are targets for antibiotics and change in the bacterial membranes preventing the permeability of the antibiotics. However, ABR is accelerated by overuse or misuse of antibiotics.

Sub Saharan African and other low and middle -income countries have the highest rates of ABR caused by indiscriminate and irrational use of antibiotics driven by lack of knowledge and poor attitude of the prescribers and dispensers (Naveed *et al.*, 2015). Clinical misuse by healthcare professionals is one of the leading causes of antibiotic resistance, studies done by the CDC show that indications for antibiotics, choice of the agent used and the duration of the therapy was incorrect in up to 50 percent of the case studies. Furthermore, populations of low-income countries are at a greater risk because of the ability to purchase antibiotics over the counter without prescription. Numerous conditions could influence health practitioners decisions when prescribing these antibiotics, some of the conditions include lack of culture and sensitivity results leading to uncertain diagnosis, consideration of the price of the drug and the patient's financial status, drug supply at a health facility, physicians personal experiences, and inadequate knowledge on rational prescribing and ABR (Mudenda *et al.*, 2019) Self- medication is also another cause of antibiotic misuse, in an effort to manage their illnesses, patients take false advice from the media, friends and family causing

them to take antibiotics unnecessarily or in excess. Pandemic and epidemic burdens on health care systems may also contribute to ABR.

Proper measures to combat antibiotic resistance development and spread in Sub Saharan are very crucial bearing in mind the projected burden of antibiotic resistance which is expected to increase by 2050. This study is designed to assess the knowledge and perception of antibiotic misuse and its side effects among undergraduate students at Lusaka apex medical university.

1.2 Statement of the problem

Sub Saharan African and other low to middle income countries have the highest rates of antibiotic resistance globally. This is due indiscriminate and irrational use of antibiotics driven by lack of knowledge and poor attitude demonstrated by both the prescribers and the consumers (Naveed *et al.*, 2015). Clinical misuse of antibiotics by healthcare professionals is one of the leading causes of antibiotic resistance and studies done by the CDC show that indications for antibiotics, choice of the agent used and the duration of the therapy was incorrect in up to 50 percent of the case studies. Furthermore, populations of low income countries are at a greater risk of developing antibiotic resistance because of their tendency to purchase antibiotics over the counter without prescription as well as the tendency of stopping the antibiotic course midway without completing the prescribed dose and duration. Literature has shown that the last two decades have not been marked by the discovery of new antibacterial substances (Miethke *et al.*, 2021), therefore, the phenomenon of antimicrobial resistance has intensified, generating substantial costs for the healthcare systems around the world (Basseti *et al.*, 2020). Simultaneously, the excessive and inadequate use of antibiotics contribute to this concern that hovers over the global health system. If this problem is not addressed, a greater proportion of the global population will develop antibiotic resistance thereby rendering the current ones ineffective for treatment of bacterial infections. To the best of our knowledge, few studies has been conducted in Zambia to highlight the aspects related to antibiotic use, misuse and potential side effects resulting from misuse of antibiotics. Therefore, this study was carried out to assess the knowledge, attitude and practices of undergraduate medical students towards antibiotic misuse at LAMU.

1.3 Justification of study

The purpose of the study was to assess knowledge and perceptions of undergraduate students at Lusaka apex medical university towards antibiotic misuse and its side effects. By analyzing the knowledge and practices of using antibiotics and correcting the inappropriate ones, we can act strategically and punctually to prevent the development of antibiotic resistance. As future prescribers, medical students need to have adequate information on ARB to tackle this crisis sufficiently. Additionally, there are less published studies that have

been done in Zambia to assess these perspectives, the information gathered here could be helpful in stimulating operational research in medical schools and guide students on drug use.

1.4 Objectives

1.4.1 General objectives

To assess knowledge and perceptions of undergraduate medical students towards antibiotic misuse and its side effects.

1.4.2 Specific objectives

- i. To assess medical students' knowledge on antibiotic use and resistance.
- ii. To assess medical students attitude towards antibiotics
- iii. To determine medical students' practices towards antibiotics

1.5 Research questions

- i. What is the level of knowledge of medical students on antibiotic use?
- ii. What is the practice of medical students regarding antibiotics?
- iii. What is the attitude of medical students towards antibiotic misuse?

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews some of the studies that have been conducted and as relevant to the research topic. It combines these studies and provide a basis and direction of the study.

2.2 Antibiotics Resistance as a global burden

Antibiotic resistance means that a particular pathogen fails to respond to the recommended course of antibiotic treatment. Often, an alternative course of treatment can be successful, but some infections persist because the disease-causing pathogen is resistant to all drugs that can reach the target tissue at concentrations sufficient to clear the infection. Clinical antibiotic resistance in bacteria was noted to occur already at the very beginning of the antibiotic era in the late 1930s and early 1940s. Both sulfonamide and penicillin resistance was reported within a few years after the launching of these two drug classes into therapeutic treatments. Likewise, streptomycin resistant mutants of *Mycobacterium tuberculosis* were identified in patients shortly after treatment was initiated (Davies *et al.*, 2010). Multi-resistant *M. tuberculosis* strains currently cause non-treatable tuberculosis infections. Similarly, multi-resistant *Neisseria gonorrhea* is an increasing problem for treatment of gonorrhea (Unemo *et al.*, 2010 and Ohnishi *et al.*, 2011). Antibiotic resistance is a major concern in the treatment of hospital acquired, or nosocomial, infections, which typically afflict elderly or immunocompromised patients. Gram-positive bacteria like *Streptococcus pneumoniae*, *Staphylococcus aureus* and *Enterococci* are well-documented nosocomial pathogens that have acquired resistance to several drugs. Vancomycin-resistant *Enterococci* (VRE) and methicillin-resistant *Staphylococcus aureus* (MRSA) are great concerns, and some MRSA strains further develop vancomycin resistance (VRSA). MRSA can also cause skin infections in otherwise healthy individuals, as seen with the much-publicized community-acquired cases (Rice, 2006 and Woodford *et al.*, 2009). Gram-negative bacteria are intrinsically resistant to more antibiotics than are Gram-positives. This is due to the low permeability of the outer membrane coupled with the presence of membrane spanning efflux pumps. These two mechanisms prevent entry and promote extrusion of antibiotics respectively, decreasing intracellular concentrations. In addition, Gram-negatives, like Gram-positives, can acquire additional resistance mechanisms. *Pseudomonas aeruginosa* readily develops multi-resistance through a combination of intrinsic and acquired resistance mechanisms, and it is a major nosocomial agent, especially concerning lung infections in cystic fibrosis patients (Poole, 2011). The major nosocomial players, *Escherichia coli*, *Klebsiella pneumoniae* and *Acinetobacter baumannii* cause infections in the urinary tract, lungs, bloodstream, bones and joints. They are increasingly acquiring resistance to the last-resort beta-lactam antibiotics, cephalosporins and carbapenems (Giske *et al.*, 2008).

WHO regions have made significant contributions to raising awareness and providing training on antimicrobial resistance. Examples include the following; the first joint commemoration of World Antibiotic Awareness Week at continental level, co-organized by the Government of Kenya, FAO, OIE, WHO and the African Union Commission; a comprehensive special issue on antimicrobial resistance published in the Pan American Journal of Public Health; the development of an antimicrobial resistance curriculum module for primary and secondary schools, and of an online course, Antimicrobial Stewardship: A competency-based approach, in which more than 46 000 people enrolled; and the development of an online “Antibiotic Hero” application, videos and social media materials used by social media influencers to raise awareness of the issue (WHO, 2020). All WHO regions provides technical support to strengthen national systems for the surveillance of antimicrobial resistance, consumption and use.

2.3 Empirical Review

Globally, in a cross-sectional study conducted among medical students from three universities in Colombia, the study was designed to describe the knowledge, attitude, and practice regarding antibiotic use and resistance among medical students. Results of the study revealed that majority of medical students had good knowledge, however, with a negative attitude and poor practice towards antibiotics use (Higueta et al., 2020). The study in Colombia was similar to a cross sectional study conducted in India which showed that students had good knowledge although the attitude and practices were poor (Sharma et al., 2019). Nonetheless, another study in India revealed that the overall knowledge on antibiotics was poor for students. Only 34.2% of students knew correctly that antibiotics are supposed to kill bacteria and 80% incorrectly answered that antibiotics are used to make one recover from cold (Siam et al, 2021).

A study conducted in China showed that 35.6% of the respondents expected antibiotics to be prescribed for common cold. About 77.8% knew that antibiotics can only be used to kill bacteria and 27.4% respondents correctly knew that antibiotics are not be used for viral infections. More than half of the study participants knew that the effectiveness of antibiotics is reduced if the full course is not completed. About 71.9% knew that overuse of antibiotics can cause resistance, nearly a quarter had a good knowledge on antibiotic use (Chua, 2020).

A study that was done in United Arab Emirates on 1,200 students showed that the knowledge of the participants on antibiotics was 56%. It was also found that nearly half of the 48% incorrectly answered that antibiotics can be used for viral infections. More than half of the students 55.5% did not perceive antibiotic resistance as a problem. About 68.5% of the students answered that they would use antibiotics for common cold and sore throat (Jarroun et al, 2019).

A study that was done in Indonesia showed that 73.12% of the respondents stated that antibiotics can be used for viral infections. The attitude half of the study participants agreed not to be completing the antibiotic course after symptoms disappears and it was also found that nearly half of the study participants obtain antibiotics from the pharmacies without prescription. Nearly half (46.9%) of the respondents had moderate level of knowledge on antibiotics (Karuniawati et al, 2021).

A study conducted by Abbo explored the knowledge, attitudes, and practices among 317 medical students in the United States, with the results indicating that 90% of the students desire more education on the appropriate use of antimicrobials, and only 33% perceived their preparedness to be adequate in some fundamental principles of antimicrobial use (Abbo *et al.*, 2013). A survey in 13 European countries found large differences in teaching important principles on the prudent use of antibiotics (Pulcini *et al.*, 2015), and another study in Congo, Africa found that knowledge regarding antibiotics was low (Batoko *et al.*, 2013).

A study that was done in Sudan showed that the knowledge of students on antibiotics was good as 40.2% scored good grades. About 43.6% of the participants answered that they always finish their antibiotic course. Half (52.7%) of the study participants of the study participants agreed to be taking antibiotics for cough. About 43.1% answered that they always need a prescription for antibiotics. The minority of the study participants 24.8% suggested that there's need to educate and enlighten people on antibiotics resistance (Sunusi et al, 2019).

In a study that was conducted at the University of Zambia among the medical students, showed that the majority (99.2%) of the study participants correctly knew that antibiotics are used to treat bacterial infections. Half of the study participants correctly responded that antibiotics are not used to speed up the recovery of common cold. The majority also knew that antibiotics are not used to treat viral infections (93.5%). All the study participants accepted that they have heard about antibiotics resistance and knew that frequent use of antibiotics can lead to resistance and reduced effectiveness (Zulu et al, 2020).

The literature reviewed showed that the overall knowledge for students on antibiotics was not adequate and majority had a negative attitude toward antibiotic use and resistance. It is very important that student get more information about antibiotics and this will improve on the rational use of antibiotics and reduce resistance. Antibiotic resistance is a global public health concern because it adversely affects treatment results, prolongs morbidity, increases hospital stay, elevates the risk of mortality and escalates medical costs. Medical students should not only be taught about the health conditions but should also learn important principles on the prudent use of antibiotics, rational prescribing behavior and ABR as future prescribers.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This section summarizes all the methods that form part of this study, it will also highlight elements of methods of the study that was adopted as well as techniques that was used to analyze and present the data.

3.2 Research design

This study was quantitative, descriptive cross-sectional study design. Questionnaires were randomly distributed to undergraduate medical students from 3rd to 4th year and they were later returned to assess the knowledge and perceptions of participants. 3rd and 4th year medical students are expected to have basic medical science knowledge.

3.3 Study variables

The study variable and the scale of measurement are in the table 3.3.1;

Variable	Variable type	Remark	Indicator(s)	Scale of measurement
Knowledge	Dependent variable	Good	Can give 2 or more acceptable responses.	Interval Scale
		Poor	Able to give 1 or less acceptable responses	
Attitude	Dependent variable	Positive	Able to give 3 or more positive responses	Interval Scale
		Negative	Able to give 2 or less positive response	
Practices	Dependent variable	Good	Able to give 3 or more positive responses	Interval Scale
		Poor	Able to give 2 or less acceptable responses	
Age	Independent Variable		18-25 26-30 >30	Interval scale
Year of study	Independent Variable		Third year Fourth year	Ordinal Scale
Gender	Independent Variable		Gender with more information	Nominal scale

			Male/ Female	
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Table 3.3.1 study variable and the scale of measurement

3.4 Study Site

Lusaka Apex Medical University (LAMU) is a privately owned Zambian medical university that was founded in 2008, with the goal of assisting the Zambian government in educating competent, qualified medical and healthcare staff to serve the people of Zambia and Southern Africa. The university's main campus is located approximately 13.1 kilometers south of the central business district of Lusaka, Zambia's capital and largest city, along the Lusaka-Kasama road. The university also has other campuses, such as Foxdale campus on Zambezi road, Mutandwa campus, located on Mutandwa road, on plot No. 12681M Kasama road, Hillview Park Lusaka. P.O.Box 31909, Lusaka, Zambia.

3.5 Target population

The study population consisted of Lusaka apex medical students from 3rd to 4th year who were available and willing to participate. They were selected using a simple random sampling method. Non-probability convenience sampling method was used in order to provide a large pool of possible participants.

3.6 Criteria

3.6.1 Inclusion criteria

This study only included medical students from Lusaka apex medical university from 3rd to 4th year.

3.6.2 Exclusion criteria

Medical students in 2nd year, all clinical medical students from Lusaka apex medical university or any other university and students that did not consent.

3.7 Sample size

Sample size was calculated using the Yamane formula;

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{213}{1 + 213(0.05)^2}$$

$$n = \frac{213}{1.5325}$$

$$n = 138$$

Where;

n= sample size

N=is the population 213

e = sampling error which was set at less than 0.05 with confidence interval of 95%

3.8 Data collection and materials

3.8.1 Procedure

Self- administered questionnaires were distributed to 3rd and 4th medical students at apex university, Faculty of medicine. No personal information that could be used in identifying the participants was requested.

3.8.2 Data collection

Data was collected through self- administered questionnaire in English by the principal researcher. The questionnaires were closed ended questions that was yes or no or choose from the option given. It was divided into four parts, the first part consisted of social demographic data of the participants that is gender, age year of study and religion. Part 2 consisted of questions to assess the knowledge on antibiotics, part 3 is on student's perception on antibiotic resistance and lastly part 4 is on student's practices toward antibiotics resistance. The purpose of the study was explained to all participants before obtaining their consent to fill in the questionnaire.

3.8.3 Data management

To ensure credibility, substantial literature review was carried out on the knowledge and perceptions of undergraduate medical students towards antibiotic misuse and its side effects. Additionally, the questionnaire has simple and precise questions allowing the participants to give clear answers disclosing their knowledge and perception. All data was collected and cross checked for missing information before departing with the respondents. The questionnaire was serial numbered and data was stored and kept confidentially under the lock and key till field work was completed, for privacy sake the keys were kept by the principle researcher.

3.8.4 Data analysis

The data was collected first, checked to correct any errors to ensure consistency and completeness. The data was analyzed using Statistical Package for Social Science (SPSS) and only fully completed questionnaires were analyzed. Descriptive statistics, which include measures of central tendency and dispersion, was reported for the respective data group based on their normality.

3.9 Ethical considerations

Ethical clearance to conduct this study was sought from Lusaka Apex Medical University Research Ethics Committee (LAMUREC) and the faculty of medicine Mutandwa campus. Consent forms were developed explaining the research and the rationale of the research. During the process of data collection and data presentation confidentiality and anonymity was ensured through the use of code numbers.

CHAPTER FOUR; RESULTS

4.1 Introduction

This chapter presents the findings and interpretations in accordance with the objective of this study which was to determine the knowledge and perceptions of undergraduate medical students towards antibiotic misuse and its side effects. Data was collected using a self-administered structured questionnaire and was analyzed using SPSS version 26 software. Data has been presented in tables, graphs, frequencies, percentages and cross tabulation.

4.2 General information

The calculated sample size for medical students was 138 among which 127 were available during that period of data collection. A total of 127 questionnaires were distributed during the data collection period of which 120 questionnaires were completely filled and returned at the end of data collection period. Therefore, the response rate was $(120/127)$ 94.5%.

4.3 Social demographic information

A total of 120 medical students were successfully enrolled to participate into the study. The study population comprised of 77 female students and 43 male students representing 64.2% and 35.8% respectively. Figure 4.3.1 shows the distribution of participants by sex;

Distribution of Respondents by Sex

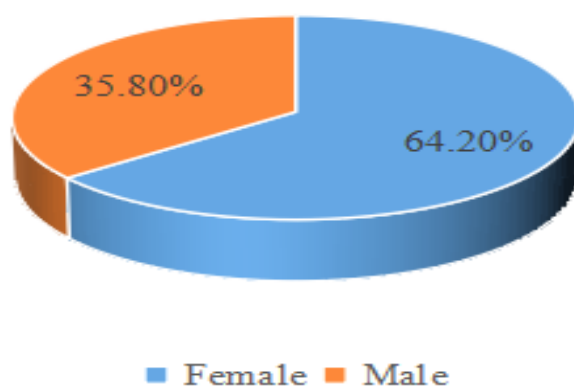


Figure 4.3.1 Distribution of respondents by Sex

Majority of the study participants were of the age range 18-25 years of age represented at 65%, while the minority were of the age range of above 30 years of age represented at 8.3%. Figure 4.3.2 shows the distribution of study participants by age;

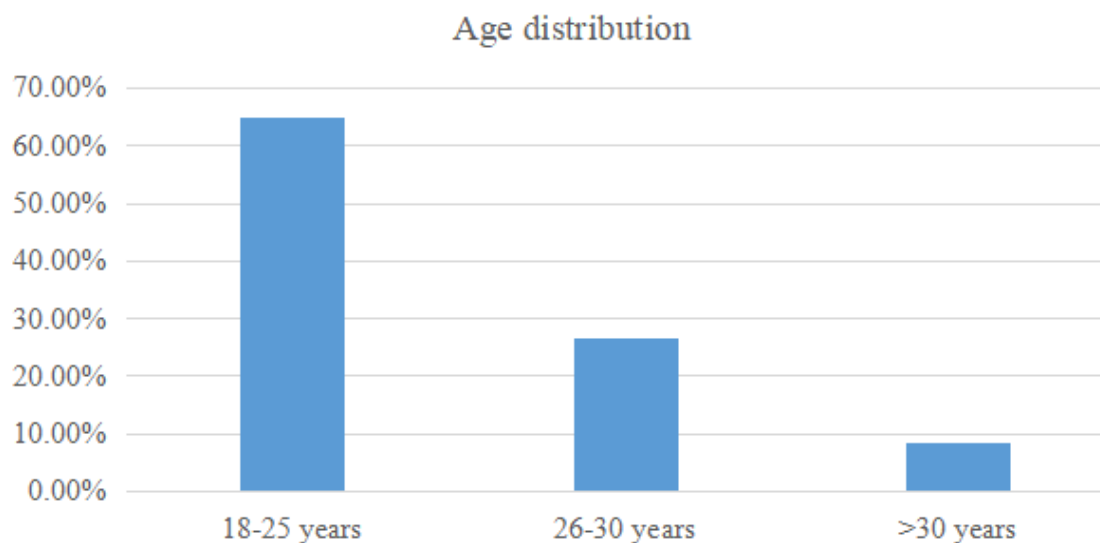


Figure 4.3.2 distribution of study participants by Age

The results further showed that majority of study participants were in 3rd year of study (92) representing 76.7%, while other participants were in 4th year of study (28) representing 23.3%. figure 4.3.3 shows the distribution of study participants by year of study

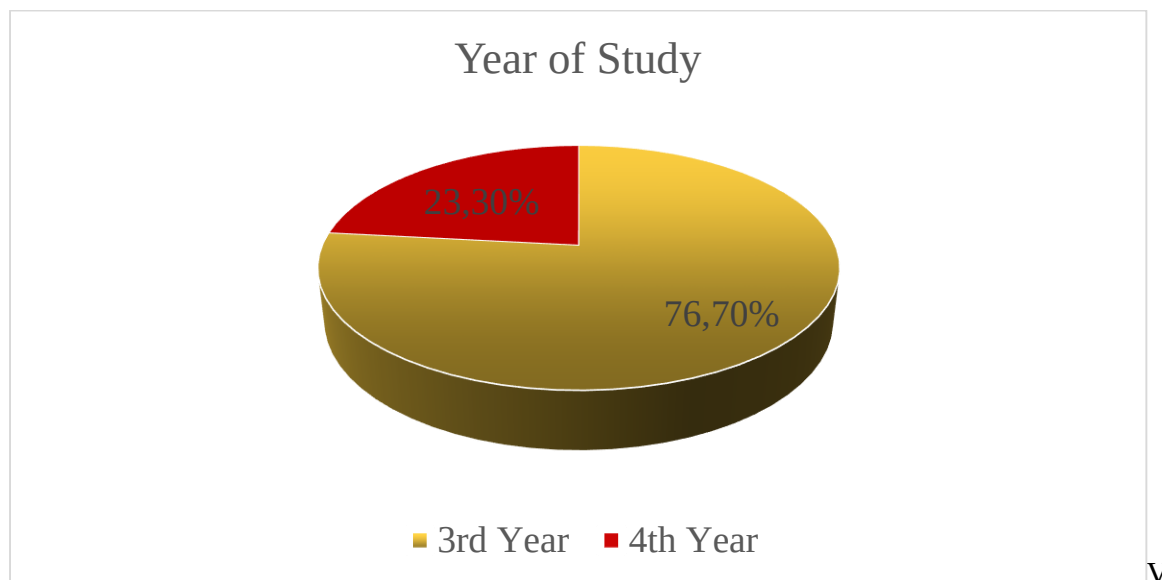


Figure 4.3.3 Year of study

As for the religion were Christians representing the 88.3%, followed by Islam representing 8.3%.

4.4 Knowledge on Antibiotic Use

Results revealed that majority of respondents had good knowledge levels on antibiotics. All the respondents admitted to have heard of antibiotics and the majority of respondents (79.2%) also admitted to have heard about antibiotic resistance, while 78.3% respondents correctly answered that antibiotics mainly targets bacterial infections. The main sources of information on antibiotic resistance was school (76.3%). others sources of information included internet (10.2%), magazines (12.6%) and friends (0.9%). Nearly two third of the study participants incorrectly answered that antibiotics speed up the recovery of a cold. Majority of respondents reported that frequent use of antibiotics can lead to antibiotic resistance (89.3%). table 4.4.1 shows the responses on the knowledge on antibiotic use;

Variable	Category	Percentage
Heard of Antibiotics	Yes	100%
	No	0
Heard of Antibiotic Resistance	Yes	79.2%
	No	20.8%
Antibiotics cure Bacterial infections	Yes	78.3%
	No	21.7%
Antibiotics cannot Cure Viral Infections	Yes	76.7%
	No	23.3%
Frequent use of Antibiotics lead to Antibiotic Resistance	Yes	89.3%
	No	10.7%
Use of Antibiotics speed up the recovery of a cold	Yes	62.5%
	No	37.5%

Table 4.4.1 Knowledge on Antibiotic Use

The results further revealed that majority of respondents had overall good knowledge score (67.5%). Figure 4.4.2 furthers shows the overall knowledge levels on antibiotics use;

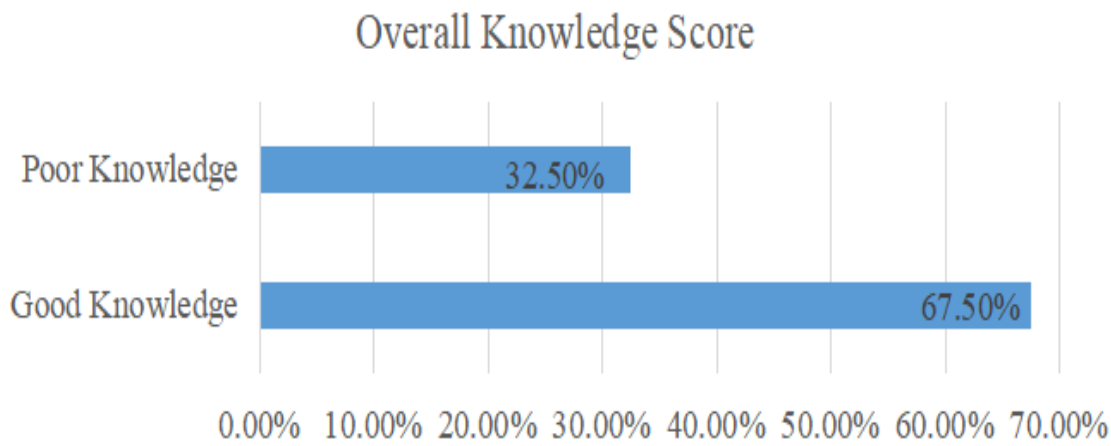


Figure 4.4.2. Overall Knowledge Score on Antibiotics Use

4.4.1 Association between Knowledge and demographic factors

Results revealed that sex and year of study of the respondents were associated with knowledge levels ($p < 0.001$). More females had more good knowledge on antibiotic use than males. 4th Year medical students had more knowledge than 3rd year students. Age was however, not associated with knowledge ($p > 0.05$) as shown in table 4.4.3;

Demographic Factor		Knowledge of Respondents		p-value
		Good Knowledge	Poor Knowledge	
Age	18-25 Years	62	16	0.265
	26-30 Years	13	22	
	>30 Years	6	4	
Sex	Male	12	31	0.001
	Female	69	11	
Year of Study	3 rd Year	61	31	0.001
	4 th Year	24	11	

Table 4.4.3 Association between Knowledge and demographic factors

4.5 Attitude of medical students on antibiotics

Results revealed that majority of respondents agreed that overuse of antibiotics is the leading cause of antibiotic resistance (90%), while 2% were neutral. Majority of respondents also agreed that it is necessary to get more education on the use of antibiotics (87.5%) as this can help reduce the misuse of antibiotics and subsequently lead to the reduction of development of antibiotic resistance. Most of the study participants suggested that there's need to establish a course on rational use of antibiotics and large scale antibiotics campaign promotion and this was represented as 87.5% and 78.3% respectively. Table 4.5.1 summarizes the responses on the attitude of medical students towards antibiotic resistance;

Variable	Category	Percent
Overuse of antibiotics is the leading cause of antibiotic resistance	Agree	90%
	Disagree	8%
	Neutral	2%
Necessary to conduct more education the use of antibiotics	Agree	87.5%
	Disagree	5.2%
	Neutral	7.3%
There a need to establish a course on rational use and prescription of antibiotics	Agree	87.5%
	Disagree	2.3%
	Neutral	10.2%
Necessary to carry out large scale antibiotics campaign promotion	Agree	78.3%
	Disagree	4.7%
	Neutral	17%

Table 4.5.1 Attitude Towards antibiotics Use

The study further established that the overall attitude of respondents towards antibiotic resistance was positive (87.5%). figure 4.5.2 shows the overall attitude towards antibiotic resistance;

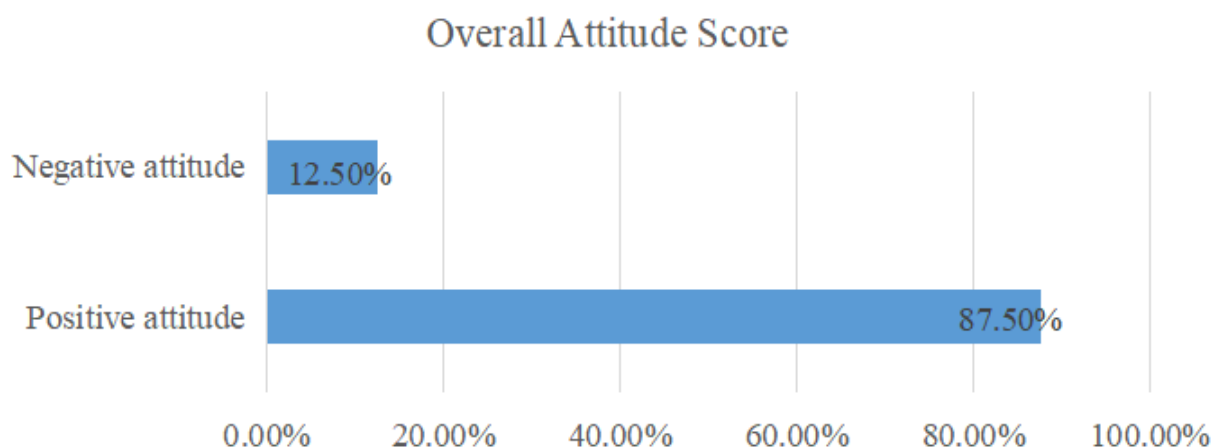


Figure 4.5.2 Overall Attitude Score towards antibiotic resistance

4.5.1 Association between Attitude of Respondents with Demographic Factors

When compared with sex, age and year of study, the results showed that sex of the respondent was associated with the attitude of the respondent (p -value=0.001). However, there was no association between the program of study nor the year of study and the attitude ($p>0.05$). Table 4.5.3 shows the results on association of attitude and demographic factors;

Demographic Factor		Attitude of Respondents		p-value
		Positive Attitude	Negative Attitude	
Age	18-25 Years	73	5	3.310
	26-30 Years	24	8	
	>30 Years	8	2	
Sex	Male	37	6	0.001
	Female	67	10	
Year of Study	3 rd Year	77	15	0.301
	4 th Year	42	1	

4.5.3 Association between Attitudes of Respondents with Demographic Factors

4.5 Practice of medical students toward antibiotics

The results revealed the practices of respondents towards antibiotics was generally poor (57.5%). This was evidenced the study results which reported that 59.2% respondents purchase antibiotics for use without the

doctor's prescription. Furthermore, majority of respondents (57.5%) admitted to not completing the course of antibiotics once they feel better having started taking a prescribed course. However, only 30% respondents admitted to take antibiotics for common cold or headache. Table 4.6.1 summarizes the results on the practices of medical students towards antibiotics;

Variable	Category	Percent
Takes antibiotics for a common cold or headache	Yes	36 (30%)
	No	84 (70%)
Purchases over the counter antibiotics without the doctor's prescription	Yes	71 (59.2%)
	No	49 (40.8%)
Completes the course of antibiotics even when symptoms disappear	Yes	51 (42.5%)
	No	69 (57.5%)

Table 4.6.1 Practices of Medical students towards Antibiotics

Figure 4.6.2 shows the overall score on the practices towards antibiotics use;

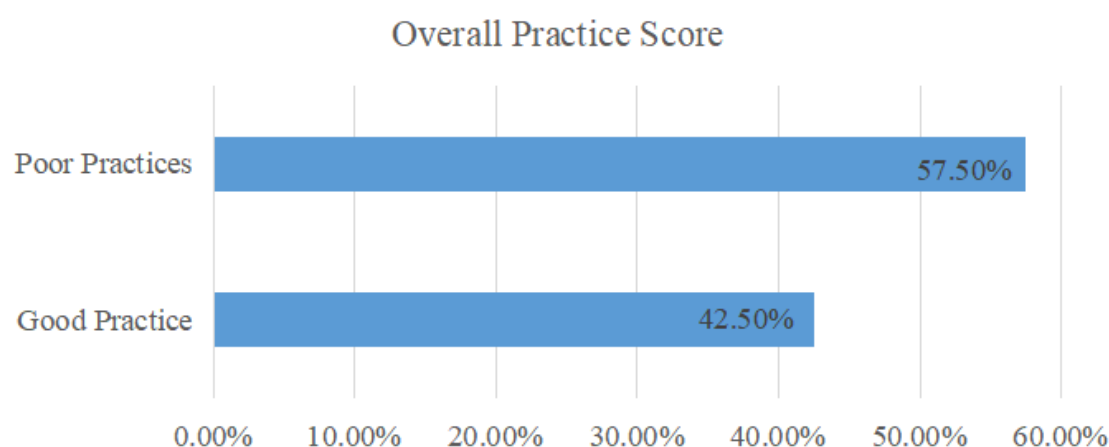


Figure 4.6.2 Overall score on the practices towards antibiotics use

4.6.1 Association between Practices and Demographic Factors

When compared with age, sex and year of study, the results showed that there was no association of demographic factors with the practices of medical students towards antibiotic use ($p > 0.05$). Table 4.6.3 shows the results on association of practices and demographic factors;

Demographic Factor		Practices of Respondents		p-value
		Good Practice	Poor Practice	

Age	18-25 Years	46	32	0.572
	26-30 Years	2	30	
	>30 Years	8	2	
Sex	Male	30	13	2.483
	Female	21	56	
Year of Study	3 rd Year	61	31	4.002
	4 th Year	24	11	

4.6.3 Association between Practices and Demographic Factors

CHAPTER FIVE: DISCUSSION

5.1 Introduction

The main objective of this study was to assess the knowledge and perceptions of undergraduate medical students towards antibiotic misuse and its side effects. This chapter discusses the findings in line with the research objectives and question.

5.2 Discussion

A total of 120 medical students were successfully enrolled to participate into the study. There were more female participants (77) representing 64.2% than males (43) students representing 35.8%. Majority of the study participants were of the age range 18-25 years of age represented at 65%. The study further showed that majority of study participants were in 3rd year of study (92) representing 76.7%.

The study showed that majority of undergraduate medical students at Lusaka Apex Medical University had good knowledge (67.5%) on antibiotic use. This was evidenced by the findings that showed that all the respondents admitted to have heard of antibiotics and the majority of respondents (79.2%) also admitted to have heard about antibiotic resistance, while 78.3% respondents correctly answered that antibiotics mainly targets bacterial infections. Nearly two third of the study participants incorrectly answered that antibiotics speed up the recovery of a cold. Majority of respondents reported that frequent use of antibiotics can lead to antibiotic resistance (89.3%). The present study is consistent with a study conducted at the University of Zambia which reported that students had good knowledge on antibiotics (Zulu et al., 2020). Results in that study showed that the majority (99.2%) of the study participants correctly knew that antibiotics are used to treat bacterial infections. Half of the study participants correctly responded that antibiotics are not used to speed up the recovery of common cold. The majority also knew that antibiotics are not used to treat viral infections (93.5%). All the study participants accepted that they have heard about antibiotics resistance and

knew that frequent use of antibiotics can lead to resistance and reduced effectiveness (Zulu et al., 2020). The present study is also consistent with a study conducted in Sudan (Sunusi et al., 2019) which reported that majority of study participants had good knowledge score on antibiotics use.

The present study also showed that sex and year of study of the respondents were associated with knowledge levels ($p < 0.001$). More females had more good knowledge on antibiotic use than males. Also 4th Year medical students had more knowledge than 3rd year students. The association between higher level of education and better knowledge antibiotics is also consistent with reports conducted by (Ling et al., 2011) and Kim et al., (2015). Higher level of education has also been reported to be associated with better use of antibiotics in practice in some studies (Mitis et al., 2015).

The study further established that the undergraduate medical students at Lusaka Apex medical university had a positive attitude towards antibiotic use (87.5%). This was so as the results revealed that majority of respondents agreed that overuse of antibiotics is the leading cause of antibiotic resistance (90%). Majority of respondents also agreed that it is necessary to get more education on the use of antibiotics (87.5%) as this can help reduce the misuse of antibiotics and subsequently lead to the reduction of development of antibiotic resistance. Most of the study participants suggested that there's need to establish a course on rational use of antibiotics and large scale antibiotics campaign promotion and this was represented as 87.5% and 78.3% respectively. The present study was consistent with a study conducted by Belkina et al., (2014) in which it was reported that medical students had a positive attitude towards antibiotic use. The present study also showed that sex of the respondent was associated with the attitude of the respondent ($p\text{-value} = 0.001$). A number of studies found no significant differences between males and females in their attitude towards antibiotics use (Ling et al., 2011). On the other hand, some reported differences (Nafisah et al., 2017, Demore et al., 2017). For example, among medical students in Sudan, females exhibited better attitude towards antibiotics and compliance with lower rate of inappropriate behavior of sharing antibiotics compared to males (Napolitano et al., 2013). However, women in Greece were more likely to use non-prescribed antibiotics compared to men (Mitsi et al., 2015). Some speculated that women's involvement in child raising and their disease management could alter their self-medication attitudes, leading to misuse of antibiotics (Mohamed et al., 2015).

The results revealed the practices of respondents towards antibiotics was generally poor (57.5%). This was evidenced the study results which reported that 59.2% respondents purchase antibiotics for use without the doctor's prescription. Furthermore, majority of respondents (57.5%) admitted to not completing the course of antibiotics once they feel better having started taking a prescribed course. However, only 30% respondents admitted to take antibiotics for common cold or headache. There was no association of demographic factors with the practices of medical students towards antibiotic use ($p > 0.05$).

The present study found that practice scores only weakly correlated with knowledge scores or attitude scores. This suggests that more knowledge or better attitude to antibiotics do not necessarily translate to better practice. Reports in the literature support the notion that there is no simple relationship between the level of knowledge and behaviors regarding antibiotics. Demore et al., (2017), found that there was no association between antibiotics knowledge and behaviors among the general population in France. This echoes the results of the survey conducted by McNulty et al., (2007), which showed, in particular, that a high level of knowledge about antibiotics was associated with more frequent self-medication. However, Lim et al., 2012, found a significant positive correlation between respondents' antibiotic knowledge score and their attitude score among the general public in Malaysia. This was consistent with a study in Korea, where adequate knowledge of antibiotics was shown to be a predictor for appropriate attitudes toward antibiotics and their use (Kim et al., 2011).

CHAPTER SIX; CONCLUSION AND RECOMMENDATIONS

6.1 Limitations

This study had several limitations. The main limitation of the study was time and resources. The study intended to conduct a survey with 138, however, only 120 medical students were successfully enrolled into the study. The number of female students who participated in the study, which was almost as twice as large as that of male students was also a limitation of the study. Women are much more concerned with health than men. It is possible that respondents may have reported socially acceptable attitudes. In addition, it is possible that respondents reported more on their knowledge regarding the use of antibiotics and not their real attitudes and practices regarding the use of antibiotics. The study was conducted using a self-administered questionnaire, thus, the use of knowledge, attitude and practices were basically self-reported, and therefore, results are only representative of medical students from LAMU who participated into the study.

6.2 Conclusion

The objective of the study was to determine the knowledge, attitude and practices of undergraduate medical students towards antibiotic misuse and its side effects at Lusaka Apex Medical University Mutandwa Campus. A cross sectional study design was employed in which 120 study participants were invited to take part into the survey. The study revealed that 67.5 percent of undergraduate medical students at LAMU had good knowledge and good attitude towards antibiotic use. However, the study also revealed that 57.5 percent of undergraduate medical students at LAMU had poor practices towards antibiotics use. Knowledge was associated with sex and year of study of the study participants ($p=0.001$) but was not associated with the age of the medical students. Attitude towards antibiotic use was also related to the sex of the medical student, where more females had a positive attitude than males ($p=0.001$). However, the practices of medical

students towards antibiotics were not related to the demographic factors of medical students ($p>0.05$). The study therefore, showed that having good knowledge does not translate to having good practices.

6.3 Recommendations

These findings call for action from relevant health authorities, policy makers and stakeholders to improve knowledge, attitude and behavior regarding antibiotics in the general population, to better healthcare professionals' knowledge and prescribing practices and to implement and to strictly enforce legislations to stop the sell of non-prescription antibiotics. Such interventions would improve irrational use of antibiotics and also reduce antibiotic overuse and misuse and help prevent emergence of resistance. The population was restricted to preclinical students, therefore, the researcher suggests that the study population be extended to clinical students to also assess their knowledge and practices on antibiotic use.

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APPENDICES

I INFORMATION SHEET

Consent form

I am student from Apex Medical University and conducting a study on the topic derived from the School of Medicine and the topic is concentrated on Health Care and Health systems Management.

Purpose of the study: the purpose of the study is as a partial fulfillment required by the institute to obtain a bachelor’s degree in Human biology and medicine. The research can also serve as awareness on the areas around the medical and health care management fields.

Description of the research: The research will use a focus group discussion to gather the information required for this study. Selection will be done by the study in terms of who participates based on the discretion of the researcher and the requirements of the study through the description given of the purpose of the study.

Potential Risks: There are no potential risks that are involved in participating in the research study foreseen by the researcher and the ethics committee.

Confidentiality: All personal information such as names shall not be used in the study results or any publication. Your responses are completely anonymous, and recordings shall be stored in an encrypted file. The recording will be safeguarded and will be deleted if need be and in accordance with the regulations

between the two parties. The researcher will then destroy all recordings, questionnaires and notes taken after the results of the research.

Voluntary participation: Participation in this study is completely voluntary and if you wish not to participate in this research in any way, it will not affect any relation with the researcher and yourself. Neither will it risk of any loss of work or punishment from the management of the firm if at all you are a member of staff.

Compensation: The researcher will not compensate any participant in this research study in any form.

Withdrawal from the study: All participants are free to withdrawal from the study at any time they wish to without any penalties.

Cost: They will be cost incurred by participates or no participate shall be asked to contribute any amount of money towards participation and the research study.

I Understand the content of the
consent form and voluntarily agree to participate in this research on
(date)2022.

Signature of participant

Signature of researcher:

II. QUESTIONNAIRE

LUSAKA APEX MEDICAL UNIVERSITY
FACULTY OF MEDICINE

TITLE: ASSESSMENT OF KNOWLEDGE AND PERCEPTIONS OF UNDERGRADUATE STUDENTS (3RD AND 4TH YEARS) AT LUSAKA APEX MEDICAL UNIVERSITY TOWARDS ANTIBIOTIC MISUSE AND ITS SIDE EFFECTS.

INSTRUCTIONS

1. Please answer all questions by circling the applicable response
2. No name should appear on the questionnaire
3. All respondents should be 3rd and 4th year apex medical students

Part 1: Baseline characteristics of participants.

1. Sex
 - A. female
 - B. male
2. Age
 - A. 18-25
 - B. 25-30
 - C. >30
3. Year of study
 - A. 3rd
 - B. 4th
4. Religion
 - A. Christian
 - B. Islam
 - C. others

Part 2: Knowledge of students on antibiotic use and resistance (Please tick the on the box applicable to you)

I. Antibiotics only cure bacterial infections

YES		NO	
-----	--	----	--

II. Use of antibiotics can speed up the recovery of a cold

YES		NO	
-----	--	----	--

III. I have heard of antibiotic resistance

YES		NO	
-----	--	----	--

IV. I understand what antibiotic resistance entails

YES		NO	
-----	--	----	--

-

Part 3: Perceptions of students regarding ABR

I. Overuse of antibiotics is the main cause of ABR

YES		NO	
-----	--	----	--

II. Is there a need to establish a course on rational use and prescription of antibiotics

YES		NO	
-----	--	----	--

III. Is it necessary to carry out large scale antibiotics campaign promotion

YES		NO	
-----	--	----	--

Part 4 : Students practices towards ABR

I. Do you take antibiotics for a common cold or headache

YES		NO	
-----	--	----	--

II. Do you purchase antibiotics without the doctors' prescription

YES		NO	
-----	--	----	--

III. Do you complete the course of antibiotics or you stop once the symptoms resolve

YES		NO	
-----	--	----	--

III WORK PLAN

This research is proposed to have duration of 6 months, during which all necessary work will be done, and a final report submitted.

		JUNE 2022	JULY 2022	AUGUST 2022	SEPTEMBER 2022	OCTOBER 2022
SUBMISSION OF RESEARCH PROPOSAL						
DATA COLLECTION						
DATA ANALYSIS AND REPORT WRITING						
DRAFT SUBMITTED TO SUPERVISOR						
IMPROVEMENTS SUBMITTED TO SUPERVISOR						
FINAL DRAFT SUBMITTED						

IV BUDGET

Description	Quantity	Unity cost	Total cost	
Transport	4	50	200	
Stationary		100	100	
Communication and internet		100	100	
Printing of draft proposal	2	100	200	
Printing of proposal	2	100	200	
Printing of final report	2	100	200	
Ethical approval	N/A	250	250	

LUSAKA APEX
MEDICAL UNIVERSITY



**LUSAKA APEX MEDICAL UNIVERSITY BIO-MEDICAL
RESEARCH ETHICS COMMITTEE
(LAMUBREC)**

Telephone: +260 976051832/0977480460

Foxdale Campus
Plot N^o 3073
P O Box 31909
LUSAKA, ZAMBIA

Email: lamubrec@lamu.edu.zm

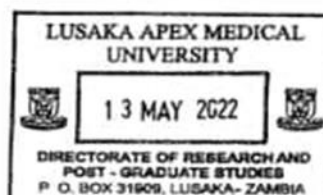
FWA 00029892

IRB 00001131

Ref: 00203-22

13th May 2022

The Principal Investigator
M/s Chishimba Chibwe
C/O Lusaka Apex Medical University
Faculty of Health Sciences
LUSAKA



Dear M/s Chishimba Chibwe,

**RE: ASSESSMENT OF KNOWLEDGE AND PERCEPTIONS OF
UNDERGRADUATE STUDENTS AT LUSAKA APEX MEDICAL UNIVERSITY
TOWARDS ANTIBIOTIC MISUSE AND ITS SIDE EFFECTS**

The above mentioned research proposal was submitted to Lusaka Apex Medical University Bio-Medical Ethics Committee (LAMUBREC) on 4th May 2022. The review was based on the following documents that were submitted.

- a. Study Proposal
- b. Questionnaires
- c. Participant's Consent Form

We are pleased to inform you that your research proposal has been approved with minor corrections as shown on the feedback report. Kindly make the corrections to the satisfaction of your Supervisor.

APPROVAL NUMBER**Ref: 00203-22**

The number should be used on all correspondence, consent forms and documents as appropriate.

- | | |
|--------------------------------------|---------------------------------|
| • APPROVAL DATE: | 12th May 2022 |
| • TYPE OF APPROVAL: | Expedited |
| • EXPIRATION DATE OF APPROVAL | 11th May 2023 |

After this date, this project may only continue upon renewal. For purposes of renewal a submitted report on a standard form obtained from the LAMUBREC offices should be submitted one month before the expiration date for continuing review.

- **SERIOUS ADVERSE EVENT REPORTING (SAE):** All SAEs and any other serious challenges/problems having to do with participant welfare and participant safety and study must be reported to LAMUBREC offices.
- **MODIFICATIONS:** Prior to LAMUBREC approval using standard forms obtainable from LAMUBREC offices is required before implementing any changes in the Protocol (including changes in the consent documents).
- **TERMINATION OF STUDY:** On termination of study, a report has to be submitted to LAMUBREC using standard forms obtained from the LAMUBREC Offices.
- **QUESTIONS:** Please contact the LAMUBREC Secretariat on Telephone Numbers: +260976051832/0977480460/0966480460 or by email on lamubrec@lamu.edu.zm.
- **OTHER**
Please be reminded to send copies of your research for our records. You are also required to submit electronic copies of your publications in peer-review journals that may emanate from this study.

Yours sincerely,



Dr Oswell Khondowe PhD, MSc PT, MSc APA, BSc PT, Dip PT
Chairperson



Lusaka Apex Medical University Mutandwa campus

P.O box 31909

Lusaka, Zambia.

29th august 2022

No objection
One
21/8/22

Assistant registerer

RE: PERMISSION TO CONDUCT A RESEARCH AT LUSAKA APEX MEDICAL UNIVERSITY, MUTANDWA CAMPUS.

Reference is made to the above captioned matter

I am a 6th year student at Lusaka Apex Medical University wishing to conduct a research at Lusaka Apex Medical University on preclinical students. The study is entitled "Assessment of knowledge and attitude of Lusaka Apex Medical University students towards antibiotic misuse and its side effects".

The research will benefit the health service as it gives a quantitative perspective response of knowledge and attitudes of medical students towards antibiotic resistance and if published will well be of benefit to the nation in addressing the underlying problem if any, with the increase in antibiotic resistance which is the major public concern. Also, this research is part of the requirements for the successful completion of my Degree- Bachelors of science in medicine and surgery.

Your favourable consideration to this effect will be highly appreciated.

Yours faithfully,

Chishimba Chibwe PMP/16/02/001022

Email; chishimbachibwe4@gmail.com

Cell No: +260967848134

Scanned with
MOBILE SCAN

LUSAKA APEX
MEDICAL UNIVERSITY



Faculty of Medicine and Surgery
Mutandwa Campus
P O Box 31909
LUSAKA
2nd September, 2022

To Whom it may Concern

Dear Sir /Madam

RE: REQUEST FOR PERMISSION TO CONDUCT A RESEARCH STUDY AT YOUR FACILITY -MISS CHISHIMBA CHIBWE PMP/16/02/001022

The above subject matter refers

The bearer of this letter **MISS CHISHIMBA CHIBWE-PMP/16/02/001022** is a 6th year bonafide student of the Lusaka Apex Medical University in the Faculty of Medicine and Surgery.

Currently she is undergoing a rotation in Pubic health and the component requires that students carry out studies in any area of interest in Public Health.

The student wishes to conduct a Research Study on the Topic: **ASSESSMENT OF KNOWLEDGE AND PERCEPTIOANS OF UNDERGRADUATE STUDENTS AT LUSAKA APEX MEDICAL UNIVERSITY TOWARDS ANTIBIOTIC MISUSE AND ITS SIDE EFFECTS**

The purpose of letter is to request for permission to allow the student to conduct this study at your Faculty. The study has been granted ethical approval by the Lusaka Apex Medical University Biomedical Research Ethics Committee (LAMUBREC.) The Approval Letter is attached.

The assistance rendered will be highly appreciated.

Yours Faithfully,



PROOF OF PAYMENT

CASH DEPOSIT

Transaction Branch:	ACCESS BANK - ACACIA PARK
Account Branch:	ACCESS BANK - ACACIA PARK
Transaction Date:	2022-05-03 09:57:18 AM
Owner of the Account:	LUSAKA APEX MEDICAL UNIVERSITY LTD
Transaction Reference:	FJB2212330378960
Depositor's Name:	STUDENT#PMP/16/02/001022 CHISHIMBA CHIBWE RESEARCH
Currency:	ZMW
Transaction Amount:	300.00
Transaction Account:	0030011356451
Amount in words:	THREE HUNDRED ONLY

TELLER
ACACIA BRANCH

CUSTOMER'S SIGNATURE
C. Chibwe

