ASSESSMENT OF ANTIBIOTIC DISPENSING PRACTICES OF COMMUNITY PHARMACISTS IN JOS, PLATEAU STATE, NIGERIA

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A mini-thesis submitted in partial fulfilment of the requirements for the degree of Master of Public Health at the School of Public Health, University of the Western Cape, South Africa.

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KEYWORDS

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ABSTRACT

Background

The irrational use of medicines is a global public health challenge, particularly in developing countries like Nigeria. One of the consequences of irrational medicine use is rising antimicrobial resistance, which continues to contribute to the increase in morbidity, mortality, and high cost of care, despite breakthroughs in medicine and new treatment options. Community pharmacists have been identified as contributors to antimicrobial resistance through their antibiotic dispensing practices. However, there is little research on community pharmacists who provide private healthcare in Nigeria.

Aim

This study described the antibiotic dispensing practices of community pharmacists and factors associated with such dispensing practices in Jos, Nigeria.

Methodology

The study used a cross-sectional descriptive design. Simple random sampling was used to select a sample of 84 community pharmacies out of a total of approximately 107 community pharmacies in Jos, and one community pharmacist from each community pharmacy.

A research assistant was trained to administer the questionnaire along with the researcher and collect information on community pharmacists' demographics, antibiotic dispensing practices, and the factors associated with those dispensing practices.

The socio-demographic data was analysed via descriptive analytical tools such as simple percentages and crosstabulations. These tools were used to generate a descriptive picture of the data, patterns and associations using SPSS version 25. Quantitative content analysis was done on responses to scenario-based questions, and recommendations made as to how the dispensing of antibiotics could be improved.

Ethical clearance was obtained from the University of the Western Cape Biomedical Research Ethics Committee and Jos University Teaching Hospital, while informed consent was obtained from all community pharmacists before the commencement of the study.

Results

The majority of the community pharmacists (87%) indicated that patients could purchase antibiotics without prescription from their pharmacies, and most pharmacists (98%) asked for reasons why antibiotics were demanded for without prescriptions. While 58% indicated that patients could purchase partial quantities of prescribed antibiotics at their pharmacies, 96% investigated the reasons for partial requests, and 94% counselled on the right dosage and frequency of the prescribed antibiotics. Sixty-seven percent of the pharmacists indicated that

one of the major reasons for dispensing antibiotics without prescription was self-medication by patients, while most (87%) indicated that financial constraint was a major reason why patients requested for partial quantities of prescribed antibiotics.

Conclusion

The dispensing of non-prescribed and part-prescribed antibiotics is a common practice amongst community pharmacists in Jos, Nigeria. Enhancing the financial status of Nigerians, as well as ensuring stricter regulatory measures on antibiotic use, would help promote rational use of antibiotics and reduce rising antimicrobial resistance rates.

DECLARATION

I declare that **ASSESSMENT OF ANTIBIOTIC DISPENSING PRACTICES OF COMMUNITY PHARMACISTS IN JOS, PLATEAU STATE, NIGERIA** is my own work, that it has not been submitted before for any degree or examination in any University or College, and that all the sources I have quoted or used have been indicated and acknowledged as complete references.

Victory Onize Olutuase: _____ April 2019

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ABBREVIATIONS

AMR	Antimicrobial Resistance
CP	Community Pharmacists
MDR-TB	Multidrug Resistance Tuberculosis
OTC	Over-the-Counter
PCN	Pharmacists Council of Nigeria
PMVs	Patent Medicine Vendors
PSN	Pharmaceutical Society of Nigeria
STDs	Sexually Transmitted Diseases
WHO	World Health Organization
XDR-TB	Multiple Drug Resistance Tuberculosis

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CHAPTER ONE: INTRODUCTION

1.1 Background

Rational medicine use, according to the World Health Organisation (WHO) (1985), requires that the right medicine gets to the right patient, at the right dose, for the appropriate clinical indication, and in the right quantity that the patient and community can afford. Irrational medicine use, therefore, implies that medicines are being used in a way that does not conform to the rational medicine use principles described above. Achieving rational medicine use is a global public health challenge, and the World Health Organization (2002) reported that globally more than 50% of medicines are either prescribed or dispensed irrationally and about 50% of patients take their medicines incorrectly. This report has also been cited by other authors (Bilal *et al*., 2016; Dakhale *et al*., 2016). According to Adebayo and Hussain (2010), the WHO reported that irrational use of medicines is very common in developing countries. A key aspect of irrational medicine use is the irrational use of antibiotics. This is partly underpinned by poor dispensing practices of health professionals, a contributory factor of the rise in antimicrobial resistance globally (Homedes and Ugalde, 2012; Nakwatumbah *et al*., 2017). To tackle the challenge of irrational medicine use, it is imperative to ascertain its extent and predisposing factors. This will inform the necessary and appropriate interventions that could be deployed to both address it and promote rational medicine use (World Health Organization, 2002).

Some of the factors contributing to irrational medicine use have been highlighted by Atif *et al.* (2016) as polypharmacy, self-medication, overuse of injections, overuse or underuse of antibiotics, and non-adherence to standard treatment guidelines. These could be influenced by the knowledge, attitudes, and practices of healthcare workers (including pharmacists), and the biased influence of pharmaceutical companies. Community pharmacists are key stakeholders in the rational use of medicines, forming the third largest group of healthcare professionals after doctors and nurses globally (Mossialos *et al.*, 2015). They are predominantly responsible for the retailing and dispensing of medicines. An important index which has been used to measure the world-wide use of antibiotics is the data on antibiotic sales from the pharmaceutical sector (Klein *et al*., 2018). This is an indication that pharmacists are key drivers in the consumption of antibiotics, and that the dispensing practices of community pharmacists are key in shaping the trend in antibiotic consumption. Furthermore, the irrational use of

antibiotics has been associated with community pharmacists globally, as reported by various studies (Ansari, 2017; Auta *et al*., 2018; Farah *et al*., 2015; Imtiaz *et al*., 2017).

Antimicrobial resistance is a growing global public health challenge which could act as a drawback to the progress already achieved in health and development in the Sustainable Development Goals agenda (Access to Medicine Foundation, 2017). At the high-level United Nations meeting on Antimicrobial Resistance in 2016, there was a re-commitment to the Global Action Plan on antimicrobial resistance which had already been adopted at the 68th World Health Assembly (Access to Medicine Foundation, 2017). Antibiotics have obviously been very useful in reducing morbidity and mortality rates due to infections. However, if the practices and factors associated with its irrational use are not addressed, antimicrobial resistance will continue to rise. Hare (2016) states that if the present antibiotic resistant rate rises by 40%, up to 9.5 million deaths could be recorded every year.

Antibiotic dispensing practices of community pharmacists such as dispensing without prescriptions and dispensing incomplete antibiotics courses also contribute to the consumption of antibiotics, and consequently, to rising antimicrobial resistance. A scenario-based study on community pharmacies in Zambia reported that up to 97% of the antibiotics requests made were without prescription and 100% of the pharmacists dispensed the antibiotic requests without prescription (Kalungia *et al*., 2016). This, they say, contributes greatly to rising antimicrobial resistance rates.

In Nigeria, the health sector is made up of public and private sectors. The public healthcare sector is made up of government institutions such as tertiary healthcare institutions, federal medical centres, teaching hospitals, state specialist hospitals, and primary healthcare centres, while the private healthcare sector includes private hospitals and clinics, community pharmacies, maternity homes, and patent medicine stores. In developing countries like Nigeria, the formal public sector often does not adequately cater for the health needs of the population. To make up for this inadequacy, the informal private sector frequently provides the majority of health care services to the population (Shah, Brieger, and Peters, 2011). In addition, a common problem in the public healthcare sector is that key medicines are usually out of stock, leading to a high percentage of the population to depend on the private healthcare sector, particularly community pharmacies, for their medicine requirements.

According to Uzochukwu *et al.* (2014), there is a dearth of research and information with respect to irrational medicine use in the private setting, of which patent medicine stores and community pharmacies make up a large proportion. The bulk of research on irrational medicine use and efforts to address irrational medicine use has previously focused on the formal public healthcare setting, with minimal action and research directed at the private settings (Mohanta and Manna, 2015). Furthermore, Ogbonna, Ilika, and Nwabueze (2015), in their review, stated that in Nigeria, 77% of the rational medicine use studies were carried out in hospital settings, while only about 4.1% of these studies were in community pharmacies. This emphasises the importance of conducting more research into the medicine use practices in community pharmacies. The antibiotic dispensing practices of community pharmacists, who are key stakeholders in rational medicines use, are important factors in determining if the challenge of antimicrobial resistance and irrational medicine use can be successfully tackled. Wafula *et al.* (2012) highlights the need for studies on retail pharmacy practices, considering their increasing public health responsibilities. This study, therefore, focused on registered community pharmacists in Jos, Plateau state, Nigeria.

1.2 Problem Statement

With the exception of medicines classified as over -the- counter (OTC) medicines, community pharmacists in Nigeria are legally expected to dispense medicines based on a prescription (Auta *et al*., 2014). In Nigeria, antibiotics are not considered OTC medicines. Farah *et al.* (2015), in their study, however, reported 100% availability of antibiotics as OTC medicines in Nigeria. Al-mohamadi *et al.* (2013) also reported that their studies in Saudi Arabia found indiscriminate dispensing of antibiotics without a prescription by pharmacists, whilst in Egypt, most pharmacists majorly adhered to dispensing controlled medicines based on a prescription. According to Sabry, Farid, and Dawoud (2014), as high as 85.4% of pharmacists dispensed antibiotics without prescriptions, and 35% of medicines dispensed as OTCs were prescription medicines in Egypt.

Jha, Bajracharya, and Shankar (2013) reported that the results of surveys presented to the World Health Organisation in the year 2000 revealed that 60% of antibiotics were prescribed unnecessarily in Nigeria. This would likely have contributed to antimicrobial resistance (Hadi *et al*., 2016). The irrational use of antibiotics includes non-prescription dispensing; unnecessary (without clinical indication) use, underuse, and overuse; and incorrect dose, duration, frequency, and indication. All these have been associated with the irrational dispensing

practices of community pharmacists (Nga *et al*., 2014). These practices could lead to antimicrobial resistance, which, in turn, would lead to an overwhelming financial burden, increased morbidity and mortality, and a loss of confidence in the health system (Atif *et al*., 2016).

1.3 Study Setting

Nigeria is a lower middle-income country in the Sub-Saharan Africa region. Jos city, where the study took place, is the capital of Plateau state in Nigeria. It sits at an altitude of 1,217m above sea level, with about 900,000 inhabitants as its population, according to the 2006 national census (Higazi, 2011). Jos is populated by migrants from different parts of Nigeria, making it one of the most diverse cities in Nigeria in terms of ethnicity, religious orientation, and socio-political inclinations (Higazi, 2011). Indeed, Jos is a cosmopolitan, lower middle-income city that offers a window through which researchers can peer into the Nigerian landscape. Presently, the Jos metropolis encompasses Jos East, Jos South, parts of Bassa, and Barkin Ladi Local Governments, with Jos North as its centre. Jos hosts a good number of thriving community pharmacists, and is equally a host to a leading pharmacy school in the country.

The Plateau state government has a total of 15 hospitals, 48 maternal and child welfare clinics, 59 general clinics, and 285 dispensaries. On the other hand, the private sector controls 47 hospitals, 310 clinics, 6 maternal, and 62 child welfare clinics, and 119 dispensaries (Sani, 2015). Community pharmacies are managed by registered pharmacists, and do not include patent medicine stores, which are drug stores managed by patent medicine vendors who have little or no formal pharmaceutical training. In Nigeria, the supply of medicines depends, to a great extent, on community pharmacies, as about 80% of medicines are distributed through the over 63,000 pharmacies. As a result, the majority of the population obtains its medicines from community pharmacies (Ogbonna *et al*., 2015). The number of registered community pharmacies in Jos is 107 as at the end of 2017, as obtained from the Pharmacists Council of Nigeria.

1.4 Purpose of Study

The purpose of this study was to gain knowledge of community pharmacists' antibiotic dispensing practices and propose possible interventions that could promote rational dispensing by community pharmacists. These findings could be useful to the Federal Ministry of Health,

Pharmacists Council of Nigeria, State Ministry of Health, Pharmaceutical Society of Nigeria, and schools of Pharmacy in Nigeria.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The 2013 World Bank Data as cited in (Auta *et al.* (2014), shows that there are about 40 doctors per 100,000 people in Nigeria. This suggests that the healthcare system is overburdened and stretched to meet the healthcare demands of over 200 million people. Community pharmacies therefore provide health services for a significant proportion of the population. They are one of the most available and accessible healthcare settings, as there is usually no need to book an appointment and a shorter waiting time is experienced than at other healthcare settings (Mohamed *et al*., 2013; Todd *et al*., 2014). They are also usually situated close to communities and have helped to improve access to medicines. Smith (2009) and Chiazor *et al.* (2015) further recognize that they are widely spread, and are, thus, sometimes the first and only healthcare service patients contact for their needs. The study by Longji *et al.* (2017) reported that in Nigeria, 65.5% of the community pharmacies surveyed were found within one kilometre of a government hospital or a private clinic. This was to tackle the constant challenge of poor medicine supply and regular medicine out-of-stock situations faced by public hospitals and some private clinics.

Kamat and Nichter (1998), in their study, reported that due to high expectations from patients and the need to maximize profit, community pharmacists are usually under pressure to prescribe and dispense medicines unnecessarily without evidence-based indications. Similarly, Saha and Hossain (2017), discovered that community pharmacists were responsible for a number of irrational dispensing practices, and suggested educational and regulatory interventions by the government to improve their knowledge and professional behaviour. In addition, community pharmacists, according to Kohler *et al.* (2012), could negatively affect the rational use of medicines as they sometimes do not provide healthcare information, or even when they do, such information is inadequate or biased. They further emphasized the importance of strengthening the private healthcare sector (which includes community pharmacies) and identified areas of possible intervention that could result in improvement in the rational use of medicines, public health, and healthcare services.

Antibiotics are one of the major classes of drugs which community pharmacists dispense on a daily basis. Pharmacists' antibiotic dispensing practices include both the over-dispensing and under-dispensing of antibiotics, as stated by Barker *et al.* (2017). These form part of the

irrational dispensing practices which could lead to antimicrobial resistance and many other adverse outcomes.

2.2 The global rise in antibiotic use

The world-wide rise in antibiotic use had been associated with increased access to antibiotics (Auta *et al*., 2018). This increased access, though attributed to improved economic levels by Klein *et al.* (2018), has also been contributed to by community pharmacies. Klein *et al.* (2018) reported that worldwide antibiotic consumption rose by 76% between the years 2000 and 2015. They further remarked that this global rise in antibiotic consumption is derived majorly from high antibiotic consumption in developing countries, coupled with moderate consumption in developed countries (Klein *et al*., 2018).

A high rise in the consumption of antibiotics (35% increase) in developing countries between the years 2000 and 2010 has been reported by Boeckel *et al.* (2014). This is quite similar to the global study on the antibiotics consumption rate of about 76 countries, which was discovered to have increased by 39% between the 2000-2015 (Klein *et al*., 2018). This increase, they say, was majorly contributed to by low- and middle-income countries. They further state that the global rise in antibiotics consumption could worsen the antimicrobial resistance burden. In Namibia, a study revealed that the pharmacy database indicated a high consumption of antibiotics during winter as a result of many patients presenting with respiratory tract infections (Nakwatumbah *et al*., 2017). Furthermore, most of the antibiotic prescriptions given at the health facility studied, were done after physical examination, without any laboratory investigation. This overlooks the process of "test and treat" which is important in isolating specific microorganisms responsible for an infection, and guides the specific antibiotic that is prescribed to manage it.

2.3 Antibiotic consumption in developing countries

Several studies on developing countries demonstrate the irrational use of medicines, poor regulations, and poor health systems. Ocan *et al.* (2017), in their study, reported that the prevalence of non-prescription antibiotic use for managing upper respiratory tract infections in Uganda was at 44.8% (38.3-52.3 CI). The misuse of medicines by prescribers, dispensers, consumers, and individuals is a global challenge which is particularly more common in developing countries (Sabry *et al*., 2014; Shankar, 2018). In particular, Barker *et al.* (2017) and

Farah *et al.* (2015) report that the dispensing of antibiotics without a prescription is a widespread practice in developing countries.

The prevalence of non-prescription antibiotic use in developing countries is probably due to citizens' poor socio-economic status, the small ratio of health care workers to population size, and weak regulatory systems. Abdulraheem, Adegboye and Fatiregun (2016), in their study on Nigeria, discovered that many participants could not afford consulting a doctor, and hence resorted to self-medication. The same study, revealed that up to 82.2% of the study participants, which were from a rural setting, had self-medicated with antibiotics, and that chemists, drug stores, and pharmacies were the major avenues for obtaining these non-prescription antibiotics (Abdulraheem *et al*., 2016).

Self-medication refers to the use of medicines without the prescription, recommendation, or control of an appropriate health personnel. Many consumers self-medicate in developing countries, and often do not have sufficient knowledge about the drugs they self-medicate on (Shankar, 2018). The results of a study carried out in Chile on consumers in community pharmacies discovered that 75% of them practiced self-medication (Shankar, 2018). Self-medication is commonly associated with antibiotic consumption, especially in developing countries where there are limited resources to adequately cater for the health needs of the population, and the majority cannot afford consultation at hospitals or clinics. This is confirmed by the results of the study conducted by Imtiaz *et al.* (2017) in Pakistan, a developing country , they reported that 41% of what was spent by patients self-medicating costed very low.

2.4 Antibiotic use in Nigeria

A study on patent medicine vendors in Nigeria reported that they dispensed one or more antibiotics to 59.7% of their patients, which is quite high a percentage (Uzochukwu *et al*., 2014). Infections are the usual indications for antibiotic consumption. Self-medication, in itself, has been termed useful by WHO as a means of managing the health of the populace, particularly in settings where health care resources and the medical system are very limited (Sapkota *et al*., 2010). This is corroborated by the fact that some ailments are self-limiting, and as such, can be effectively managed through responsible self-medication which simultaneously utilizes limited resources efficiently (Shankar, 2018). However, through self-medication, some ailments have been misconstrued for infections, thus encouraging the unnecessary use of antibiotics. For example, Sapkota *et al.* (2010), in their study, reported that a review of several

studies on self-medication with antibiotics in developing countries showed that antibiotics were commonly used for cold, sore throat, diarrhoea, and even the prevention of infection from sanitary pads used during menstruation in Nigeria. Another study by Findley *et al.* (2013) indicated that about one third of the women surveyed in a maternal, new born, and child health program in Northern Nigeria used antibiotics for managing fever, cough, and diarrhoea in their children. Although the study did not directly indicate the source of purchase and whether it was through a prescription or not, it was however mentioned as part of the self-care practices the mothers used in caring for their children.

2.4.1 Antibiotics surveillance and stewardship in Nigeria

Poor surveillance systems in low-income countries may make the task of curtailing antibiotic resistance more cumbersome, compared to high-income countries (Graham *et al*., 2016). It is common knowledge that antimicrobial surveillance systems, even when they do exist, are weak and mainly operational in hospital settings. Nasir *et al.* (2015), in their study, remarked that in Nigeria and many developing countries, laboratory information systems for antibiotic surveillance are not in place. The majority of the antibiotic surveillance systems that exist in Nigeria are voluntary and sparse. More so, such efforts and antibiotic surveillance data are not usually nationally coordinated. The only good and nationally coordinated antibiotic surveillance system is the surveillance system for pulmonary tuberculosis, this is the National Tuberculosis and Leprosy control program which is a small segment compared to the entire antibiotics in use (Nasir *et al*., 2015). A study by Khan *et al.* (2016) revealed that antimicrobial stewardship was not formally instituted in community pharmacy settings in Malaysia. A similar situation is obtainable in Nigeria where the presence of antimicrobial stewardship is either lacking or very weak in many hospitals. In addition, antimicrobial stewardship is totally lacking in the community pharmacy setting. This explains why antibiotics are grossly used irrationally in the community pharmacies, as earlier mentioned. Khan *et al.* (2016) concluded that with the growing challenge of antimicrobial resistance, it is imperative to establish antimicrobial surveillance systems in the community pharmacies in Malaysia. This could help to curtail irrational dispensing practices, and as a wider goal, curb the rise of antimicrobial resistance.

2.5 Antibiotic consumption and the development of antibiotic resistance

Although antibiotic resistance is a natural occurrence which could result from appropriate use, the inappropriate use of antibiotics increases its chance of occurrence and quickens its rise, which, in turn, narrows down available treatment options for managing infections (Access to

Medicine Foundation, 2017; Ocan *et al*., 2014). Although this is a world-wide public health challenge, it is more common in developing countries where statistics show a high occurrence of antibiotics resistance (Sapkota *et al*., 2010). The major cause of antimicrobial resistance globally is inappropriate prescription and dispensing of antibiotics by healthcare professionals (Nakwatumbah *et al*., 2017). Auta *et al.* (2018) also remarked that the increase in access to antibiotics and increased prescription or non-prescription use of antibiotics are contributory factors to antibiotic resistance.

The WHO's 2013 report as cited by Dye, (2015) stated that infectious diseases were responsible for about 16 million deaths in 1990, 15 million deaths in 2010, and will be responsible for 13 million deaths in 2050. Antibiotics have been useful in reducing the mortality and morbidity rates associated with infectious diseases (Yevutsey *et al*., 2017). Despite this milestone achieved by the use of antibiotics, multidrug-resistant strains of microorganisms are spreading at a rapid rate. These have led to a higher cost of care. On a yearly basis, antibiotic resistant bacterial infections account for about 700,000 deaths globally (Access to Medicine Foundation, 2017; Hare, 2016).

In Nigeria, there is insufficient data on the cost associated with the use of antibiotics, as well as antibiotic resistance. Antimicrobial resistance is a key public health challenge in Nigeria, and a number of studies have attempted to publish the high prevalence of resistance to specific antibiotics. The following antibiotic-resistant pathogens have been identified: Methicillin-resistant Staphylococcus aureus, Vancomycin-resistant Staphylococcus aureus and enterococci, multidrug-resistant gram-negative bacteria, carbapenem-resistant Enterobacteriaceae, as well as multidrug and extensive drug-resistant Mycobacterium tuberculosis (MDR-TB and XDR-TB) (Nasir *et al*., 2015). No doubt, antibiotic-resistant microbial strains would lead to higher cost of care than their susceptible counterparts, longer hospital stays, and poor clinical outcomes (WHO, 2014). Antibiotics dispensing practices formed one of the factors that were identified and analysed by International Pharmaceutical Federation (2015), and they remarked that it would greatly impact on the extent of antimicrobial resistance in the future.

2.6 Antibiotic dispensing practices of community pharmacists

One of the major sources of antibiotics globally is the community pharmacy, and it has been reported that a study carried out by WHO that up to 93% of consumers across the twelve

countries surveyed (Nigeria, South Africa, Barbados, Mexico, India, Indonesia, Russia Federation, Serbia, Egypt, Sudan, China and Vietnam) had recently purchased their antibiotics from a pharmacy or medical store (Chang *et al*., 2017). Pharmacists who dispense medicines are usually the final link between the patients and the medicines. Almost every medical consultation ends with a medicine being prescribed, and the effectiveness or hazard of the prescription depends largely on the pharmacist or dispenser's training, supervision, and knowledge about the medical condition being managed. Hazards arising from dispensed medicines are sometimes due to the irrational dispensing practices of the pharmacists or dispensers, and this is sometimes associated with the financial gains from such practices (Poudel and Nissen, 2018). Pharmacists have a strategic responsibility in the enhancement of appropriate antibiotics use (Alkhuzaei *et al*., 2018). Chang *et al.* (2017) stated that the dispensing of antibiotics without a prescription, the general behavioural tendencies towards the use of antibiotics, and knowledge about antibiotics, have all promoted self-medication with antibiotics and its inappropriate use. This, in turn, has increased the hazards associated with the irrational use of antibiotics. In addition, the major driver of antimicrobial resistance globally, is the irrational prescribing and dispensing of antibiotics (Nakwatumbah *et al*., 2017). Furthermore, Vanda *et al.* (2017) remark that the International Pharmaceutical Federation has asserted that for a decrease in antimicrobial resistance rates, pharmacists should improve on their antibiotic dispensing practices.

A number of studies have attempted to describe the dispensing practices of community pharmacists, and particularly, their antibiotic dispensing practices. The dispensing of antibiotics without a prescription, based on self-medication, and/or for the wrong indication, as well as the dispensing of incomplete quantities of prescribed antibiotics, are practices that have been associated with irrational dispensing practices, and Wafula (2013) suggests that these may have contributed to the global rise in antimicrobial resistance.

2.6.1 Dispensing without a prescription

The practice of dispensing antibiotics without a prescription, despite existing regulations, has been reported by authors as a common practice especially in developing countries and low-resource settings particularly in Nigeria (Bahnassi, 2015; Chang *et al*., 2017; Farah *et al*., 2015; Hoxha *et al*., 2018; Okeke *et al*., 1999; Sabry *et al*., 2014; Wafula, 2013). In Nigeria, antibiotics have been reported to be readily available or dispensed without prescription and in some cases up to 100% availability without prescription is reported(Farah *et al*., 2015; Okeke

et al., 1999). Bahnassi's (2015) survey on community pharmacists revealed that the majority of pharmacists in Syria were comfortable with, and commonly practiced, dispensing antibiotics without a prescription. Another study carried out by Imtiaz *et al.* (2017) in Pakistan revealed that 35% of antibiotics dispensed were dispensed without a prescription in community pharmacies. The study by Belkina *et al.* (2014) also reported that pharmacies were the major source of antibiotics without prescription, and that the prevalence of this practice ranged from 48% in Saudi Arabia to 78% in Yemen and Uzbekistan. These practices ignored existing regulations on medicines that must be dispensed with a prescription. However, the dispensing of drugs without prescription is not only common in developing countries. A systematic review of studies carried out across five continents and other parts of the world revealed that getting antibiotics without a prescription was a usual practice, especially in South and Eastern Europe, South America, Asia and Africa (Zawahir et al., 2018). Similarly, a survey on antibiotics use carried out in nine countries (United Kingdom, France, Belgium, Italy, Spain,Turkey,Thailand, Morrocco and Turkey) discovered that antibiotics could be purchased without a prescription in all the countries (Zawahir et al., 2018). A simulated case scenario study carried out in Catalonia, Spain, revealed that 79.7% of the pharmacies dispensed an antibiotic without prescription when a urinary tract infection case was presented (Llor and Cots, 2018). The irrational dispensing of antibiotics without prescriptions in Mexican pharmacies has been tagged by regional health experts to be responsible for antibiotic resistance (Homedes and Ugalde, 2012).

The following methods of requesting for medicines (antibiotics inclusive) without a prescription have been identified by Kamat and Nichter (1998): mentioning the name of the medicine needed, showing an old sample or strip of the medicine needed, presenting scribbled names of medicines on a piece of paper, describing the characteristics of the medicine, mentioning the symptoms and requesting for the appropriate medicine, and mentioning parts of a body or condition associated with a specific medicine.

The trends in requesting for medications without prescription was observed to be dependent on socio-economic status. In low-income settings, patients were observed to request for medicines by mentioning the affected parts of the body, or mentioning the colour or some other characteristic associated with the medicine. The middle-income settings generally just mentioned the name of the medicine they needed, while the high-income settings requested for branded medicines (Kamat and Nichter, 1998). This highly demonstrates that the dispensing of

antibiotics without a prescription by pharmacists is still widespread, and requires urgent intervention to forestall the adverse effects associated with such dispensing practices.

2.6.2 Unnecessary use of antibiotics by community pharmacists

The unnecessary use of antibiotics, often leading to overuse, has been reported by several studies. An antibiotic could be prescribed, but if it is not for the right indication, it could be used irrationally. For example, a study carried out in Egypt discovered that all antibiotics prescription and dispensing was done without the appropriate culture sensitivity test (Sabry et al., 2014). This implies that treatment was done without significant effort to use the most appropriate antibiotic for each patient. In Nigeria, nearly all pharmacy premises surveyed by Igun U (1994) dispensed an antibiotic for diarrhoea, while only very few of the community pharmacists actually dispensed the standard treatment for diarrhoea, which is oral rehydration therapy. Farah *et al.* (2015), in their study of community pharmacists antibiotics dispensing in Lebanon, report that as high as 41% of the antibiotics prescribed (pharmacists mostly dispense what they prescribe in their pharmacy), were not necessary, as they were not for the right indication. The antibiotics were for diarrhoea, viral infections, respiratory illness and non-infectious ailments, these were unnecessary indications responsible for the high use of antibiotics. Sabry, Farid and Dawoud, (2014) in their study in Egypt further noted that about one-third of antibiotics dispensed during the study were inappropriate for the conditions being treated. For example, upper respiratory tract infections, which are mostly viral and resolve on their own, were the most common indication for which antibiotics were dispensed. The study carried out by Sapkota *et al.* (2010) in their survey on Nigerian female students in four southwestern universities in Nigeria, highlighted that the antibiotics that were used by the female students to manage menstrual symptoms were purchased from chemists and pharmacists.

2.6.3 Dispensing based on self-medication

Self-medication implies that ailments are self-diagnosed and treated with medicines without medical consultation or supervision (Ocan et al., 2015). Self-medication has been reported to be as high as 91.4% in Nigeria (Ocan et al., 2015). Sources of antibiotics for self-medication include pharmacies (61.5%). Often, when pharmacists dispense medications based on a patient's request, the medications, apart from probably being for the wrong indication, are incomplete in dose and duration. Imtiaz *et al.* (2017), in their study on antibiotics dispensing by pharmacies in Pakistan, reported that 35% of the antibiotics dispensed were based on request

from patients and self-medication. Wafula (2013) from his study on dispensing practices of antimalarials and antimicrobials in western Kenyan pharmacies, reports that most of the antibiotics dispensed based on patients' requests during their study were partial doses, despite their counselling against incomplete dosing. Similarly, Malla *et al.* (2014), in their study, report that antibiotics were as common as OTCs in Nepal, and that consumption was usually incomplete in dose and duration.

2.6.4 Dispensing incomplete duration of antibiotic dose prescribed

A study in India, a developing country, discovered that 85% of the pharmacy staff dispensed sub-optimal quantities of the standard course of antibiotics prescribed (Barker et al., 2017). They further remarked that some studies on the duration of antibiotics revealed similar results in developing countries worldwide. While Wafula (2013) reported that although community pharmacists counselled patients against purchasing an incomplete dose of antibiotics, they went ahead to dispense the incomplete course of the antibiotics. Another study by Shet, Sundaresan and Forsberg (2015) on dispensing of antimicrobials by pharmacies in Bangalore, India reported that antibiotics were, most of the time, dispensed without consideration for dose and duration. They further reported that 58% of the pharmacists surveyed counselled patients on the dose of antibiotics, while 51% gave counselling on completing the duration of antibiotics medication while dispensing. Basak and Sathyanarayana, (2010), in their survey on community pharmacies in Tamilnadu, India, discovered that most of the antibiotics dispensed (68.2%) were incomplete in duration. For example, some of the pharmacists dispensed one capsule/tablet of antibiotics, while others dispensed a day or two days' supply of the antibiotics. Similarly, the study by Hoxha *et al.* (2018) reported that 33% of the pharmacists surveyed actually dispensed 3 tablets of amoxicillin-clavulanic acid while counselling on the its appropriate use. Another survey of community pharmacies in Nepal discovered that incomplete durations of antibiotic doses prescribed were dispensed at a high rate (73%) (Ansari, 2017). However, 49% of the pharmacists surveyed declined dispensing three tablets of amoxicillin clavulanic acid while explaining the harmful effects. Dispensing incomplete durations of prescribed antibiotics has been associated with patients having poor socio-economic status, low resource settings, and particularly, developing countries (Wafula, 2013).

2.6.5 Dispensing branded antibiotics in place of generics

One of the motivating factors for the irrational use of antibiotics are their high cost and the practice of dispensing expensive branded antibiotics, instead of the cheaper affordable

generics, especially in urban areas. This also contributes to the purchase of incomplete doses due to unaffordability (Nga et al., 2014). However, a study by Farah *et al.* (2015) reported that community pharmacists in Lebanon from a lower socio-economic area were more disposed to dispensing generics of antibiotics due the advantage of the lower cost it offers its patients from a poor socio-economic background. This practice was different from that of community pharmacists from a higher socio-economic background who dispensed more branded antibiotics due to their belief that the generics were lower in potency compared to the branded ones. The results of the study carried out by Imtiaz *et al.* (2017) showed that the burden of cost associated antibiotics consumption could be largely attributed to the prevalent use of branded antibiotics in both the private and public healthcare sectors in Pakistan, while the use of generics remained minimally low.

2.7 Factors associated with the dispensing of antibiotics

Some socio-economic and behavioural factors have been identified as associated with the irrational use of antibiotics, especially in developing countries. These are: lack of finance for adequate healthcare, incorrect information about their illness, and sub-optimal information about medications (which resulted in self-medication for minor illness). In addition, when a prescription has been previously given for a similar ailment, some patients may not consider it necessary to consult a doctor for the present illness due to the aforementioned factors (Poudel and Nissen, 2018).

Factors responsible for self-medication include poor regulatory measures, ignorance of associated risks, the inability to afford certain medicines, lack of time to visit the hospital, easy access to medicines, the influence of largely publicised medicines and tendency to self-care. The consequences of self-medication, amongst many others, include wrong diagnosis and wrong choice of medications, inability to identify adverse drug reactions, drug-food and drug-drug interactions, abuse and dependence on drugs, drug induced diseases and greater public healthcare costs (Poudel and Nissen, 2018). A number of factors have been discovered to influence the irrational dispensing of antibiotics: economic incentives, consumer expectations, weak professional regulations and the influence of pharmaceutical sales representatives.

2.7.1 Economic incentives

Nga *et al.* (2014), in their study to understand the economic factors that motivate irrational dispensing of antibiotics in community pharmacies in Vietnam, discovered that respondents

were worried that if they complied with the regulation of dispensing antibiotics based on a prescription, their general income and sales could be negatively affected. Reports from studies in India such as Kamat and Nichter, (1998) and Shet, Sundaresan and Forsberg, (2015) have shown that economic incentives influence the antibiotic dispensing practices of community pharmacists. Shet, Sundaresan and Forsberg, (2015) in their study further stated that establishing the right economic incentives could help in managing irrational antimicrobial dispensing practices. Since the pharmacies are usually for-profit enterprises, to avoid losing sales and to keep the pharmacy business running, economic factors motivate a lot of irrational dispensing practices (Bahnassi, 2015). This is corroborated by (Chirdan *et al.* (2013), who stated that private healthcare settings usually try to make the most of demand for their services and also make unnecessary sales. This could influence the pharmacists to unnecessarily dispense antibiotics. Hence, the economic incentive was one of the motivating factors for pharmacists' inappropriate dispensing of antibiotics.

2.7.2 Consumer expectations

The common belief that "there is a pill for every ill" is an expectation from patients that often influences health professionals to irrationally prescribe medicines. This brings to fore the common practice of prescribing antibiotics for viral infections due to patients expectations (Poudel and Nissen, 2018). Many patients self-medicate because they do not have sufficient finances to consult a doctor. Hence, they walk up to the pharmacist and request for antibiotics when they feel that their illness requires antibiotics. When the pharmacist insists on not dispensing antibiotics without a prescription, the patient may go to another pharmacy where it would be dispensed. If this trend continues, it results in reduced sales for the ethical pharmacist, and has been expressed as one of the factors that influences the antibiotic dispensing practices of community pharmacists (Hadi et al., 2016). It has also been reported that in an attempt not to disappoint patients' expectations of getting their medications when they come to the pharmacy and maintain customer loyalty, pharmacists dispense antibiotics without a prescription (Bahnassi, 2015). In developing countries particularly, the majority of pharmacies dispense antibiotics based on the consumer's demand. A study reported that up to 39% of some community pharmacists studied in Qatar admitted that they dispensed antibiotics to consumers due to pressure from them (Alkhuzaei et al., 2018). Shet, Sundaresan and Forsberg, (2015) reported that several reviews on low income countries with respect to their antibiotics use, indicated patient demand for antibiotics as one of the factors influencing antibiotic dispensing practices in developing countries. Similarly, Graham *et al.* (2016) stated that in Nigeria, a study

reported the preference of patients for antibiotics as treatment when they visit the patent medicine vendors.

2.7.3 Professional regulations

It has been observed that weak professional regulations or the failure to implement regulatory strategies could greatly influence the antibiotic dispensing practices of pharmacists (Shet, Sundaresan and Forsberg, 2015; Al-mohamadi *et al.*, 2013). In Nigeria, it has been reported by Sapkota *et al.* (2010) that the poor regulation of the sale and promotion of antibiotics has led to its irrational use. Sabry, Farid, and Dawoud (2014) further reported the lack of monitoring of dispensing practices by regulatory authorities in Egypt as a contributory factor to the dispensing of antibiotics without a prescription. Similarly, it has been reported that the outright sale of all medicines (both OTCs and prescription-only medicines) without a prescription is due to the lack of monitoring, supervision, and controlling of dispensing practices in Saudi Arabia by the Saudi FDA (Al-mohamadi et al., 2013). Although weak regulation has been reported as partly responsible for irrational antibiotic dispensing practices, Shet, Sundaresan and Forsberg (2015) remarked that regulation alone is not adequate in curbing these antibiotic dispensing practices. However, they also state that improving regulations regarding antibiotic dispensing practices could promote appropriate antibiotic dispensing practices.

2.8 Influence of pharmaceutical sales representatives

Kamat and Nichter (1998) reported that dispensing practices by pharmacists were influenced by the marketing tactics of pharmaceutical sales representatives. The representatives lobby health professionals to stock, prescribe, and dispense their medicines as a way of promoting their medicine products.

In conclusion, Auta *et al.* (2018), in their systematic review of databases on published studies that had reported the sale and supply of antibiotics in community pharmacies globally, remarked that even though the dispensing of antibiotics without a prescription is against established regulations, 50% of the antibiotics are still purchased globally without a prescription, and community pharmacies are majorly responsible for this practice. Community pharmacists are strategically involved in the use of antibiotics, and acquiring knowledge of their dispensing practices to determine those which contribute to the irrational use of antibiotics is important.

CHAPTER THREE: METHODOLOGY

3.1 Study Aim

To assess the antibiotic dispensing practices of community pharmacists in Jos, Nigeria.

3.2 Study Objectives

- To describe the socio-demographic profile of community pharmacists.
- To determine the antibiotic dispensing practices of community pharmacists as regards presented prescriptions and OTC requests.
- To determine the factors associated with the antibiotic dispensing practices of community pharmacists.
- To identify practices indicative of the irrational dispensing of antibiotics which require intervention.

3.3 Study Design

This study employed an observational cross-sectional descriptive study design to assess community pharmacists' antibiotics dispensing practices and the factors associated with such practices. This has been useful in measuring disease or health occurrences, as well as the prevalence of health outcomes and exposure variables at a particular time in a defined population (Varkevisser *et al*., 2003). This study could be followed by a qualitative study to better understand community pharmacists' antibiotic dispensing practices.

3.4 Study Population and Sampling

3.4.1 Study Population

The number of registered community pharmacies in Jos obtained from the Pharmacists Council of Nigeria was 107 as at the end of 2017. Every community pharmacy has a registered superintendent pharmacist.

3.4.2 Sampling Method and Sample size Determination

The number of registered community pharmacies obtained served as the sampling frame. Simple random sampling was the sampling technique used. Each of the pharmacies were assigned a number from 1 to 107, and the numbers were written on small pieces of paper. The 107 pieces of papers were then put in a container and shaken vigorously to ensure

randomisation (Varkevisser *et al*., 2003). With a calculated sample size was 84, 84 pieces of papers were taken out of the box. The community pharmacies corresponding to the numbers picked were recorded. These are the community pharmacies that formed the sample. Epi info was used to determine the sample size, as indicated below.

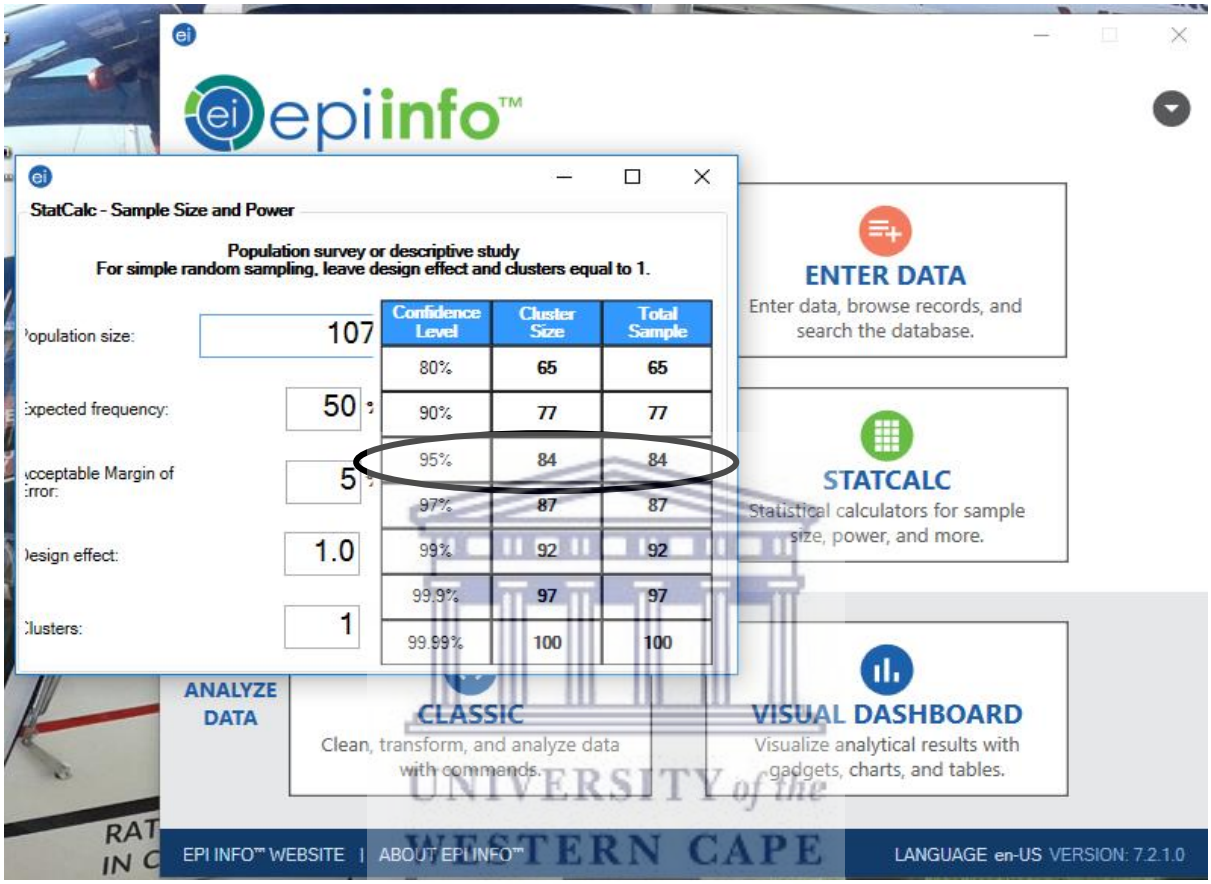

Figure 1: Screenshot of Epi Info StatCalc used to determine sample size

At each community pharmacy, one community pharmacist was included in the study.

3.5 Data Collection

3.5.1 Data Collection Tool

A structured questionnaire was designed to elicit answers to questions, which were then quantified, counted, and expressed numerically (Degu and Yigzaw, 2006). The structured interviewer-administered questionnaire was based on structured responses and simulated case scenarios. The data collection tool was an adaptation of the questionnaire used in the Zambian study by Kalungia *et al.* (2016). The questionnaire was divided into three sections. Section A captured the demographics of the community pharmacists and the characteristics of the pharmacy premises, Section B captured antibiotic dispensing practices, while Section C

presented simulated case scenarios that attempted to elicit responses describing the antibiotic dispensing practices of the pharmacists. Please refer to Appendix 1 for a copy of the questionnaire.

3.5.2 Data Collection Process

The data collection process was carried out in two phases.

(a) First phase (pre-test)

The questionnaire was first pre-tested, to ascertain if and how the questionnaire was understood. It was administered to five purposively selected community pharmacists, not included in the selected study sample. The data collected was coded, captured, and analysed. The analysis was to test the reliability and validity of the questionnaire, in order to modify and improve the questions and scenarios where necessary, before the main data collection phase.

Pre-test report

The research assistant was trained for a day. The research assistant was taken through the questionnaire, and the process for taking down responses was demonstrated by asking the research assistant, the research questions. The research assistant also repeated the process by asking the researcher questions. This was to determine if the data collection process was understood by the research assistant. Questions were asked, and possible challenges that could come up during the process of data collection were identified, discussed, and addressed.

The pilot study was carried out for a period of two days. Five pharmacists were contacted for the pilot study. An appointment was booked with one of the pharmacists because she was not available at her premise, while the other four were visited at their premises. One of the pharmacists declined the questionnaire being researcher-administered and insisted on self-administering it, while the other four agreed to the researcher administering the questionnaire.

The questionnaires were printed out and responses ticked or noted down appropriately. The researcher went with the research assistant to one of the pharmacies as a team to observe the data collection process. Each questionnaire took about 15-25 minutes to complete. The response rate was 80%. It was difficult to get the attention of one of the pharmacists, and hence, data was collected from four pharmacists and analysed.

Data capture for pre-test

The questionnaire was used to develop a template in SPSS for data entry. The data collected was captured into SPSS based on codes generated. Data cleaning and validation was done to check for missing values and ensure that the data was properly captured, as reflected in the questionnaire. The questionnaire was adjusted based on the results of the pre-test analysis as indicated in the appendix.

(b) Second phase (main data collection)

The questionnaires were administered to one pharmacist in each of the 84 sampled community pharmacies in Jos city. The research assistant recorded the community pharmacists' responses on the questionnaires.

Data Collection Report for the Main Study

The main data collection process spanned about two weeks with an average of 2-5 questionnaires administered per day. A visit was made to the sampled community pharmacies, and the questionnaire administered to the pharmacist available at the pharmacy premise. An introduction was made and the reason for the visit to the pharmacy premise was also stated. Upon granting audience, the main aim of the study was stated, and the information sheet handed over to them. Those who gave their consent signed the consent form before proceeding to the questionnaire section. The questionnaire was researcher-administered. It was conducted by the researcher and a trained research assistant. A summary of responses to the survey is given in the Table 1 in the Results section.

During the period of the data collection, some of the pharmacists gave outright audience and consent upon the researcher's arrival at their premises, and the questionnaire was administered. Others gave an appointment for a more suitable time, as they were busy with patients and would not want to lose out on business. The questionnaires were printed out, responses ticked appropriately, and notes taken for some of the responses. After all questions had been responded to by the pharmacists, the researcher thanked the pharmacists for their audience, time, and responses, and left. Each interview lasted about 15-25mins.

3.6 Data Analysis Tools and Software

The first part of the questionnaire produced socio-demographic data. This was analysed via descriptive analytical tools such as simple percentages and cross-tabulations. The analyses, done in SPSS version 25, generated a descriptive picture of the sample. Frequency was used via SPSS version 25 to analyse responses to sections B1 and B2 of the questionnaire. Responses to scenario-based questions (section C) were organised into a structured list of words in order to transform the derived categories into quantitative data. Subsequently, frequencies and other quantitative data were analysed via quantitative content analysis. Other quantitative data generated from other parts of the questionnaire were also analysed using proportions and the contingency method to determine patterns and associations.

3.7 Validity

To minimise possible measurement bias, the validity of the study instrument was conducted via the following methods:

- **Face validity**: The questionnaire was administered to a sample of the community pharmacists who are stakeholders in the study, in order to get their views on its credibility. This is important towards ensuring that the questionnaire is acceptable to those who will be its recipients.
- **Content validity**: Content validity analysis was performed to ensure that the questionnaire reflects all the elements of the variable been studied.
- **Construct validity**: A construct validity test was also conducted to ensure that the instrument reflects the theoretical components of the constructs. The construct validity was ensured by testing the instrument via a pilot study using a sample size of 5 participants. The data collected was analysed and necessary adjustments made to the questionnaire after the pilot study. This was done to ensure the instrument designed would collect the intended data.

The questionnaire was also structured and worded in such a way as to elicit the most honest responses possible. Every study participant responded to the same questionnaire to ensure that information was gathered in the same way.

Steps were also taken to address the possibility of various kinds of bias in the administration of the research instrument. These include:

- Obsequiousness bias: The questionnaire was not designed in the negative, so as to prevent the respondents from giving responses perceived to be desirable by the investigator.
- Recall bias: The structured questionnaire had some graded responses to assist the study participants respond according to what truly defines them.
- Information bias: The questionnaire was first pre-tested. This is to ensure accurate measurement of the study variables because inaccurate measurement would threaten the validity of the study.
- Confounding factors: Potential confounding factors such as age, years of community pharmacy practice, and years of post-graduation were measured in the study.

3.8 Reliability

Reliability helps to ensure that the study instrument will produce the same results when used for data collection under the same study setting (Varkevisser *et al*., 2003). To ensure the reliability of the study, the questionnaire, which is an adapted validated instrument, was modified based on the responses and feedback from the pre-test. The participation of a trained research assistant in the pre-test and also the main study was to ensure reliability (Varkevisser *et al*., 2003).

3.9 Generalizability

The results of this study apply to the study population and could be generalised with caution to other community pharmacists in similar settings.

3.10 Limitations

A medicine use evaluation study would have been more appropriate. However, most of the community pharmacies in Nigeria do not have an organized system of storing past prescriptions. Hence, a retrospective evaluation of past prescriptions, which would have given information on dispensing practices of antibiotics, was not possible (Ogbonna *et al*., 2015). In self-report studies, there is the tendency for recall bias and dishonesty. This was addressed as detailed in section 3.7 above. Similar studies using both hypothetical and real case scenarios to elicit responses from pharmacists on their antibiotics dispensing practices have been carried out successfully by other authors (Bell *et al*., 2016; Homedes and Ugalde, 2012; Kalungia *et al*., 2016; Zawahir *et al*., 2018). Another limitation to this study is that the response rate 48

(57%) was well below the calculated sample size of 84 at 95% Confidence interval. This implies that the results of this study would be generalised with caution to community pharmacists in similar settings.

3.11 Ethical Considerations

Ethical clearance was obtained from the University of the Western Cape Biomedical Research Ethics Committee with reference number BM18/8/14 (see appendix 4). The ethical clearance for the research within Jos was also obtained from the Jos University Teaching hospital (JUTH) before the commencement of the study (See appendix 5). A participation information sheet (Appendix 2) was provided to the community pharmacists, stating the purpose of the study and assuring them of confidentiality and the freedom to withdraw from the study at any stage if they want to, without any fear of harm or consequence. A consent form (see appendix 3) was given to all participants to sign, with the option of voluntary participation in the survey.

Questionnaires for community pharmacists were in English, as pharmacists were comfortable with this language. Though there was no direct benefit to the pharmacists for participating in the study, its outcomes may be used to improve rational dispensing and the use of antibiotics in the future. The study had the possibility of causing some discomfort to respondents in the event that they were not willing or were unable to answer some of the questions. Their right to decline answering questions or withdraw from the study was explained to them.

All information obtained was treated with utmost confidentiality with no suggestive identity of any participant disclosed to any third party. The confidentiality of the selected community pharmacies, as well as the participating pharmacists, were ensured by assigning codes to the selected community pharmacies. The codes of the selected community pharmacies were reflected on the data collection forms which was administered to one pharmacist in the community pharmacy. Identification keys only accessible to the researcher were used to link the coded data collection forms with each participant. All information obtained was properly stored in password-protected laptops accessible only to the researcher and supervisors. In line with ethics, completed questionnaires are stored in secured cabinets and kept for a period of five years before being destroyed. The results of the study will be used only for the purpose of this research. They will be disseminated to the Pharmacists Council of Nigeria who will further disseminate them to other appropriate authorities. The presentation of the research findings at local and international conferences and publication in an academic journal will be considered.

CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter reports the results of the analyses. The results are categorised into various sections to demonstrate how the study objectives were met. These sections are:

- The socio-demographic profile of community pharmacists
- Pharmacy characteristics based on socio-economic location
- Antibiotic dispensing practices by community pharmacists of presented prescriptions and OTC requests
- Common ailments patients present when requesting for an antibiotic
- Reasons patient present for requesting for part quantities of prescribed antibiotics and reasons patients present for requesting antibiotics without prescriptions
- Perceived impact of dispensing incomplete antibiotics and dispensing without prescriptions on public health
- Suggested solutions to the problem of dispensing incomplete quantities of prescribed antibiotics and dispensing without prescriptions

A total of 48 pharmacists out of 84 gave their consent for the questionnaire to be researcher-administered, resulting in a response rate of 57 percent. About 14 percent outrightly declined to participate in the study, while 12 percent insisted on the questionnaire being self-administered. Since this was not in accordance with the design of the study, they were automatically excluded. About 5 percent of the pharmacists were discovered to be shuttling between two pharmacy premises, and hence, were only interviewed at one pharmacy. About 12 percent of the pharmacists were unavoidably absent after three repeated visits to their premises. The reasons given were that some were on leave, some travelled, while others were just not available. We were thus unable to get an appointment with those pharmacists. Table 1 provides a summary of the study respondents.

Table 1: Summary of study respondents

Item	N	Percent
Identified Sample Size	84	100%
Respondents	**48**	**57%**
Non-respondents	36	43%
• Outright decline	12	14%
• CP that insisted on self-administration of questionnaire	10	12%
• Double-covering	4	5%
• Not Available	10	12%

CP: Community Pharmacists

4.2 Socio-demographic profile of community pharmacists

The socio-demographic characteristics of the surveyed community pharmacists are presented in Table 2. The questionnaire was administered to 48 community pharmacists, one pharmacist in each community pharmacy. The majority of the pharmacists were male (65%), and were below 40 years of age (77%). The majority also had more than five years' experience post-pharmacy graduation (65%) and had more than five years' experience practicing within a community pharmacy (51%). While 46% do not have any post pharmacy qualifications, 54% have one or more post-pharmacy qualification.

Table 2: Socio-demographic characteristics of the community pharmacists (n=48)

Variable		N	Percent
Gender	Male	31	65%
	Female	17	35%
	Total	***48***	***100%***
Age bracket	21-30 years	14	29%
	31-40 years	23	48%
	41-50 years	9	19%
	≥ 51 years	2	4%
	Total	***48***	***100%***
Years in Community Practice	0-5 years	23	48%
	6-10 years	15	31%
	11-15 years	5	10%
	≥ 15 years	5	10%
	Total	***48***	***100%***
Further Qualification Since Graduation	No post pharmacy qualification	22	46%
	Short courses	10	21%
	Postgraduate diploma	5	10%
	Masters	11	23%
	Total	***48***	***100%***
Years after Post-graduation	0-5 years	17	35%
	6-10 years	20	42%
	11-15 years	5	10%
	≥15	6	13%
	Total	***48***	***100%***
Pharmacist Status	Locum Pharmacist	13	27%
	Superintendent Pharmacist	16	33%
	Sole Owner Pharmacist	11	23%
	Partner Pharmacist	4	8%
	Manager Pharmacist	4	8%
	Total	***48***	***100%***

4.2.1 Features and distribution of community pharmacies based on socio-economic location

The characteristics and distribution of community pharmacists and the socio-economic strata they serve are shown in Table 3.

The high-income area had the highest staff size (35) as well as the highest average number of antibiotics request without prescriptions (86%), but with the lowest antibiotic requests with prescriptions (14%). The upper middle-income area, with a staff size of 6, had the highest average requests for antibiotics with prescriptions (62%). The lower middle income and the

low-income area had the lowest staff size (4), and antibiotics requests without prescriptions were (62%) and (67%) respectively.

Table 3: Pharmacy characteristics based on socio-economic location

Pharmacy Location	No of pharmacies	Average Staff Size	Average number of antibiotics requests per day				
			Total	With Prescription	Percent	Without prescription	Percent
High income	1	35	280	40	14%	240	86%
Upper Middle income	9	6	39	24	62%	15	38%
Lower Middle income	27	4	29	11	38%	18	62%
Low income	9	4	27	9	33%	18	67%
Missing	2						
Total	**48**						

The antibiotic dispensing practices by community pharmacists of presented prescriptions and OTC requests are shown in Tables 4-7.

4.2.2 Antibiotic dispensing practices by community pharmacists of presented prescriptions

The antibiotic dispensing practices of community pharmacists without prescriptions are shown in Table 4. Seventy-nine percent of the community pharmacists indicated that patients frequently requested for part quantities of prescribed antibiotics from their pharmacies. An average number of the community pharmacists (58%) indicated that patients could purchase part quantities of prescribed antibiotics, even though almost all the pharmacists (98%) indicated that they asked for reasons why part-prescribed quantities are been requested, 94% counselled on the appropriate dose and duration of the antibiotics.

Table 4: Antibiotic dispensing practices with prescription (N=48)

Practice	Proportion
Can patients purchase part quantity of prescribed antibiotics?	**Yes** (58%); **No** (42%)
How frequently do patients request for part quantities of prescribed antibiotics?	**(Very) Frequently** (79%); **Rarely** (21%)
Do you ask for reasons why part quantity of prescribed antibiotics is been requested?	**Yes** (96%); **No** (2%); *N*=46*
How do you counsel patients on the dose and duration of antibiotics they request for?	**Yes** (94%); **Counsel on right dose, frequency and duration**. **Missing** (6%)
For patients that present prescriptions with antibiotic brands, do you dispense generics or the prescribed brands?	**Prefer dispensing generics** (56%); **Prefer dispensing branded** (35%)

Unless otherwise indicated (*) N=48

4.2.3 Antibiotic dispensing practices by community pharmacists of OTC requests

The antibiotic dispensing practices of the community pharmacists without prescription are shown in Table 5. All the community pharmacists (96%) indicated that patients frequently requested for antibiotics without prescriptions, while 87% indicated that patients could purchase antibiotics without prescriptions from their pharmacies. Notwithstanding, almost all the pharmacists (98%) indicated that they asked for the indication of the antibiotics upon request.

Table 5: Antibiotic dispensing practices without prescription (N=48)

Practice	Proportion
Can patients purchase an antibiotic without a prescription?	**Yes** (87%); **No** (13%)
How frequent do patients request for antibiotics without prescription?	**(Very) frequently** (96%); **Rarely** (4%)
Do you ask for the indications for antibiotics upon requests?	**Yes** (98%); **Missing** (2%)
Do patients request for the complete course of antibiotics without prescription?	**Yes** (17%); **Sometimes** (75%); **No** (8%)
What is your dispensing policy in the absence of a prescription is based on?	**Recourse to Dr** (25%) **Pharmacist's Knowledge** (75%)

4.3 Top three antibiotics commonly requested and dispensed in community pharmacies

Table 6 shows the top three antibiotics requested (on doctor's prescription and without a prescription, that is, on patient's request), and Table 7 shows the top three antibiotics that community pharmacists actively dispense (on prescription and without a prescription).

Table 6: Top three antibiotics requested as part prescription and without prescription

Rank Order	*Request for Part prescribed quantity*	*Request without prescription*
1st	Ampiclox	Ampiclox
2nd	Amoxicillin	Amoxicillin
3rd	Augmentin	Metronidazole

Table 7: Top three antibiotics dispensed in part and without prescription

Rank Order	*Part dispensing of prescribed quantity*	*Dispensing without prescription*
1st	Ampiclox	Ampiclox
2nd	Amoxicillin	Amoxicillin
3rd	Metronidazole & Co-trimoxazole	Co-trimoxazole

4.4 Most common ailments patients present with when requesting an antibiotic

The most common ailments patients indicate when requesting antibiotics without a prescription are shown in Table 8. Flu (cold, cough and catarrh), urinary tract infections, diarrhoea, respiratory tract infections, injury, and sores are the most common ailments responsible for antibiotic requests. These five ailments accounted for 66% of the antibiotic requests.

Table 8: Most common ailments presented by patients when requesting for antibiotics without prescription

Ailment	No	Percent
Flu: Cold, cough, catarrh	21	17%
Urinary Tract Infections	20	16%
Diarrhoea	17	13%
Respiratory Tract Infections	13	10%
Injury and sores	13	10%
Sexually Transmitted Infections	10	8%
Boil	8	6%
Typhoid	8	6%
Body pains	3	2%
Fever	3	2%
Unprotected intercourse	3	2%
Pneumonia	2	2%
Skin Infections	2	2%
Other infections	2	2%
Inflammation	1	1%
Total	**126**	**100%**

4.5 Incentives from sales representatives for dispensing particular brands of antibiotics

Responses are presented in Table 9. Most pharmacists (70%) indicated they do not receive incentives for dispensing particular brands of antibiotics.

Table 9: Incentives for dispensing particular brands of antibiotics

Response to Incentive for dispensing specific brands	No	Percent
Yes, Always	1	2.1%
Sometimes (Yes or No)	11	22.9%
Always No	34	70.8%
Missing value	2	4.2%
Total	**48**	**100.0**

4.6 Reasons associated with the antibiotic dispensing practices of community pharmacists

The major reasons patients presented for requesting part-prescribed quantities were financial constraints (86%), misconceptions on the use of antibiotics (6%), and making up for previous incomplete doses (6%).

The major reasons for patient's request for antibiotics without prescriptions were self-medication (67%), easy access to the pharmacies (17%), and prophylaxis against Sexually Transmitted Diseases (8%).

Table 10: Reasons patients present for requesting for part quantities of prescribed antibiotics and reasons patients present for requesting antibiotics without prescriptions

Dispensing Practices	Factors	Notes
Dispensing incomplete duration of antibiotics	• Financial constraints on the part of patients ***(n=41, 86%)*** • Pill burden ***(n=1, 2%)*** • Patients' misconceptions such as using antibiotics for unprotected intercourse, no need for full course, etc. ***(n=3, 6%)*** • Making up for previous incomplete course ***(n=3, 6%)***	Financial constraint on the part of the patient substantially accounts for pharmacists' dispensing incomplete duration.
Dispensing without prescription	• Ease of accessing healthcare at the community pharmacy ***(n=8, 17%)*** • Confidence in the pharmacist ***(n=2, 4%)*** • Lack of access to healthcare due to cost ***(n=1, 2%)*** • Prophylaxis against sexually transmitted diseases ***(n=4, 8%)*** • Self-medication or recommendation from friends and relatives ***(n=32, 67%)***	Self-medication as motivated by cheaper and faster access to primary health care services.

4.7 Identifying practices indicative of irrational dispensing of antibiotics, that requires intervention

The community pharmacists were asked scenario-based questions to elicit responses indicative of their practices, as shown in Table 11. For the "unnecessary prescription scenario", the majority (63%) indicated that they would dispense the medication, since it's a prescription and due diligence would have been taken. Most (83%), for the "dispensing branded antibiotics in place of generics" scenario, also indicated that they would dispense branded antibiotics in place of generics, since it would afford them more money. A good number of the pharmacists (98%) indicated a decline in dispensing incomplete dose – the "Request for incomplete dose and duration of antibiotics" scenario – due to sub-optimal dose. For the "Request for antibiotics without prescription" scenario, 67% indicated they would not dispense due to wrong indication. For the "Request based on recommendation from friend" scenario, 71% indicated they would not dispense an antibiotic because there was no clinical indication for it. For the "Request for repeat prescription", the majority (91%) indicated they would not dispense an antibiotic because it's unethical.

Table 11: Community pharmacists' dispensing practices in simulated case scenarios

Scenario theme	Yes, would dispense antibiotic	Main reasons for dispensing antibiotic	No, would not dispense	Main reasons for not dispensing antibiotic	Association with community pharmacy practice	Association with postgraduate training
Unnecessary use of antibiotics A woman comes in with a prescription of metronidazole for her 5-year old son. She complains that he has been stooling 4-5 times daily for about two days. Would you dispense?	n=30; 63%	Antibiotic is indicated in the prescription from the doctor; and the antibiotic is effective.	n=18; 37%	Antibiotics is not indicated in the prescription.	Cramer's V=0.349; p=0.119; no association	Cramer's V=0.200; p=0.589; no association
Dispensing branded antibiotics in place of generics A patient comes with a prescription having Amoxicillin-clavulanic acid. Would you dispense a generic or branded Augmentin?	n=40; 83%	Efficacy and safety of branded antibiotic; it is indicated in the prescription; patients' ability to pay; more income to the pharmacy.	n=8; 17%	Generic antibiotic is more affordable; and it is proper to stick to prescription.	Cramer's V=0.499; p=0.008; association exists	Cramer's V=0.200; p=0.589; no association
Request for incomplete dose and duration of antibiotics A teenage boy of about 15 years comes with an amoxicillin prescription. He requests for 2 tablets out of the prescribed quantity to treat his infected sore leg. He states that it is the quantity he can afford. Would you dispense 2 tablets?	n=1, 2%	Patient's insistence	n=47; 98%	Requested dose is sub-optimal and could lead to resistance. It is unethical.	Cramer's V=0.152; p=0.775; no association	Cramer's V=0.159; p=0.751; no association

Scenario theme	Yes, would dispense antibiotic	Main reasons for dispensing antibiotic	No, would not dispense	Main reasons for not dispensing antibiotic	Association with community pharmacy practice	Association with postgraduate training
Request for antibiotics without prescription A young lady comes to request for some Septrin (Cotrimoxazole) tablets to manage her Flu symptoms. Would you dispense the Septrin?	n=17; 35%	Pharmacist's investigation shows the need for antibiotics; effectiveness of the requested antibiotics; and patient's ability to pay.	n=31; 65%	Antibiotics is not indicated in treating Flu.	Cramer's V=0.185; p=0.649; no association	Cramer's V=0.461; p=0.017; association exists
Request based on recommendation from friend Mrs B comes with an empty card of ciprofloxacin and requests for a card to treat her urinary tract infection. She says her friend gave her as a sample and it has been effective in treating her friend's urinary tract infection. Would you dispense ciprofloxacin?	n=14; 29%	Pharmacist's investigation shows the need for antibiotics; the antibiotic is effective for treating the condition	n=34; 71%	Antibiotics should be dispensed based on clinical or laboratory investigation.	Cramer's V=0.202; p=0.582; no association	Cramer's V=0.337; p=0.142; no association
Request for repeat prescription A boy comes to request for 4 tablets of Ampiclox to manage his painful boil. He states that he has this before and it works well. Would you dispense it?	n=4; 8%	Patient's insistence; the understanding that patient will come back to make up for the dose.	n=44; 92%	Sub-optimal dose could lead to resistance; and it is unethical. The need to dispense antibiotic after investigation.	Cramer's V=0.265; p=0.337; no association	Cramer's V=0.213; p=0.536; no association

4.8 Perceived Impact of dispensing incomplete antibiotics on public health

The majority of the community pharmacists (81%) indicated that dispensing incomplete prescribed quantities have a huge impact on the health of Nigerians and (85%) indicated that unauthorised dispensing also has a huge impact on the health of Nigerians as shown in Table 12.

Table 12: Perceived Impact of part of prescribed antibiotics and unauthorised dispensing

Level of Impact	Incomplete quantities		Unauthorised dispensing	
	No	Percent	No	Percent
Huge Impact	39	81	41	85
Moderate Impact	5	10	6	13
Low Impact	4	9	1	2
Total	**48**	**100**	**48**	**100**

4.9 Suggested Solutions to Problem of dispensing incomplete quantities of prescribed antibiotics

The community pharmacists suggested some solutions to the problem of dispensing incomplete quantities of prescribed antibiotics, as shown in Table 13. Forty-two percent suggested counselling and creating awareness on the importance of completing the appropriate prescribed quantity. Twenty-five percent suggested that pharmacists should insist on not dispensing incomplete quantities, while fifteen percent suggested stricter regulation of antibiotic use and patent medicine vendors.

Table 13: Suggested solutions to the problem of dispensing incomplete quantities of prescribed antibiotics

Suggested Solutions	No	Percent
Pharmacists should present affordable alternatives to patients to enable them to afford the complete dose.	4	8
Pharmacists should insist on not dispensing incomplete quantities.	12	25
There should be counselling and creating awareness on the importance of completing the appropriate prescribed quantity.	20	42
There should be more regulation of antibiotic use and patent medicine vendors	7	15
There should be improvement in the socio-economic status of the people by the Government	3	6
Others (There should be laboratory investigation before antibiotics use and Pharmacists should look away from money)	2	4
Total	**48**	**100**

4.10 Suggested solutions to the problem of unauthorised dispensing of antibiotics

The community pharmacists suggested some solutions to the problem of dispensing incomplete quantities of prescribed antibiotics, as shown in Table 14. Fifty percent suggested counselling and awareness creation on the importance of consultation before antibiotic use, while twenty-five percent suggested stricter regulation of OTC dispensing of antibiotics, especially by patent medicine vendors.

Table 14: Suggested solutions to the problem of unauthorised dispensing of antibiotics

Suggested Solutions	No	Percent
Pharmacists should counsel and create awareness on the importance of consultation before antibiotic use	24	50%
Pharmacists Council of Nigeria and Pharmaceutical Society of Nigeria should be stricter in regulating the OTC dispensing of antibiotics especially by patent medicine vendors	12	25%
Pharmacists should counsel on the importance of appropriate laboratory investigation before antibiotic use	3	6%
There should be government intervention to ensure that healthcare is affordable to all Nigerians	3	6%
Pharmacists and dispensers should be trained on appropriate antibiotics dispensing	2	4%
Pharmacists must be aware of the ailment for which the antibiotics is being requested for	2	4%
Self-medication should be stopped; the right thing should be done and there should be more respect for the pharmacy profession	2	4%

CHAPTER FIVE: DISCUSSION

5.1 Introduction

This chapter discusses the major findings of this study which assessed the antibiotic dispensing practices of community pharmacists in Jos, Nigeria, a lower-middle income country. The socio-demographic characteristics of the respondents are briefly discussed, followed by the results, which are discussed in comparison with previous published studies.

This study found a high rate of dispensing of part quantities of prescribed antibiotics as well as dispensing antibiotics without prescriptions, with 58% of the pharmacists stating that patients could purchase part quantities of prescribed antibiotics, while 87% of the pharmacists indicated that patients could purchase antibiotics without prescription in their pharmacies. Several studies have attempted to describe the antibiotics use by community pharmacies and will be further discussed (Abdulraheem *et al*., 2016; Ansari, 2017; Bahnassi, 2015; Basak and Sathyanarayana, 2010; Farah *et al*., 2015; Gebretekle and Serbessa, 2016; Imtiaz *et al*., 2017; Kalungia *et al*., 2016; Nga *et al*., 2014; Sabry *et al*., 2014; Shet *et al*., 2015; Zawahir *et al*., 2018). One recent study on the dispensing practice of antibiotics without prescription by community pharmacies in Zambia (a LMIC) showed that 100 percent of the pharmacies dispensed antibiotics without a prescription, despite the prohibition of OTC dispensing of antibiotics in the country (Kalungia *et al*., 2016).

Socio-demographic characteristics of the respondents and the pharmacy premises

Seventy-seven percent of the respondents were between the ages of 21-40. This implies that the majority of the practicing community pharmacists in Jos are young and have less than 10 years of practice in community pharmacy. The same age category accounts for about 48% of those who have had 5 years or less experience in community practice, while 25% of the respondents have had between 6 – 10 years' experience. The age bracket of 21 – 40 years also represents 73% of community pharmacists who have 10 years post-graduation experience and below. It is pertinent to note that only about 17% from the dominant age category (21 – 40 years) in the community pharmacy practice have had either a postgraduate diploma or Master's degree since graduation.

The geographical spread of community pharmacy locations in the study shows that the highest concentration of community pharmacies (about 59%) is in the lower middle-income area. This is consistent with statistics that depict Nigeria as a lower middle country (World Bank, 2018).

This is followed by low-income and upper middle-income areas (both 20%). The lowest concentration of community pharmacies is in the high-income area, a fact which also reflects the characteristics of population socio-economic distributions based on living areas. There were fewer pharmacies in high income areas, with larger staff numbers, compared to the more pharmacies in lower/low income areas with smaller staff numbers. The highest request for antibiotics without prescription (86%) was found in the high-income areas, followed by the low-income areas (67%) and the lower middle-income areas (62%). Although the request for antibiotics without prescription was high across all the socio-economic strata in this study, it was higher in the high-income location. This finding is similar to that by Farah *et al.* (2015), whose study in Lebanon, reported high rates of dispensing antibiotics across all the socio-economic strata, although theirs was higher in lower-income areas. They stated that the possible reason for these high rates of dispensing in both the high and low-income areas is that going to a pharmacy is more affordable than going to the hospital or clinic for both the poor and rich alike.

5.2 Part dispensing of prescribed antibiotics

There is a very high rate of requests for part quantities of prescribed antibiotics. Seventy-nine percent of the community pharmacists indicated that patients frequently requested part quantities of prescribed antibiotics, while 58% indicated that patients could request for part quantities of prescribed antibiotics at their community pharmacies. This is similar to the results from the study by Ansari, (2017) where 73% of the pharmacy staff surveyed at the community pharmacies in two districts at central Nepal indicated that they dispense part quantities of the standard course of antibiotics. A review of several studies on low income countries as reported by Shet, Sundaresan and Forsberg (2015) discovered that patient demand was one of the key influencing factors of pharmacists' dispensing practices. Although there is a high demand for part dispensing of antibiotics in this study probably influenced by patient's request, 96% of the community pharmacists still demonstrated professionalism by investigating the reasons for part requests, while 94% counselled on the negative impacts of antibiotics underuse.

A major factor associated with antibiotics underuse is the patient's socio-economic status, and Nigeria, being a lower middle-income country, has a population whose majority possesses a poor socio-economic status (World Bank, 2018). The results of this study confirm this, as 86% of the community pharmacists reported that financial constraint was one of the most common

reasons patients gave for their part purchase of normal course antibiotics. The study by Barker *et al.* (2017) in India, another low and middle income country, further aligns with this finding. Their study showed that 85% of the pharmacy staff reported under-dispensing the standard duration of antibiotics, and that this was due to the demand influenced by the poor socio-economic status of the patients.

Furthermore, in this study, patients have misconceptions about the proper use of antibiotics, as 6% of the community pharmacists remarked that some patients request stat doses of antibiotics after unprotected sex, while others just feel they don't need the complete quantity. Another 6% indicated that patients request part quantities in order to complete courses they have already started, and 2% indicated that patients complain of the pill burden of some antibiotics, hence they request for part antibiotics. All these factors have been associated with the under-dispensing of antibiotics by community pharmacists. It was also discovered from the study that Ampiclox is commonly prescribed, and it is the antibiotic for which patients most commonly request part quantities. Ampiclox, Amoxicillin, Augmentin and Metronidazole are the top antibiotics being requested for in part quantities.

5.3 Dispensing without a prescription

The majority of the community pharmacists (87%) indicated that patients can purchase antibiotics without prescriptions in their pharmacies. This implies that they dispense antibiotics without prescriptions. This is similar to many other studies from countries across the world. In Zambia, 100% of the pharmacies dispensed antibiotics without prescriptions (Kalungia *et al.*, 2016). A qualitative study carried out in Ethiopia discovered that all the five pharmacies dispensed antibiotics as OTC medications (Gebretekle and Serbessa, 2016). In Nepal, 66.5% of the pharmacies dispensed antibiotics without prescriptions (Ansari, 2017). In Spain, 64.7% of the community pharmacists dispensed antibiotics without medical prescriptions (Zapata-Cachafeiro *et al.*, 2018). However, the results from an Egyptian study on the antibiotic dispensing practices of community pharmacies showed a lower percentage (23.3%) of pharmacists dispensing antibiotics without prescriptions, while a higher percentage dispensed antibiotic with prescription (Sabry *et al*., 2014).

Even though 87% of the community pharmacists indicated that patients can purchase antibiotics without prescription at their pharmacies, 96% indicated that patients frequently request for antibiotics without prescriptions at their pharmacies, while 98% acknowledged that

they still investigate the indications for antibiotic requests without prescriptions. Similarly, other studies have found that pharmacists investigate the reasons for antibiotic requests. Furthermore, 75% of the community pharmacists that dispense antibiotics without prescriptions do so based on their professional knowledge, and 25% with recourse to a medical doctor. The finding from this study indicates that when patients demand antibiotics without prescriptions, it is sometimes incomplete in duration as indicated by 8% of the pharmacists. Zawahir, Lekamwasam and Aslani, (2018) also report several studies where dispensing an antibiotic without prescriptions is associated with its underuse.

On the other hand, dispensing of antibiotics without prescriptions has been associated with unnecessary and over-use of antibiotics. The results of this study show that the majority of the antibiotics requested without prescriptions, and those dispensed, were for viral infections (17%) or not even indicated for the ailments they were treating as in the case of diarrhoea (13%). This implies that 30% of the total antibiotics requested without prescription are unnecessary. This translates into unnecessary expenses by the population as a result of dispensing antibiotics without prescription by the community pharmacists. Dispensing antibiotics without prescription, especially when it is not indicated, leads to more expense. A similar finding to corroborate this discovered that 66% of the pharmacies irrationally dispensed antimicrobials, and the cost associated with the unnecessary dispensing of antimicrobials in India is between 1.1 to 1.7 billion dollars annually (Shet *et al*., 2015). On the contrary, the study in Egypt by Sabry, Farid and Dawoud (2014) reported that the finding from their study had 63.6% of antibiotics dispensed based on prescriptions, while 23.3% of the antibiotics dispensed were based on patient requests. The greatest expense was associated with antibiotics dispensed based on prescriptions. They however commented that this could be due to a high use of branded names in the prescriptions which are more expensive and equally not affordable in resource-limited settings.

Self-medication with antibiotics was a very common practice by patients in this study. Sixty-seven percent of the community pharmacists indicated that self-medication was one of the reasons patients presented when requesting for antibiotics without prescriptions. Therefore, this practice has influenced the community pharmacists to dispense antibiotics without prescriptions. Roque *et al*. (2014) stated that previous studies in Europe had identified over-the-counter dispensing of antibiotics was a practice associated with self-medication. From this study, Ampiclox is the most common antibiotic that is requested for without prescription. In other words, it is the most common antibiotic that patients practise self-medication with. This

result is similar to another Nigerian study that reported Ampiclox as the top-most self-medicated antibiotic (Abdulraheem *et al*., 2016). Ampiclox is the most commonly requested antibiotic in this study due to its affordability in Nigeria. Other studies, however, have reported that amoxicillin was the most common antibiotic requested for without prescription in community pharmacies in Ethiopia and Zambia respectively (Gebretekle and Serbessa, 2016; Kalungia *et al*., 2016).

Another major factor associated with the dispensing of antibiotics without prescriptions is the easier and quicker access to healthcare at the pharmacy. Seventeen percent of the pharmacists remarked that patients give this reason for their walk-ins to request for antibiotics without prescriptions. This further establishes the fact that pharmacies are easier to access compared to hospitals. Hence, patients who cannot afford consulting at the hospital walk into the pharmacy to request for the care or medications they feel they need. Sabry, Farid, and Dawoud (2014) remarked that pharmacies provide accessible healthcare to patients with poor socio-economic status. Eight percent of pharmacists indicated that patients walk in to request antibiotics without prescriptions as prophylaxis against sexually transmitted diseases. Four percent indicated that the patients have confidence in the pharmacists, hence their request for antibiotics without prescriptions at the community pharmacies, while two percent remarked that a lack of access to healthcare motivated the requests for antibiotics without prescription.

5.4 Responses to simulated case scenarios

Six scenarios were generated to extract possible irrational antibiotic dispensing practices by community pharmacists. Simple percentages were used to determine the proportion of the sampled community pharmacists who answered "Yes" as against "No" to each of the scenarios. The reasons for their responses were summarised to understand the basis for such reactions. Crammer's V statistic was used to determine the association between postgraduate training, the community pharmacy practice and the scenarios. The p-values shows that the associations are not statistically significant.

For the scenario on unnecessary use of antibiotics, 63% of the pharmacists indicated that since it's a prescription, due diligence would have been made, and hence, they would dispense the antibiotic, while 37% indicated that they would not dispense the antibiotic, as it is not indicated

for the condition. This response confirms that there is a widespread use of antibiotics for minor illness which are usually viral and self-limiting, and it is encouraged by health practitioners. This is similar to findings from a study in Zambia, where most of the pharmacy staff were disposed to dispensing antibiotics in all the presented case scenarios, even when there was no clinical indication for the presented ailment (Kalungia *et al*., 2016).

Dispensing branded antibiotics is prevalent from this study, as 83% of the pharmacists admitted that they preferred dispensing branded to generic antibiotics due to the efficacy, safety of branded antibiotics, and higher income to the pharmacy. The majority (98%) indicated that they would decline dispensing a sub-optimal dose of antibiotic. This is probably due to the fact that the quantity requested for in the scenario is not up to the standard pack of ten (a card of antibiotic). Previous results have shown that 58% indicated that patients could purchase part quantities of antibiotics. This may be possible if the part quantity is up to the standard pack of ten (a card of antibiotic), as many revealed that they do not cut the antibiotic cards.

On the scenario related to requests for antibiotics without prescription, 65% declined dispensing an antibiotic without a prescription because it is not indicated for the presented ailment, while 35% indicated they would dispense after investigation. A similar scenario presented to pharmacists in the study by Bahnassi (2015), however, had 91.2% of the pharmacists indicating that they would dispense the antibiotic without a prescription in the scenario.

On the scenario with request for antibiotics based on recommendations from a friend, 71% indicated that they would decline dispensing an antibiotic until a laboratory investigation is carried out, while 29% indicated that they would dispense.

The scenario for a repeat antibiotic prescription had 92% declining to dispense an antibiotic because it could lead to resistance, and 8 percent indicating that they would dispense only if the patient insists. This is contrary to a similar study where a hypothetical scenario presented to community pharmacists on the re-use of antibiotics had 87.8% indicating that they would dispense a second pack of a previously dispensed antibiotic upon request (Bahnassi, 2015). They stated that patients could use the antibiotics again, if they had used it before.

In summary, for scenarios on the unnecessary use of antibiotics and dispensing branded antibiotics in place of generics, pharmacists were more prone to dispense antibiotics. On the

other hand, for scenarios on requests for incomplete dose and duration, a request based on a recommendation from a friend, and reuse of antibiotics, more pharmacists declined dispensing.

5.5 Suggested solutions to incomplete dispensing and unauthorised dispensing by community pharmacists

Eighty one percent of the community pharmacists surveyed indicated that there is a huge impact of incomplete dispensing on the health of Nigerians. While 42% of the community pharmacists suggested that there should be more awareness and counselling on the importance of completing the standard doses of antibiotics, 25% recommended outright refusal by the pharmacists to dispense an incomplete dose. Fifteen percent also suggested more strict regulation of Patent Medicine Vendors, as they are perceived to be more disposed to dispensing incomplete quantities of prescribed antibiotics, and are not adequately regulated. If this goes on unchecked, it tends to put pressure on the community pharmacists to also dispense incomplete quantities of antibiotics in order not to lose business to the unethical patent medicine vendors. While 8% suggested the recommendation of more affordable generic to patients, 6% suggested that the government should improve the socio-economic status of Nigerians to enable them afford the complete doses of prescribed antibiotics. Improving the social determinants of health in Nigeria would go a long way to make essential healthcare affordable to Nigerians.

Just over 85% of the community pharmacists indicated that dispensing antibiotics without prescriptions has a huge impact on the health of Nigerians. This is opposite to the findings from a study in Syria, where only 7% of the surveyed pharmacists indicated that there is a huge impact, and the average (48%) indicated that there is a slight impact of dispensing antibiotics without prescription on the health of Syrians respectively (Bahnassi, 2015). The community pharmacists from this study suggested some solutions to dispensing antibiotics without prescriptions, which included: pharmacists counselling and creating awareness on the importance of consultation before antibiotics use (50%), and that the Pharmacists Council of Nigeria and the Pharmaceutical Society of Nigeria should be stricter in regulating the use of antibiotics and particularly regulation of Patent Medicine Vendors (25%). These suggestions were also made by other authors (Bahnassi, 2015; Kalungia *et al*., 2016; Wafula, 2013).

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study shows that there is a high rate of irrational antibiotics use by patients and irrational dispensing by community pharmacists in Jos, Nigeria. This is not different from other study findings on the irrational use of antibiotics seen globally, in developed and developing countries alike. Despite existing regulations on the appropriate use and dispensing of antibiotics in Nigeria, requests for antibiotics without prescription are high in Jos, as is the practice of dispensing without prescription. Requests for, and the dispensing of part prescriptions is also highly prevalent, even though almost all the pharmacists stated that they counselled against part consumption of the standard course of antibiotics. All these practices likely contribute to the rising antimicrobial resistance globally. This leads us to infer that even though regulations exist, they are somewhat weak or not effectively implemented, and calls for an urgent intervention by stakeholders to curtail this practice and its impact on the health of Nigerians.

6.2 Recommendations

With respect to the findings from this study, the following recommendations are made:

1. The data obtained from this study could be used by the pharmacy regulatory bodies in Nigeria to strengthen their inspection and supervisory roles as regards the use of antibiotics by community pharmacists in Jos. It is also useful for policy makers in designing appropriate interventions to curtail the rising rate of antimicrobial resistance.
2. Regulations on the appropriate use of antibiotics such as dispensing antibiotics with a prescription and dispensing the full course of prescribed antibiotics should be thoroughly enforced by the Pharmacists Council of Nigeria.
3. There should be greater enlightenment of the Nigerian population on the rational use of antibiotics, as well as enhancing their financial status.
4. Furthermore, more educational programs on appropriate dispensing of antibiotics should be designed by regulatory bodies for community pharmacists as well as supportive supervision.

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APPENDICES

7.1 Appendix 1 – Questionnaire

Section A: Pharmacist's sociodemographic data and pharmacy characteristics

Instruction: Please tick appropriately (X)					
Gender		**Age Bracket**		**Years in Community Practice**	
Male		21 - 30 years		0 - 5 years	
Female		31 - 40 years		6 - 10 years	
Highest Qualification Since Graduation		41 - 50 years		11 - 15 years	
		51 years or more		16 years or Above	
Nil		**Years of Post-graduation**		**Pharmacist's Status**	
Short Courses		0 - 5 years		Locum Pharmacist	
Postgraduate Diploma		6 - 10 years		Superintendent Pharmacist	
Master's		11 - 15 years		Sole Owner-Pharmacist	
WAPCP Fellow		16 years or Above		Partner Pharmacist	
PhD				Manager Pharmacist	

Staff & Dispensing Characteristics		**Socio-economic status of residents within Pharmacy Location**	
Number of Staff Members in your Pharmacy		High Income	
Estimated Number of prescriptions per day		Upper Middle	
Estimated Number of Antibiotics prescriptions per day		Lower Middle	
Estimated Number of antibiotics requests without prescription per day		Low	

Section B: Antibiotics sale and dispensing practices

B1: Dispensing with a prescription

SN	Questions	Response		Comments
1	Can patients purchase part quantity of prescribed antibiotics?	Yes		
		No		
2	How frequent do patients request for part quantities of prescribed antibiotics?	Very frequently		
		Frequently		
		Rarely		
3	Do you ask for reasons why part quantity of prescribed antibiotics is been requested?	Yes		
		No		
4	What are the three most common antibiotics that **patients request** part of prescribed quantity of?	1		
		2		
		3		
5	What are the three most common antibiotics, that you **dispense** incomplete prescribed quantity of?	1		
		2		
		3		
6	What common reasons do patients present for requesting incomplete prescribed antibiotic quantity?	1		
		2		
		3		
7	How do you counsel patients on the dose and duration of antibiotics they request for?			
8		1	Generics more preferred	

SN	Questions	Response				Comments
	For patients that present prescriptions with antibiotic brands, do you dispense generics or the prescribed brands?	2	Branded more preferred			
9	Are there incentives sales representatives for dispensing particular brands of antibiotics?	Yes, sometimes		Yes, Always		
		No, sometimes		Always No		
10	What do you think is the impact of dispensing incomplete quantity, of prescribed antibiotics on the health of Nigerian patients?	1	Huge impact			
		2	Moderate impact			
		3	Low impact			
		4	No impact			
11	What is the best solution to the problem? (if the pharmacist thinks a problem exists)?	1				
		2				
		3				

B2: Dispensing without a prescription

SN	Questions	Response			Comments
1	Can patients purchase some antibiotics without prescriptions?	Yes			
		No			
2	How frequently do patients request for antibiotics without prescriptions?	Very frequently			
		Frequently			
		Rarely			
3	Do you ask for the indication of antibiotics upon request?	Yes			
		No			
4	What are the three most common antibiotics **patients request** for without a prescription?	1			
		2			
		3			
5	What are the three most common antibiotics **you dispense** without a prescription?	1			
		2			
		3			
6	What common ailments do patients present when requesting for an antibiotic?	1			
		2			
		3			
7	What common reasons do patients present for requesting for an antibiotic without a prescription?				
8	Do patients request for the complete course of duration of antibiotics when they come without prescription?	1	Yes		
		2	No		
9	Your dispensing policy (in the absence of a prescription) is based on?	1	Patient's request		
		2	Your decision & knowledge		
		3	Professional regulations		
10	For patients that present their symptoms, do you dispense generics or branded antibiotics?	1	Mostly generics		
		2	Mostly branded		
11	What do you think is the impact of un-authorized dispensing of antibiotics on the health of Nigerian patients?	1	Huge impact		
		2	Moderate impact		
		3	Low impact		
		4	No impact		

SN	Questions	Response		Comments
12	What is the best solution to the problem? (if the pharmacist thinks a problem exists)?	1		
		2		
		3		

Section C: Antibiotic dispensing practices

Scenarios with prescriptions	State yes or no, if you would dispense an antibiotic	If yes, state reasons	If no, state reasons
Unnecessary use of antibiotics **Scenario A**: A woman comes in with a prescription of metronidazole for her 5-year old son. She complains that he has been stooling 4-5 times daily for about two days. Would you dispense?			
Dispensing branded antibiotics in place of generics **Scenario B**: A patient comes with a prescription having Amoxicillin-clavulanic acid. Would you dispense a generic or branded Augmentin?			
Request for incomplete dose and duration of antibiotics **Scenario C:** A teenage boy of about 15 years comes with an amoxicillin prescription. He requests for 2 tablets out of the prescribed quantity to treat his infected sore leg. He states that it is the quantity he can afford. Would you dispense 2 tablets?			

Scenarios without prescriptions	State yes or no, if you would dispense an antibiotic	If yes, state reasons	If no, state reasons
Request for antibiotics **Scenario A**: A young lady comes to request for some Septrin (Cotrimoxazole) tablets to manage her Flu symptoms. Would you dispense the Septrin?			
Request based on recommendation from friend. **Scenario C**: Mrs B comes with an empty card of ciprofloxacin and requests for a card to treat her urinary tract infection. She says her friend gave her as a sample and it has been effective in treating her friend's urinary tract infection. Would you dispense ciprofloxacin?			
Request for repeat prescription Scenario D: A boy comes to request for 4 tablets of Ampiclox to manage his painful boil. He states that he has this before and it works well. Would you dispense it?			

7.2 Appendix 2: Information sheet

UNIVERSITY OF THE WESTERN CAPE
Private Bag X 17, Bellville 7535, South Africa
Tel: +27 21-959 2809 Fax: 27 21-959 2872
E-mail: soph-comm@uwc.ac.za

PARTICIPANT INFORMATION SHEET

Project Title: Assessment of the Antibiotic dispensing practices of Community Pharmacists in Jos, Plateau State, Nigeria

What is this study about?

This is a research project being conducted by Olutuase Onize Victory at the University of the Western Cape. We are inviting you to participate in this research project because you are a community pharmacist practicing in Jos, Plateau state. The purpose of this study is to assess the antibiotic dispensing practices of community pharmacists.

What will I be asked to do if I agree to participate?

You will be asked to give information about your age, sex, highest qualification achieved, years of post -graduation and years of community pharmacy practice. You will be asked for your responses to questions regarding antibiotics dispensing as well as simulated case scenarios. This study would be carried out in Jos Nigeria. This interview will take about twenty minutes.

Would my participation in this study be kept confidential?

The researcher undertakes to protect your identity and the nature of your contribution. To ensure your anonymity, your name will not be included in the questionnaire and an identification code will be used. Through the use of an identification key the researcher will be able to link your questionnaire to your identity; and only the researcher will have access to the identification key. To ensure your confidentiality, all data will be kept in a locked filing cabinet in a locked room with restricted access, data forms will have identification codes without names and computers with the study data will be password protected. If we write a report or article about this research project, your identity will be protected.

What are the risks of this research?

There may be some risks from participating in this research study. As a community pharmacist you will be revealing your dispensing practices to the researcher. We will nevertheless ensure that the data is kept strictly confidential.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the investigator learn more about antibiotic dispensing practices of community pharmacists. We hope that, in the future, other people might benefit from this study through improved understanding of rational dispensing and use of antibiotics that would reduce antimicrobial resistance.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

What if I have questions?

This research is being conducted by Olutuase Victory, School of Public Health at the University of the Western Cape. If you have *any* questions about the research study itself, please contact Olutuase Victory at: 08065908450 or 3615176@myuwc.ac.za.

Supervisors:

Dr Hazel Bradley, School of Public Health, University of the Western Cape, Robert Sobukwe Road, Bellville 7535, South Africa

Email: hbradley@uwc.ac.za Tel: 0027219592630

Prof Richard Laing, Boston University School of Public Health, 801 massechusetts Avenue, Boston, MA 02118, USA/ School of Public Health, University of the Western Cape, Robert Sobukwe Road, Bellville 7535, South Africa

Email: richardl@bu.edu Tel: 00161 7414 1445

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Prof Uta Lehman
Director School of Public Health
University of the Western Cape
Private Bag X17
Bellville 7535
ulehmann@uwc.ac.za

Prof Anthea Rhoda
Dean, Faculty of Community & Health Sciences
University of the Western Cape
Private Bag X17
Bellville 7535
chs-deansoffice@uwc.ac.za

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office
New Arts Building,
C-Block, Top Floor, Room 28

This research has been approved by the University of the Western Cape's Senate Research Committee. (REFERENCE NUMBER: BM18/8/14).

7.3 Appendix 3: Consent form

UNIVERSITY OF THE WESTERN CAPE
Private Bag X 17, Bellville 7535, South Africa
Tel: +27 21-959 2809 Fax: 27 21-959 2872
E-mail: soph-comm@uwc.ac.za

CONSENT FORM

Title of Research Project: Assessment of Antibiotic dispensing practices of Community Pharmacists in Jos, Plateau State, Nigeria.

The study has been described to me in language that I understand. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits.

Participant's Name (Optional): _____

Participant's Signature: _____

Date: _____

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office
New Arts Building,
C-Block, Top Floor, Room 28

7.4 Appendix 4 – Ethical clearance from UWC

UNIVERSITY of the WESTERN CAPE

OFFICE OF THE DIRECTOR: RESEARCH
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6 November 2018

Mr VO Olutuase
School of Public Health
Faculty of Community and Health Sciences

Ethics Reference Number: BM18/8/14

Project Title: Assessment of antibiotic dispensing practices of community pharmacists in Jos, plateau state, Nigeria.

Approval Period: 06 November 2018 – 06 November 2019

I hereby certify that the Biomedical Science Research Ethics Committee of the University of the Western Cape approved the scientific methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

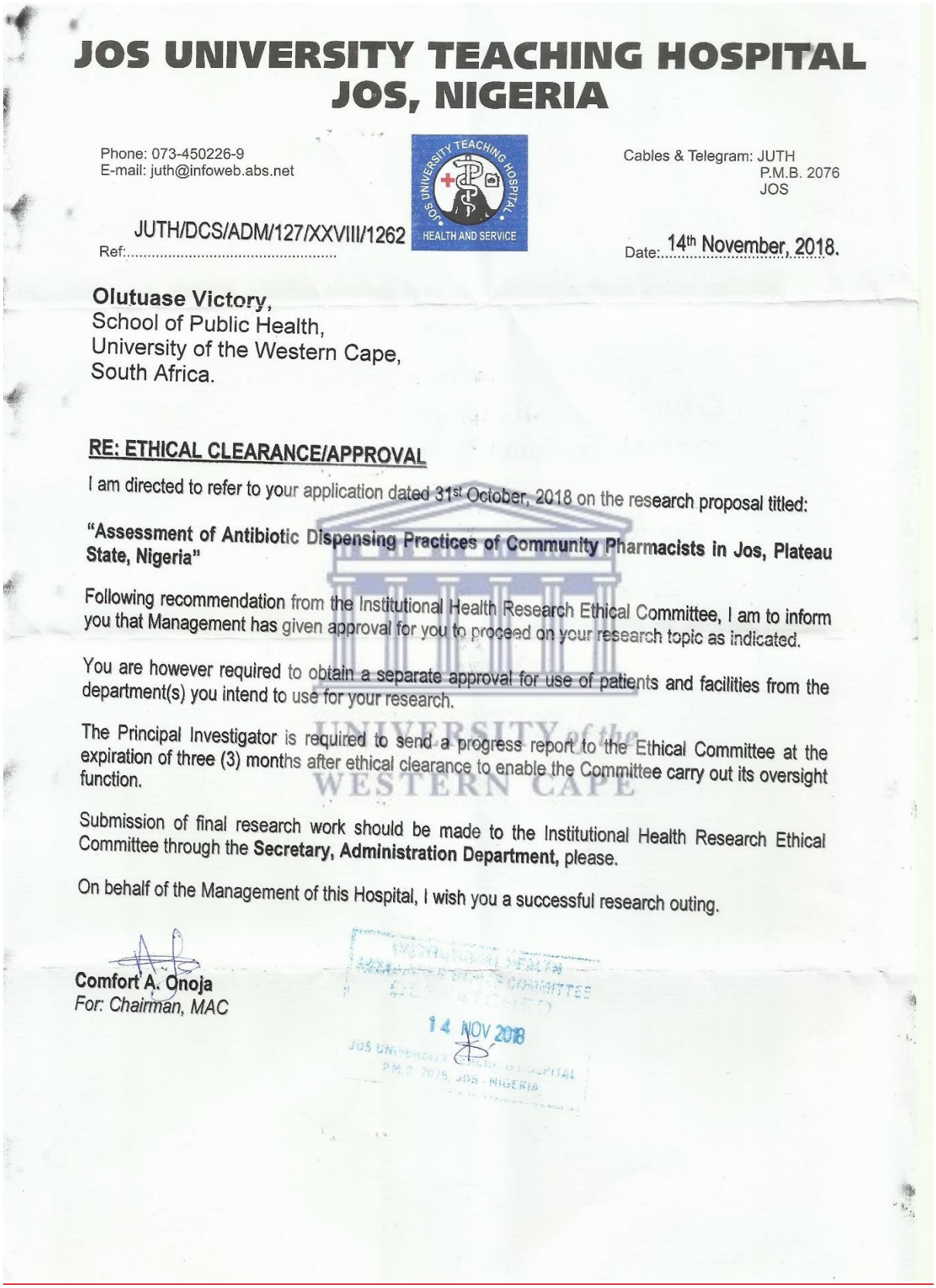
Please remember to submit a progress report in good time for annual renewal.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

BMREC REGISTRATION NUMBER -130416-050

7.5 Appendix 5 – Ethical Clearance from Nigeria



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JOS

Ref: JUTH/DCS/ADM/127/XXVIII/1262

Date: 14th November, 2018.

Olutuase Victory,
School of Public Health,
University of the Western Cape,
South Africa.

RE: ETHICAL CLEARANCE/APPROVAL

I am directed to refer to your application dated 31st October, 2018 on the research proposal titled:

"Assessment of Antibiotic Dispensing Practices of Community Pharmacists in Jos, Plateau State, Nigeria"

Following recommendation from the Institutional Health Research Ethical Committee, I am to inform you that Management has given approval for you to proceed on your research topic as indicated.

You are however required to obtain a separate approval for use of patients and facilities from the department(s) you intend to use for your research.

The Principal Investigator is required to send a progress report to the Ethical Committee at the expiration of three (3) months after ethical clearance to enable the Committee carry out its oversight function.

Submission of final research work should be made to the Institutional Health Research Ethical Committee through the **Secretary, Administration Department,** please.

On behalf of the Management of this Hospital, I wish you a successful research outing.

Comfort A. Onoja
For: Chairman, MAC

14 NOV 2018