

# Assessment of Practices of Self-Medication with Antibiotics and Its Associated Factors among Medical Students at The Copper belt University.

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## Abstract

**Introduction:** Self – medication is a serious problem of public health concern worldwide. It refers to the use of drugs to manage self-diagnosed disorders or symptoms and is mostly common in developing countries due to wider increase of drug availability without prescription. Some reports show that up to 80% of all drugs are purchased without any prescription in developing countries, which is substantiated by reports that the prevalence of self-medication in developing countries is in the range of 12.7% to 95%. Self – medication involves obtaining drugs without prescription and taking the drug based on advice of and from relatives and friends.

**Objective:** To assess self – medication practices with antibiotics and its associated factors among medical students at the Copperbelt University.

**Method:** A cross – sectional descriptive study method was used for this study. Data was collected using a structured questionnaire which had both closed and open – ended questions. A questionnaire was chosen in this study because it allowed the researcher to collect the most complete and accurate data in a logical flow. A sample of the questionnaire was given to the students who consented to participate in the study at the Copperbelt university school of medicine.

**Results:** A total number of 334 participants were involved in this study. The majority of the study participants were females at 166 (49.7%) and males at 163 (50.3%). A number of students were in the age range of 18–24 years of age being at 200 (59.9%) 25-29 at 121(36.2%), 30-34 at 9(2.7%) and above 34(1.2%) were only 41.2. The study further showed that 179 (53.6%) of participants had good knowledge, 151 (45.2%) had average knowledge and 4 (1.2%) had poor knowledge of self-medication. 34% of participants had good practice, the majority 66% had a bad practice with the common self-prescribed drugs being the analgesia at (80.5%) where Paracetamol was mostly prescribed by 77% of students followed by antibiotics (52.1%) where amoxicillin was at 28.2% and the least prescribed drug was a proton pump inhibitor (6.9%). There was an association between knowledge on self-medication and the age of participant (P value 0.044).

**Conclusion:** The prevalence of self-medication with antibiotics among medical students at Copperbelt University is common and this calls for an urgent organized effort beginning at the local level to the national level so as to curtail the use of antibiotics without consent from medical personnel or a prescription from an appropriate office.

**Keywords:** Diabetes, herbs, medicinal plants, hyperglycaemia

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## Introduction

### 1.1 Background Information

Self-medication is defined as the use of drugs to treat self-diagnosed disorders or symptoms or the intermittent or continued use of prescribed drug for chronic or recurrent disease or symptoms (Esan et al., 2018). This broadly includes old prescription, referring prescription, acquiring medication without prescription, consulting friends and relatives, neighbor's social group and sharing medicines (Vidyavati et al., 2016). However, Self-medication is considered as a part of self-care that helps efficient use of burdened health care system with guidelines for the regulatory assess (WHO, 2001). It also reduces cost of health care and allows health workers to concentrate on emergency diseases, but at the same time side

effects of self- medication can too severe that they become an emergency (Vidyavati et al., 2016).

It is currently estimated that antimicrobial resistance infections cause approximately 50,000 deaths a year in Europe and the United States alone (Aubrey., et al 2016). The practice of SMA is common worldwide, with more occurrence in Low-and-Middle-Income Countries (LMICs) where governments are paying high prices to purchase medicines (Leung E, 2011). According to the WHO, over 50% of global antibiotic prescriptions are inappropriate with 2/3 of antibiotics available in the pharmaceutical market being used for self-medication (WHO, 2014).

Although some medicines are risk free and useful for treatment of minor health problems, their excess and regular use may lead to some serious health problems and side effects and

adverse reactions. Self-medication practice is independent of age for both males and females (Pwar et al., 2009) but more in younger and educated people because they have no time to go to the doctor and no patience to wait (Vidyavati et al., 2016).

The issue of self-medication was first recognized as public health concern in 1960's due to its high prevalence (Khantzian, 1974). As a result, several countries have taken significant measures so as to formulate steps to regulate responsible self-medication through availability of safe drugs along with proper instructions about their use and if need be, a consulting a physician (WHO, 2010).

Medicines for self-medication are often called Over the Counter (OTC) drug, which are available without a Doctor's prescription through pharmacies, mostly in the less developed countries (Pwar et al., 2009). The most widely self-medicated substances are antibiotics. These drugs used to treat common health issues at home, as well as dietary supplements. Many people often diagnose their problems by comparing their problems/diseases with someone else being diagnosed for the same signs and symptoms. Sometimes the self-suggested medicine can give positive results but in majority of cases, it creates so many health problems. However, the major concern of self-medication globally and locally has been with the use of antibiotics which has led to development of antimicrobial resistance, misdiagnosing illnesses, wrong therapeutic indication, dangerous adverse drug reaction, and drug interactions (Napolitano, 2013). It is for this reason that Self-medication with antibiotics has become one chief factor driving inappropriate utilization of antibiotics and closely related to the emergence of antimicrobial-resistant strains (English, 2010).

Self-Medication is now widely accepted and used as it has an important role to play in health care and, with the continued improvement in people's education, general knowledge and socio-economic status; self-medication has been successfully integrated into many health care systems throughout the world (Ali et al., 2010). Despite the objective of self-medication being clear, it is often practiced without a sound scientific background (Phalke et al., 2006).

### **1.2 Statement of The Problem**

The prevalence of Self-Medication has sharply increased throughout the world. There are reports showing that up to 80% of all drugs including antibiotics are purchased without any prescription in developing countries, which is substantiated by reports that the prevalence of self-medication in developing countries is in the range of 12.7% to 95% (Divya, 2016). Because of the rise in its use, self-medication for example with antimicrobials has brought an emergence of human pathogens resistance world-wide particularly in developing countries, where antibiotics are often available without a prescription.

The self-medication of antibiotics remains a global problem and the misuse and overuse of antibiotics are further complicated by the spread of infections involving multi-drug resistant bacteria (MDRBs) which limit the action of drugs previously considered to be highly effective, as well as the

shortage of novel antibiotics (Elong, 2019). It has been estimated that more than 50% of antibiotics are purchased without a prescription and used over-the-counter in most parts of the world (Alhomoud, 2017). This also has become a challenge to developing countries like Zambia, especially among medical students who possess basic knowledge about diseases and drugs. If necessary, interventions are not put in place it will lead to consequences that will be difficult to overcome. Therefore, a study like this one which aims to establish the prevalence of self-medication with antibiotics and factors associated with it is necessary.

### **1.3 Literature Review**

Self-medication often involves a combination of therapeutic resources and the use of both over-the-counter (OTC) and prescription-only medicines, including antibiotics. Increasing concerns with the global emergence and spread of antimicrobial resistance (AMR) have pointed to the need to reduce and optimize the use of antimicrobial medicines (WHO, 2015). Moreover; lack of knowledge is a major factor responsible for inappropriate antimicrobial use and hence resistance globally (WHO, 2001). If the current trend continues, 10 Million deaths are attributable to AMR worldwide by 2050 (O'Neil, 2014).

A study among Chinese university students reported antibiotic SM prevalence of 47%. While most of the students (64.8%) self-medicated based on their own experiences, community pharmacies (89.4%) were the main source for self-Medication (Zhu X, 2016) while among non-medical students from Karachi, Pakistan reported that while 63% participants denied having any knowledge about antibiotic resistance, only 20% correctly knew that indiscriminate use of antibiotics can lead to increased antibiotic resistance (Shah S., et al 2014).

Self-medication with antibiotics being a global problem, Africa is not spared from its side effects. It has been observed that patterns of self-medication with antibiotics were found to vary across socio-economic groups, cultural contexts and also according to the efficiency of the health care system. As mentioned above, studies have documented high prevalence's rates of self-medication with antibiotics in some LMICs including in many African countries (Neusa et al., 2019). These patterns have posed a threat of AMR and disastrous as microbiologists, epidemiologists, and doctors are positing that we are moving into a "post-antibiotic" period in which humans may well be in as much danger of microbial infections as they were before penicillin was discovered (Viens, 2015).

A study carried out in Nigeria among undergraduate students showed that they were more involved than community members in self-medication with antibiotics. In addition, it was observed that 43% of the undergraduates reported weekly usage of antibiotics for self-diagnosed illnesses with a distribution pattern of most commonly used antibiotics among undergraduate students being metronidazole (18%), amoxicillin/clavulanic acid (16.8%), ampicillin/cloxacillin (14.8%), cotrimoxazole (12%), and tetracycline (11%) and reasons reported for engaging in self-medication among

undergraduate students and community members were due to long delays in the hospital (46% and 35%), it being cheaper not to go to hospital (26% and 19%), and the distance to the hospital (15% and 21%) (Olumide., et al 2018).

A similar study in Cameroon found that in the matter of knowledge of antibiotics' side effects or risks, although overall respondents stated that antimicrobial drugs can cause adverse reactions, only 58% were able to name one side effect, among which allergic reaction was the most often reported (52.8%). Insufficient knowledge about the use of antibiotics could explain their inappropriate use and, even possibly serious and adverse drug effects due to their abuse (Elong, 2019).

Another study conducted in Sudan to estimate the prevalence of self-medication with antibiotics /antimalarials concluded that the self-medication was alarmingly high where 73% of the population reported to have used such medicines (Stevenson, 2001), as well as in Mozambique by the Global Partnership for Antibiotic Resistance (GARP), in 2015, noticed high consumption of antibiotics at the community level, with people buying and consuming antibiotics without seeking advice from a qualified health care professional (HCP) and or without a medical prescription (Sigaúque B, 2015).

It has been noted that several studies have shown that a vast majority of people do not have proper knowledge and belief regarding the side effects of SM (Azami-Aghdash, 2015). Self-medication may cause many health problems. Beside the negative effects of self-medication, many of the people use the self-suggested medicine. According to Jan (2015) the main factors causing self-medication include costly medication and medical bills, lack of education and over confidence, freely available drugs at corners shops, selling drugs without prescription and lack of strict governments checks. Unavailability of medical facilities, poverty, and unawareness about health principles all are the factors responsible for the adaptation of self-medication practice. The author further stated that freely available drugs at corners shops, selling drugs without prescription and lack of strict government checks are also the factors responsible for self- medication among the people (Alamgir, 2018). There are scarce studies that discuss self-medication with antibiotics in Zambia. However, a study carried out was aimed at determining the extent of non-prescription sales and dispensing of antibiotics among community pharmacy outlets in Zambia. It was found that across the sociocultural landscape of Zambian communities, illnesses such as diarrhea, fever and cough are often mistakenly perceived to be treated well with antibiotics such as amoxicillin, metronidazole and/or cotrimoxazole. This is despite these illnesses likely to be viral in origin.

## 1.4 Objectives

**1.4.1 General Objective:** The main objective of this study is to assess self – medication practices and its associated factors among medical students at the Copperbelt University.

**1.4.2 Specific Objectives:** To determine the level of knowledge of self – medication among medical students at the Copperbelt University.

2. To investigate the practices of self-medication among medical students at the Copperbelt University.

3. To identify factors associated with self – medication among medical students at the Copperbelt University.

## 1.5 Research Question

What is the prevalence of self – medication practices with antibiotics and its associated factors among medical students at the Copperbelt University?

## 1.6 Rationale and Justification

This study is significant because it will help medical students and other stakeholders to be aware of self- medication especially with antibiotics and its impacts on their health. This will help them to take precautionary measures before they decide to self- medicate. Furthermore, the finding of this study may be useful to policy makers as they may help them establish or strengthen the available rules and regulations that govern self- medication. This will lead to proper regulation and distribution of over the counter drugs through various drug outlets hence control of irrational use of medicines especially prescribed medicines.

In addition, this study is important to medical students as it will make them aware of the possible risks associated with self-medication. This will allow them to consider following proper channels for treatment instead of practicing self- medication when they become sick. Moreover, lack of knowledge is a major factor responsible for inappropriate use of antimicrobial use and hence resistance globally Thus, tackling the global spread of antibiotic resistance is a high priority for the World Health Organization (WHO) which recommended creating increased awareness about self-medication and its control (WHO, 2016). Finally, other researchers who wish to carry out studies of a similar nature may use this study as a source of information.

## 1.7 Measurement

### 1.7.1 Operational Definitions

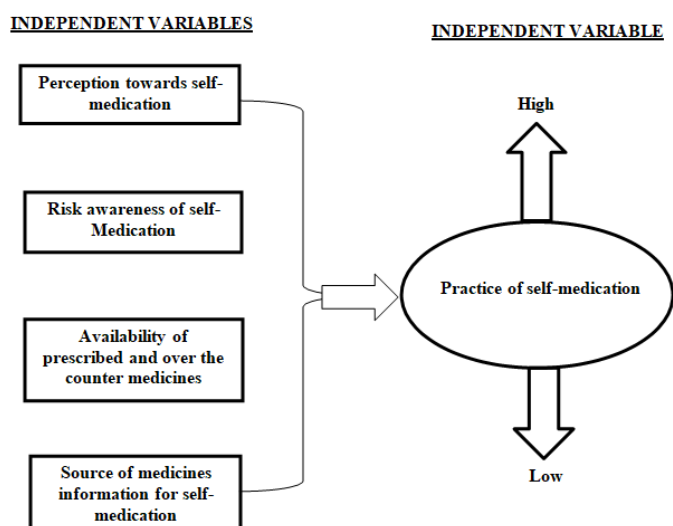
1. Self – medication: refers to the use of drugs to treat self-diagnosed disorders or symptoms or the intermittent or continued use of prescribed drug for chronic or recurrent disease or symptoms (Esan et al., 2018).

1. Knowledge in this study knowledge refers to one's ability to have facts and information on self - medication. This includes understanding what self - medication is, its risks and benefits.

2. Practices towards self - medication: refers to medical student's actual application of self – medication.

3. Over the Counter (OTC) drugs this refers to drugs that available without a medical practitioner's prescription through pharmacies, shops and other medicine dispensing outlets (Lusinge, 2017).

## 1.8 Conceptual Framework



**Figure 1.** Conceptual Framework.

**The entire Source: Lusinge (2017)**

Figure 1 above shows the conceptual framework for the study. The figure shows that practice of self- medication (as the dependent variables) is determined by the following independent variables; perception of individual towards self-medication, risk factors for self- medication, availability of medicines for self- medication as well as the sources of medicines information for self- medication (Lusinge, 2017).

The mentioned variables are considered to be the main determinants for self- medication among medical students at the Copperbelt University.

**METHODOLOGY**

**2.1 Study Site**

The study was done at the Copperbelt University, Michael Chilufya Sata School of Medicine located in Ndola Township.

**2.2 Target Population**

The target population were the students at the Copperbelt University, Michael Chilufya Sata School of medicine.

**2.3 Study Design**

A cross – sectional descriptive study method was used for this study. Descriptive research involved field survey where the researcher went to the population of interest to ask certain questions about the problem under study.

**2.4 Sample Size Calculation**

Cbu Mcs Som has about 2500 students combined. Taking this number as the total population, the target sample size for this study was calculated using OpenEpi, Version 3, open source calculator-SSPropor from www.OpenEpi.com as shown below;

**Table 1.** Data Extract from Open Epi, Version 3, and open source calculator at ‘‘ SSPropor.

ASSUMPTIONS	Confidence Level (%)	Sample Size
Population size (N): 2500	95%	334
Hypothesized % frequency of outcome factor in the population (p): 50% +/-5	80%	155
	90%	245
	97%	397
Confidence limits as % of 100(absolute +/- %) (d): 5%	99%	525
	99.9%	756
Design effect (for cluster surveys-DEFF): 1	99.99%	944

**2.5 sampling procedure**

In this study, simple random sampling method was used to recruit participants. All students at the Copperbelt University, Michael Chilufya Sata School of Medicine (CBU – MCS SOM) were invited to take part in the study. Those who met the inclusion criteria were recruited in the study. A total of 334 students comprising students were recruited in the study.

**2.6 Inclusion and Exclusion Criteria**

**2.6.1 Inclusion Criteria:**

- Students at the Copperbelt University, Michael Chilufya Sata School of medicine
- Student who gave informed consent.

**2.6.2 Exclusion Criteria:**

- Staff at the Copperbelt University, Michael Chilufya Sata School of medicine.
- Student who were not willing to give informed consent.

**2.7 Data Collection**

Data was collected using a structured questionnaire which had both closed and open – ended questions. A questionnaire was chosen in this study because it allowed the researcher to collect the most complete and accurate data in a logical flow. A sample of the questionnaire was given in the appendix section of this paper. The period of data collection was 2 months.

**2.8 Data Analysis**

Data was be manually entered and analyzed in the Statistical Package for Social Science (SPSS) version 22 software. Here descriptive statistics such as percentages, frequency tables, pie chart and bar graphs were used to describe the collected data. Bivariate analysis and cross – tabulation was also used to determine correlation between variables. P – values less than 0.05 was considered to be statistically significant.

**2.9 Ethical Consideration**

Before this study was carried out, it was first approved by the ethics review committee at Tropical Disease Research Centre (TDRC) of Ndola and the public health team at CBU – MCS SOM. After the approval is given, informed consent was obtained from respondents prior to their enrolment in the study. Those who did not give consent were not included in the study. Also, participation in the study was voluntary and respondents

were free to withdraw from the study at any stage during the study. Additionally, codes were used to maintain anonymity of all participants and all their information was kept strictly confidential. Lastly, the procedures and instruments that were used in this study were not to cause any harm to the study participants.

**2.10 Study Limitations**

One of the major limitations in the study was financial as the study was not funded. The lack of funds prevented access to some articles that contain vital information because those were needed to be purchased online. Another limitation was time. The study was conducted during school, therefore not enough time will be available to collect the data. Lastly, the study used self-administered questionnaires to obtain data. Thus, participants did not have time to clarify any ambiguous questions.

**Results**

**3.1. Socio-demographics characteristics**

*Table 2. Socio-demographic characteristics.*

Sr. No.	Particular (n=300)	Frequency	Percent (%)
	18-24	200	59.9
	25-29	121	36.2
	30-34	9	2.7
	>34	4	1.2
	male	166	49.7
	female	168	50.3
	single	315	94.3
	married	17	5.1
	divorced	2	.6
	2 <sup>nd</sup> Year	59	17.7
	3 <sup>rd</sup> Year	55	16.5
	4 <sup>th</sup> Year	43	12.9
	5 <sup>th</sup> Year	53	15.9
	6 <sup>th</sup> Year	124	37.1
	Christian	330	98.8
	Muslim	4	1.2

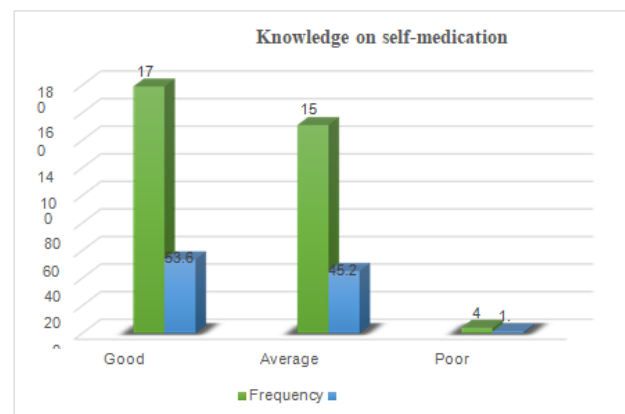
A total number of 334 participants were involved in this study. The majority of the study participants were females at 166 (49.7%) and males at 163 (50.3%). A number of students were in the age range of 18–24 years of age being at 200 (59.9%) 25-29 at 121(36.2%), 30-34 at

9(2.7%) and above 34(1.2%) were only 4. In addition, 315 (94.1 %) students were single whereas 17(4.1%) of them were married and 2 (0.6%) were divorced. A total of 330 (98.8%) of

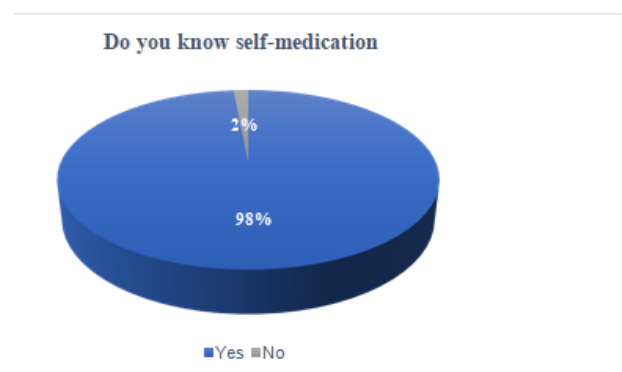
study participants were of Christian denomination and 4 (1.2%) were belonged to Muslim. The majority of participants were 6<sup>th</sup> years being at 124(37.1%) of study. And the least were the 4<sup>th</sup> years at 43 (12.9%) respectively.

**3.2. Knowledge**

Figure 1 below shows the knowledge levels of medical students on self-medication. In this study, 179 (53.6%) of participants had good knowledge, 151 (45.2%) had average knowledge and 4 (1.2%) had poor knowledge. Table 2 highlights the questions that were used to access knowledge on self-medication and table 3 shows the knowledge on effect of self-medication. In the table, 95.8% said that most drugs were not dangerous if self-prescribed. This shows a poor knowledge on self-medication. But the majority of the questions showed knowledgeable as shown in the table 3 below. Furthermore, figure 2 shows that the majority of the participants were aware of self-medication (98%).



*Figure 2. Knowledge on self-medication.*



*Figure 3. Awareness of self-medication.*

*Table 3: Questions for assessing knowledge on self-medication.*

Knowledge on self-medication	Yes		No	
	Frequency	Percent (%)	Frequency	Percent (%)
Do you think taking education (especially antibiotics) without the	17	5.1%	317	94.9%

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guidance (instructions) of a physician (doctor) is right?				
Do you think taking medication without the guidance (instructions) of a physician (doctor) can cause problems for an individual?	320	98.5%	14	4.2%
It is okay for a medical student to treat himself/herself after falling sick since he/she knows something about diseases and their treatment.	46	13.8%	288	86.2%
Only serious health conditions should be treated by doctors. Minor conditions should be managed at home with over the counter drugs (drugs obtained from drug stores, pharmacies etc).	57	17.1%	277	82.9%
It is okay to get advice on what medications to take from family members and friends when one is sick?	226	67.7%	108	32.3%
It is okay to follow advice on medications from friends when one is sick?	258	77.2%	76	22.8%

**Table 4.** Knowledge on effects of self-medication.

Sr. No	Knowledge on effects of self-medication		Frequency	Percent
1	Can cause death	No	132	39.5
		Yes	202	60.5

2	Reduces queues at the hospital and clinics	No	73	21.9
		Yes	261	78.1
3	Most drugs are not dangerous	No	14	4.2
		Yes	320	95.8
4	Cures the disease	No	47	14.1
		Yes	287	85.9
5	Can mask the signs and symptoms of the underlying disease	No	78	23.4
		Yes	256	76.6
6	Causes no problems	No	15	4.5
		Yes	319	95.5
7	Can lead to drug addiction	No	138	41.3
		Yes	196	58.7
8	Can lead to drug dependency	No	80	24
		Yes	254	76
9	Can cause drug resistance	No	41	12.3
		Yes	293	87.7

### 3.3. Practice

Figure 3 below shows the practice of self-medication of medical students.

The chart shows that only 34% of participants had good practice, the majority 66% had a bad practice. Table 4 shows a specific practice questions which lead to this bad practice findings. Figure 4 further shows a list of common self-prescribed drugs.

The figure shows that analgesia was the most self-prescribed drug (80.5%) and the least prescribed drug was a proton pump inhibitor (6.9%).

Figure 5 further shows the most common drug that were reported used by medical students under the category of analgesia, Paracetamol was used by 77.0% of students followed by Diclofenac by 42%. On antibiotics, amoxicillin was used by 28.2%, followed by metronidazole 22% respectively.

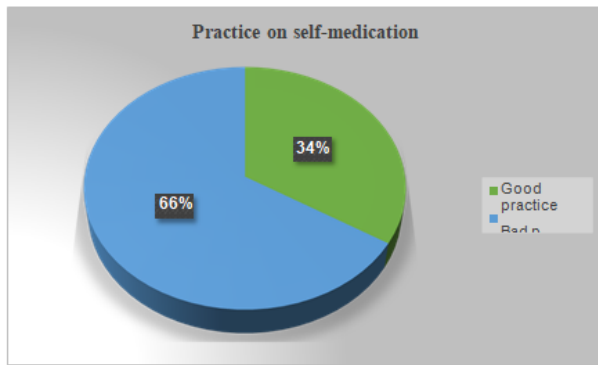


Figure 4. Practice on self-medication.

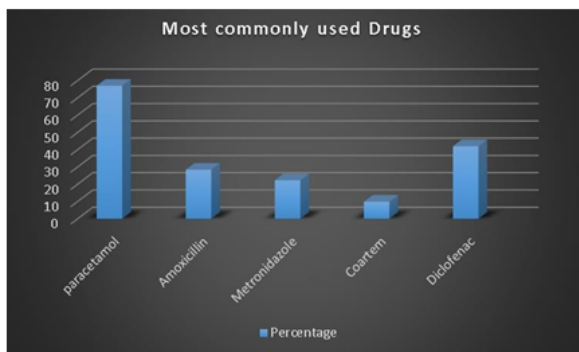


Figure 5. Most commonly prescribed drugs.

Table 5. Questions on practice on self-medication.

Sr. No	Questions		Frequency	Percent
1	Do you give yourself antibiotics without seeing a doctor when sick	No	205	61.4
		Yes	129	38.6
2	Do you treat yourself when you have minor health problems	No	32	9.6
		sometimes	302	90.4
3	Do you treat yourself when you have major health problems	No	234	70.1
		sometimes	100	29.9
4	Do you encourage friends and relatives to seek medical help from health workers when they are sick	No	16	4.8
		Yes	318	95.2

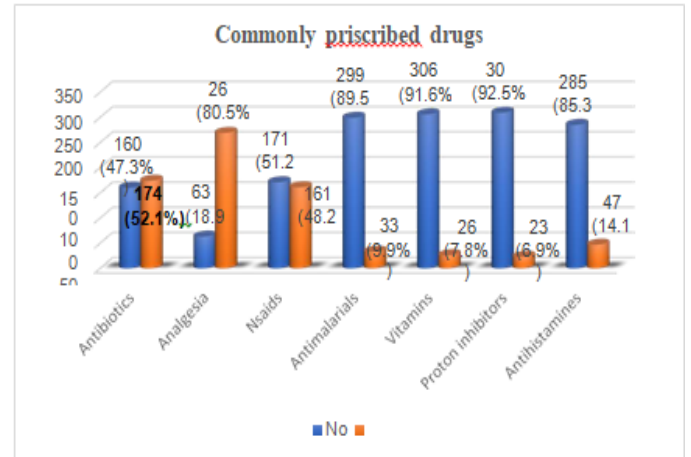


Figure 6. Commonly self-prescribed drugs.

### 3.4. Associations

Table 3 below shows the association between knowledge on self-medication to practice on self-medication, age and year of study of participants. Regarding the association between knowledge on self-medication to age of participants, the study found that 49% of participants with good knowledge were between 18-24 years old, 55.4% with good knowledge were between 25 to 29 and all those above 29 years old had good knowledge (100%). Thus, there was an association between knowledge on self-medication and the year of study (P value 0.044.). On the association between knowledge and practice of self-medication, the table clearly shows that 60.0% of participants with good knowledge had good practice and 49.5% with good knowledge had bad practice. The chi-square showed that there was no relationship between knowledge on self-medication to practice (P-value = 0.065). Furthermore, table 5 also gives a chi-square of 0.569 on the relationship between self-prescription to year of study, these shows that there was no relationship. More details on the above associations are shown in table 5 below.

VARIABLES (n=300)		Knowledge of medical students on self-medication			Chi-square Test (p value)	
		Good Knowledge	Average Knowledge	Poor Knowledge		
Association Between Knowledge on Antibiotics Use to Age						
Age	18-24	Count	99	98	3	0.044
		% within Age of participant	49.50%	49.00%	1.50%	
	25-29	Count	67	53	1	
		% within Age of participant	55.40%	43.80%	0.80%	
	30-34	Count	9	0	0	

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		% within Age of participant	100.00%	0.00%	0.00%	
	>34	Count	4	0	0	
		% within Age of participant	100.00%	0.00%	0.00%	
Association Between Knowledge on Antibiotics use to practice						
Practice on self-medication	Good practice	Count	78	52	0	0.065
		% within Practice on self-medication	60.00%	40.00%	0.00%	
	Bad practice	Count	101	99	4	
		% within Practice on self-medication	49.50%	48.50%	2.00%	
Association Between Knowledge on Antibiotics use to year of study						
Year of Study	2 <sup>nd</sup> Year	Count	28	30	1	0.569
		% within Year of Study	47.50%	50.80%	1.70%	
	3 <sup>rd</sup> Year	Count	34	21	0	
		% within Year of Study	61.80%	38.20%	0.00%	
	4 <sup>th</sup> Year	Count	19	24	0	
		% within Year of Study	44.20%	55.80%	0.00%	
	5 <sup>th</sup> Year	Count	32	20	1	
		% within Year of Study	60.40%	37.70%	1.90%	
	6 <sup>th</sup> Year	Count	66	56	2	
		% within Year of Study	53.20%	45.20%	1.60%	

## Discussion

This study attempted to assess self-medication practice with antibiotics and its associated factors among medical students at Copperbelt University and further analyzed different factors that affect such a practice. In this study there were more female respondents than males of which females were 166 and males at 163 although the statistical significant difference between genders was little which is similar to the study carried out in Malaysia (Haque et al 2019). It also showed that the number of students was in the age range of 18–24 years of age and majority were single. In a study carried out in by Okyay and

Erdoğan in 2017 showed a similar trend in practice where majority of students were in the range of 18–23 years of age. But most studies have revealed more male participation than females however the difference in prevalence of self-medication with antibiotics might be due to differences in study design, community awareness, and definitions. The results in this study also revealed that medical students had significantly knowledge on self-medication as shown on Table 3 which is consistent with a study carried out in Nigeria (Ayanwale et al 2017). This is also consistent with another study done by Mehta and sharma in 2015. The study further indicated that only 34% of participants had good practice, the majority 66% had a bad practice. The most common medicines that the students had consumed without prescription were analgesics by 80.5% followed by antibiotics by 52.1% and proton pump inhibitors being the least used at 6.9%. This is similar with studies by Lukovic et al 2014 and abel and amelo in 2010. It further revealed that majority of the medical students sometimes treated themselves when they had a minor health problem. This could be attributed to the fact that medical students have an easy availability of drugs, and information from textbooks/seniors. (Neelm et al 2019).

The study also revealed the association between knowledge on self-medication to practice on self-medication, age and year of study of participants. The association between knowledge on self-medication to age of participants, the study found that 49% of participants with good knowledge were between 18-24 years old, 55.4% with good knowledge were between 25 to 29 and all those above 29 years old had good knowledge (100%). Thus, there was an association between knowledge on self-medication and the age of participant (P value 0.044.). On the association between knowledge and practice of self-medication, it showed that 60.0% of participants with good knowledge had good practice and 49.5% with good knowledge had bad practice. The chi-square showed that there was no relationship between knowledge on self-medication to practice (P – value = 0.065). Furthermore, Table 5 also gives a chi-square of 0.569 on the relationship between self-prescription to year of study, this show that there was no relationship.

## Conclusion

The study suggests that self-medication with antibiotics among medical students at Copperbelt University is common and this calls for an urgent organized effort beginning at the local level to the national level so as to curtail the use of antibiotics without consent from medical personnel or a prescription from an appropriate office. This will be possible through implementation and enforcing of laws restricting access to antibiotics. Furthermore, there is also need of importantly, there is a need for a robust public education and campaigns to enlighten students on possible effects of antibiotic self-medication hazardous side effects of antibiotics.

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