Knowledge, attitudes and perceptions of pharmaceutical retailers towards dispensing of antibiotics: A qualitative assessment in the Shai Osudoku district of Ghana.

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Dr Kwasi Frimpong	……..	……
Supervisor's name	Signature	Date

Dedication

This work is dedicated with love to the following persons: My lovely and supportive husband Rev. Ebenezer Asiamah. Our beloved children Paa Kwabena Asiamah, Kwaku Asare Asiamah and Maame Akua Oforiwaa Asiamah.

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I am most grateful to the Almighty God whose favour, wisdom, overflowing mercies and faithful guidance empowered me to reach this height of the academic hierarchy to produce this work.

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Abbreviations

AB	-	Antibiotics
ABACUS	-	Antibiotics Access and Use Study
ABR	-	Antibiotic Resistance
CHAG	-	Christian Health Association of Ghana
CHPS	-	Community- Based Health Planning Services
CKI	-	Community Key Informant
EDL	-	Essential Drug List
FDA	-	Food and Drugs Authority
FDB	-	Food and Drugs Board
GIMPA	-	Ghana Institute of Management and Public Administration
GSL	-	General Sales List
LCS	-	Licensed Chemical Seller
LMIC	-	Lower and Middle Income Countries
MoH	-	Ministry of Health
MPH	-	Masters of Public Health
NGO	-	Non- Governmental Organization
OTC	-	Over the Counter
PI	-	Principal Investigator
PoMs	-	Prescription only Medicines
PR	-	Pharmaceutical Retailers
SHS	-	Senior High School
UHC	-	Universal Health Care
WHO	-	World Health Organization

Abstract

Introduction: The improper use of antibiotics is a contributory factor of microbial resistance. This is an essential public health problem. Pharmaceutical Retailers (PR) play an important role in the administration and control of drugs including antibiotics to their clients. Pharmacies and drug shops are usually the first line of health care in developing countries, mainly in rural areas that have insufficient private or public health facilities. The objective of this study was to conduct a qualitative analysis of antibiotics retailers' knowledge, attitudes and perceptions with regard to antibiotic dispensing.

Methods and analysis: The study was conducted in Shai-Osudoku district in the Greater Accra region of Ghana. It was an exploratory qualitative study which was conducted in two phases.

In the phase 1 all possible selling or dispensing points for antibiotics (pharmaceutical retailers (PR) within the study area were mapped. This included any formal or informal antibiotic retailers from public hospital pharmacy to street vendor or drug peddler. The phase 2 comprised of training of field workers on the interview guide, recruitment of pharmaceutical retailers and conducting of in-depth interviews. Antibiotic retailer ≥ 18 years old were eligible for the in-depth interview. In all 5 pharmacists, 3 chemical sellers and 2 drug peddlers were interviewed. A total of ten (10) in-depth interviews. After the interviews, the audio recordings of interviews that were conducted in the local dialect were translated into English language and transcribed. The themes were classified using thematic analysis.

Results: The study found out that the commonest antibiotics sold by respondents are Ampicillin, Amoxicillin and Chloramphenicol. Customers sometimes give directives to PR to demand the type of antibiotics to give them as they describe their illness and mention specifically what antibiotics they want. Clients are mostly given instructions on how to take antibiotics. This is done whether drugs were dispensed or purchased with or without prescription. Incomplete doses of antibiotics are sold sometimes to customers with various reasons. Generally majority of the respondents are aware of expiry dates which they regularly check on the drugs.

Ethical clearance: The study obtained approval for ethical considerations, from the Ethics Review Committee of the Department of Development policy at the School of Public Service and Governance, GIMPA.

Recommendation: Community members should be educated on the proper use of antibiotics. The education must emphasize on the importance of seeing a doctor to diagnose and prescribe antibiotics before usage. In- service training must be organized for both health facility staff who dispense antibiotics and the retailer at the community pharmacies. Rules and regulations binding the sales of antibiotics must be enforced with sanctions in place to prevent both chemical shop retailers and the drug peddlers from the sales of antibiotics to the general public.

CHAPTER ONE: INTRODUCTION

1.0 Background

Antibiotics have been used for ages to treat infections, though till the preceding century society did not know the infections were caused by bacteria. Several moulds and plant excerpts were used to treat infections by some original civilizations. However, up to the 20th century, infections that we now see as forthright to treat, for instance pneumonia and diarrhoea which are caused by bacteria, were considered as the number one cause of human death in the developed countries (Microbiology Society, 2017). Antibiotics have continually been realized "as one of the phenomenon discoveries of the 20th century. The actual amazement is the increase of antibiotic resistance in hospitals, communities, and the environment associated with their usage (Davies & Davies 1996).

Resistance is an unavoidable consequence of antibiotic use, but it increases extremely with misapplication and abuse. It is therefore domineering to improve antibiotic use, principally in outpatient situations where 90% of the consumption happen (Vazquez-Lago et al., 2017). Antimicrobials are perhaps one of the utmost efficacious forms of chemotherapy in the history of medication. It is essential to echo the number of lives they have protected and how meaningfully they have contributed to the management of infectious diseases that were the main causes of human morbidity and mortality for greatest of human lifetime (Aminov, 2010). Antibiotics changed the world and radically transformed diseases that were once deadly into manageable health problems (Oyindamola, 2017) Sometimes people are unaware of the role of antibiotics in the management of common infections. Therefore, it is important to have an understanding of pharmaceutical retailers' knowledge, attitude and perception towards antibiotics.

Accessibility to healthcare is still a major problem in certain parts of Ghana, particularly in the rural areas. In Ghana, there is widespread Over-The-Counter (OTC) dispensing of antibiotics, causing inappropriate use of antibiotics. There are different types of antibiotics retailers including pharmacists, Licensed Chemical Sellers (LCS, over-the-counter medicine sellers) and drug peddlers who are the primary source of' antibiotics and patients as well as the general public seek their services directly. The incorrect use of antibiotics is well thought out as a main cause of microbial resistance and it is an important public health problem. Pharmaceutical retailers (PR) play an important role in managing and dispensing drugs for outpatients. This study sought to explore pharmaceutical retailers' knowledge, attitudes, perceptions and dispensing habits and also strengthen our understanding of how pharmaceutical retailers recognise antibiotics. Clients sometimes access their services without prescription.

This chapter will start with a discussion of background information which may be beneficial in understanding the context within which this research is beached. The statement of the research problem and the theoretical stance of the researcher will be emphasized, followed by a brief explanation of the overall organization of the thesis.

Antibiotics (AB) have been used to treat patients who have infectious diseases for many years. These medicines have reduced illness and death associated with infectious diseases, redeeming countless lives through specific findings. Their consumption for preventive and curable purposes have saved the life of uncountable patients and better patient care universally (Ekambi et al., 2019). Antibiotics were revealed many decades back and afterwards, they are still a revolt in the management, treatment and result of infectious disease. Consequently, antibiotics are one of the most commonly prescribed, sold and used drugs globally. They are sometimes used at wrong dosages, for wrong

symptoms, at wrong medicating intervals and for too long or short length of time. World Health Organization (WHO) reported an increase of the antibiotic resistance which is a major public health risk worldwide (Albina et al., 2016).

Studies conducted in American, Asian and European countries show that between 22% and 70% of parents have misunderstandings about the proper uses and efficacy of antibiotics and frequently use them without a prescription (Albina & Kryeziu, 2016). A change in the behavior of customers and suppliers of antibiotics is one of the main strategies in the control of antibiotic resistance. Antibiotics are sold without prescription of doctors in many developing countries and are used in an incorrect way. This leads to an increased number of Antibiotic resistance (ABR) in Ghana as well as in other developing countries. Antibiotics are amongst the utmost regularly used medications worldwide and are of great importance to world-wide health despite their significance, the constant effectiveness of antibiotics is threatened by the development of resistance. The unnecessary and preventable use of antibiotics has been reported as the foremost cause of antibiotic resistance (Oyindamola 2017). One of the crucial drivers for the occurrence and spread of ABR is non-prudent antibiotic (AB) use, which results in collection burden towards relevant bacteria.

ABR is a worldwide public health challenge that threatens the treatment and prevention of bacterial infections and destabilizes advanced medical procedures such as cancer chemotherapy, organ transplantations and surgeries (Irawati et al., 2019).ABR can happen anywhere which the community is included, mostly where infections are common and can spread quickly. Misapplication and abuse of antibiotics is quickening the emergence and spread of ABR. Self-medication with ABs and dispensing of AB without a recommendation or prescription from a doctor is common practice in low- and middle-income countries (LMICs). Such practices could be due to lack of public

awareness regarding ABR and inadequate implementation of regulations on antibiotic prescribing and dispensing (Irawati et al., 2019)

Access to healthcare is still a main challenge in Ghana, mostly in the rural regions. The Ministry of Health approximations show that only 45% of rural households, compared to 92% of urban households, have connection to a health facility, indicating they are within an hour‘s travel to a public or private facility by any means of transportation (Agbeko, 2012). Community pharmacists have key roles in facilitating the cautious use of ABs that have been established by several studies worldwide. (Gajdács et al., 2020) This also applies to other pharmaceutical retailers in the community.

A projected two-thirds of worldwide trades of antimicrobials happen over the counter without a prescription. Additionally, antimicrobials are the greatest generally retailed medicines in developing countries. The abuse, misapplication, or unsuitable use of antimicrobials are key causative factors to the appearance of antimicrobial resistance (Siltrakool, 2017).

A pharmacist is the connection between doctors and patients. He or she is trained and has the qualification to offers guidelines and advice the patient to capitalize on the anticipated effect of the drugs and decrease the adverse effects of the drug. The pharmacist works at the pharmacy which is larger than the chemical shop. It is legal to sell or dispense antibiotics at the pharmacy and by pharmacist. One of the main duties of a pharmacist is to crosscheck prescriptions from physicians prior to dispensing the medication to the patients to certify that the patients don't collect the wrong drugs or receive an improper dose of medicine. Serious consequences including death may occur if patients are given the wrong drugs or inappropriate usage instructions.

Much of their work is related to patient safety, although preventing dangerous drug interactions is primarily a physician's responsibility, pharmacists provide a check against this possibility.

Pharmacists might similarly educate other health care professionals such as physicians or nurses about pharmacology-related issues or medication supervision and contribute most in the measure to stop the inappropriate use of antibiotics (Sinha, 2014).

Commercial drug shops which are mostly not large and pharmacies are generally the first line of health care in deprived countries, particularly in rural areas that have very limited private or public clinics. Drug shops, also recognized in certain countries as chemist shops or patent medicine vendors, which are different from pharmacies, are usually many. They do not naturally employ trained pharmacists, and are lawfully permitted to sell only non-prescription medicines and pre-packaged medicines.

In several countries, private-sector drug shops, also known as licensed chemical shops in Ghana, are the first place people go for health care particularly in areas with limited health facilities and pharmacies. Their services are well patronized by community members due to the short waiting time and their friendly staff. Licensed chemical shops are also more reachable in rural settings compared to pharmacies and health facilities. Majority of the owners of licensed chemical shops are not pharmacists. The level of education for most of these owners is secondary education as minimum. The Pharmacy Council of Ghana legally gives them the permit to sell a selection of over-the-counter medicines, which does not include antibiotics apart from Cotrimoxazole. Though no training is prerequisite to obtain a license, licensed chemical sellers frequently obtain training from the Licensed Chemical Association and Pharmacy Council (Afari-Asiedu et al., 2018)

Drug peddlers are another category of pharmaceutical retailer. Their services are rendered in communities in rural or deprived areas. They operate illegally and sell all kinds medicines including antibiotics which they are not supposed to sell. Community members patronize their services because their drugs are cheaper and they brought to their door stairs. These peddlers move from house to house selling their medicines. They also sell at the market places. Some of them walk around selling whilst others ride bicycles. Most of them have no knowledge of the medicine they sell. They have no idea of the instruction to give to their clients neither are they aware of expiring dated and what to do when the drugs expire.

1.1 Statement of problem

In developing countries where communicable disease is widespread with little medical access and poor regulation, pharmaceutical retailers take the advantage of selling all kinds of drugs including antibiotics to the populace with or without prescription. It is therefore important to assess the knowledge, attitude and perception of these retailers. The situation is only anticipated to be worse if measures are not taken to address this. Knowledge and attitudes to antibiotic use has been revealed to be a suitable predictor of the accurate usage of antibiotics (Saengcharoen et al., 2012).

In Ghana, there is widespread over-the-counter dispensing of antibiotics, causing high levels of incorrect use, and an intensification in antibiotic resistance. Regulations inhibit licenced Chemical Sellers (LCS, Over-the-Counter Medicine Sellers) from selling antibiotics apart from Cotrimoxazole. In reality, nevertheless, these retailers sell a multiplicity of antibiotics (AfariAsiedu et al., 2018) After knowledge and attitudes related to wrong dispensing have been recognized, interventions could be planned to

emphasis on these limitations to improve antibiotic use and contribute to minimizing resistance (Vazquez-Lago et al., 2017)

This study aims to explore retailers' knowledge and attitude about medical prescription and dispensing of antibiotics and their knowledge on expired antibiotics to facilitate safe and appropriate use of antibiotics in study area and Ghana as a whole.

In the study area and its surrounding populations, no such study has been done so far. Hence, it is very necessary to determine thoughtfully and certainty the knowledge, attitude and perception of pharmaceutical retailers towards dispensing of antibiotics. I chose Shai Osudoku district because I was part of a bigger study on Antibiotic Access and Use Study (ABACUS) which was conducted in two districts in the Greater Accra region of Ghana, which Shai Osudoku was one of them. The topic for the study among other reasons was triggered by some observations from the ABACUS study.

1.2 Research questions

The full range of the different types of pharmaceutical retailers both licensed and otherwise operating within the study area and fell within the sample criteria, were included in the in-depth interview. Also employees who work directly with customers were be included.

To certify that these interviews produce good perceptions, it was required that interviewers should have an experience in understanding the country's regulations on antibiotic sales.

1. **What sort of information (verbal or written) do retailers give to customers about the antibiotics sold to customers?**
2. **Do customers request for incomplete doses of antibiotics due to certain reasons?**
3. **Do retailers check the expiry dates on the antibiotics they sell?**

1.3 Objectives

1.3.1 General objective

The study is to examine knowledge, attitude and perception of antibiotics retailers and dispensers on the health effects of dispensing antibiotics to clients and customers.

1.3.2 Specific objectives

1. **To explore retailers' perspectives on instructions given to customers about antibiotics dispensed or sold to customers.**
2. **To identify retailers' responses on customers request for incomplete doses of antibiotics.**
3. **To examine retailers' knowledge on expired antibiotics.**

1.4 Significance/ Justification of the study

Improper practice of antibiotics is an utmost public health challenge in numerous Low and Middle Income Countries (LMIC). In LMICs, there is general "over the counter" sale of antibiotics from unlicensed suppliers, causing high levels of incorrect use and producing Increase in antibiotic resistance (ABR). This is causing loss of several first line antibiotics as effective" medications (Afari-Asiedu et al., 2018). The neglected health care delivery systems in LMICs drive people to choice community pharmacies and chemical shops for treatment and refuse medical consultation (Horumpende et al., 2018). Another reason for seeking care from pharmaceutical retailers is the delay in getting treatment at the health facility which establishes a major discouragement in looking for care at the hospital as well as an encouragement for people to seek care at the pharmacy, LCS shops and other medicine sellers (Afari-Asiedu et al., 2018). Financial challenge is one of the motives for choosing pharmaceutical retailers over medical other medical professional or health facilities. Advantages of antibiotics are threatened by self-medication as well as people's lack of knowledge and wrong usage

of antibiotics, particularly in developing countries (Ekambi et al., 2019). In-depth interview method was used in this study since it gives the freedom to explore participants' knowledge, attitudes and perceptions regarding antibiotics and ABR. In addition, it is effective for achieving understanding into individual experiences, attitudes and perceptions. Moreover, it helps in accepting the meaning, common features or principles of a practice or incident (Irawati et al., 2019)

It is my desire that this study though limited to pharmaceutical retailers within the study area will help them gain more insight through training, support, and regulation that could reduce some routinely provided services that may not be lawful and might possibly cause harm through incorrect use or unsafe practices in the dispensing of antibiotics. Again, this investigation would benefit other pharmaceutical retailers in Ghana in administering antibiotics. This research will also help the government and policy makers to proposal appropriate strategies to improve healthcare access and dispensing of antibiotics.

1.5 Structure of the Thesis

This thesis is written in five chapters. Chapter 1 comprises of the background of the study, statement of the problem, hypotheses/research questions, objectives, justification/ significance/motivation / Importance and the structure of the thesis.

Chapter 2 presents a review of the literature, providing a description of available research on knowledge, attitude and perception of pharmaceutical retailers in dispensing antibiotics, as well as the conceptual framework for this study.

Chapter 3 presents a description of the qualitative research design that was used in the study. This section covers the study setting/ design, selection of study subjects data collection, analysis plan and ethical considerations.

Chapter 4 presents the study results obtained and the discussion as well as the study strengths and limitations and implications of findings.

Chapter 5 discusses the significant findings of the study, contributions and conclusions. This last session ends with the recommendations for future work or research.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter indicates a review of the existing literature concerning how the knowledge, attitude and perceptions of pharmaceutical retailers towards antibiotic use as well as the operationalization of a pharmacy and a chemical shop. The review focuses on studies conducted in other regions of the world, Africa and Ghana. The chapter concludes with an examination of the conceptual framework that inspired this study.

Pharmaceutical retailers play an important role in dispensing and management of drugs in general. Though not all of them qualify to dispense antibiotics, majority of them both qualified and unqualified do. Though the increasing resistance could be related to several factors, a main reason is the overall capacity of antibiotic intake and particularly incorrect diagnosis, undiscriminating prescribing, and dispensing errors (Damisie et al., 2019). There is a multipart association between the pharmaceutical retailers and humanity. The patients, physicians and retailer are all motivated by their own plans and are subject to occasionally very authoritative influences (Monnet, 2005). Though the primary aims of some pharmaceutical retailers are to provide medicines to improve the health of people, as any other trade they are also running a gainful business.

2.1 Overview of global history of pharmaceutical retailing

Antibiotics have not merely required a dramatic influence on human medicine, since their initiation through the 1930s, but similarly on food manufacture. On farmhouses fishing fleets as well as in dealing with vegetation and aquaculture operations. Practice of antibiotics comprised the treatment and prevention of disease, increasing food transformation and reservation nutrition. However, from the mid-1950s onwards,

agricultural antibiotic usage likewise prompted increasing struggles about drug residues and antimicrobial resistance (AMR) (Kirchhelle, 2018). Through the 1960s and 1970s, the antibacterial drug business emerged internationally. By the early 1970s, over 270 antibiotics had been produced. More new products were introduced and profits followed. In the 1980s, there were various antibiotics on the market that the expected profits from the progress of new antibacterial medicines were extremely reduced. Pharmaceutical companies begun to invest in new drugs for chronic illnesses, because their long-term daily treatment is often needed. This is measured as one of the major reasons for the shortage of new antibiotics in the 1990s (Monnet, 2005).

Meaningfully, antibiotic concerns did not advance evenly but instead contributed to an increase, an international improvised of diverse regulatory methods. During a time of growing concerns about AMR and a post-antibiotic age, Kirchhelle in an article, recreates the origins, universal proliferation, and international regulation of agricultural antibiotics. The article debates that policymakers must recall the long history of regulatory failures that has caused the existing antibiotic infrastructures. For active global stewardship to progress, there is the need to report the financial enslavements, deep-rooted notions of development, and split cultural understandings of risk, which all contribute to drive global antibiotic intake and AMR (Kirchhelle, 2018).

Auta et al, projected the extent of non-prescription supply of antibiotics in community pharmacies. The collective proportion of non-prescription distribution of antibiotics was 62%. Non-prescription distribution of antibiotics was highest in South America. Antibiotics were generally supplied for acute and self-limiting conditions (Auta et al., 2019). The state of abuse and misapplication in developing countries is mostly distressing. Greater rates of antibiotic practice have been recounted in numerous developing countries, including Pakistan, Nepal, Eritrea, Uzbekistan, Oman, Sudan,

Jordan, Zimbabwe, Lebanon, Yemen, and Nigeria. The unreasonable usage of antibiotics is not basically common in only developing countries, but similarly extensive in the developed world (Akinyandenu & Akinyandenu, 2014).

2.2 Pharmaceutical retailing in Africa

Pharmaceutical demand was valued at $1.1 trillion worldwide in 2015, with 36 percent of that in emerging markets (IMS, 2016). This share is predicted to increase significantly in the near future, mainly as a result from a growing population increasingly afflicted with disease over long durations. Pharmaceutical demand is equally influenced by increased ability of the population to pay either out of pocket due to rising middle class wealth, or due to increased access to private health insurance and through programs such as universal health care (UHC) and donor-funded programs. Investing financial resources in health and pharmaceutical services increases as households become wealthier (IMS, 2016).

Developing countries are identified to have as many as three parallel types of medicine supply chains; public, private, and voluntary or NGO sector, whereas developed countries usually have one main type of supply chain that serves to distribute both publicly and privately funded medicines. It is evident that, the availability of medicines in developing countries is at an inflection point, and investment in the private sector can accelerate efficient distribution of medicines (Barham et al., 2017). Private medicine retailers are thence fast becoming key players in promoting access to medicines in low and middle-income countries. In sub-Saharan Africa, drug shops are often the most widely used source for health services, access to health information and pharmaceutical products. Small commercial drug shops and pharmacies, are often the first line of health care in poor countries, especially in rural areas that have very few

private or public clinics (Wafula et al., 2012). Generally, it is presumed that the private sector tailor their services towards wealthy clients and therefore has higher prices. Evidence however reveals that the poor are mainly the largest consumers of private health services (Bate et al., 2013). National household surveys conducted among residences in selected sub-Saharan African countries has shown that the poor, for several reasons (exemption of price) such as perceived quality of care, availability of medicines and health care workers, additional payments and discrimination, resort to buying medicines with cash from private and informal drug sellers (McCabe et al., 2011). Private sector pharmaceutical services to the poor are provided in both the formal and informal sectors, and on a commercial for-profit or not-for profit conditions. In the informal sector they may include traditional healers, midwives, and individual medicine sellers. Medicines sold through the private sector via retail pharmacies, private clinics or hospitals, or even unlicensed sellers are distributed through a network of importers, wholesalers and distributors. Generally, the public-sector pharmaceutical supply chain is noted to outsource certain functions to the private sector (McCabe et al., 2011).

2.3 Pharmaceutical retailer's Knowledge, attitude and perception on antibiotics in Africa

Pharmaceutical retailers play a relevant role in enhancing antimicrobial stewardship initiatives, as well as influencing prescribing decisions (Muloi et al., 2019). It is therefore necessary to have an understanding of the knowledge and attitudes towards antibiotics among pharmaceutical retailers. Presently, there had been limited research in this area, and data is scarce. Especially in Africa, much studies has not been done in this regard. Only few studies have been carried out in some related countries, with majority of the studies been done in other regions of the world (Muloi et al., 2019).

In a study to determine practices and knowledge of antibiotic retailers in Kenya, it was found that there was an overlap between antibiotic classes sold for use in both human and veterinary medicine (Muloi et al., 2019). Although clinical training significantly influenced retailers' adequate knowledge on issues related to antibiotic use, it was identified by the study that there were several inappropriate prescribing practices among retailers. For instance the study found that a majority of veterinary and human drug stores sold antibiotics without a prescription, while customer preference was a major influence for prescribing antibiotics to customers. Similarly, a majority of respondents suggested that antimicrobial resistance is only a problem for regular consumers of antibiotics and disagreed with the statement that antibiotic resistant bacteria could be spread from person to person (Muloi et al., 2019).

Consequently, a study conducted among patent medicine vendors in Nigeria showed that, most of the vendors had adequate knowledge of the causes of antimicrobial resistance and its prevention. However, the practices leading to antibiotic resistance were very prevalent among the medicine vendors. Majority of medicine vendors were found to consistently sell antibiotics to clients without doctor's prescription. Close to a half of the vendors were identified to practice self- medication, whereas a larger proportion of them often purchased drugs in bulk from the open market instead of pharmaceutical companies. Moreover, it was found that a majority of medicine vendors do not check for drug expiry date before selling to clients, while at a significant proportion of them do not counsel clients on the need to complete the recommended dosage (Awosan et al., 2018)

A systematic review study by Goodman and colleagues assessed knowledge of pharmaceutical retailers at two broad levels; knowledge specific to treatment, and knowledge on wider aspects of practice such as treatment policies. In the study, PRs

knowledge on drug specific aspects was found to vary substantially. A majority of PRs knew what drugs to give for tracer conditions, but had less knowledge on appropriate dosing (Wafula et al., 2012). A minority of PRs were found to believe that antibiotics could cure viral infections. Evidently, pharmacy shops located in urban and affluent areas were more likely to provide correct treatments, as compared to those in rural areas but however also charged higher prices for medicines. A vast majority of shops simply sold whatever medicines clients requested, with little history taking and counselling.

Most shops also stocked popular medicines at the expense of policy treatment recommendations. In general, treatment policies were poorly communicated by PRs to their clients, and this partly relates to why staff had poor knowledge on key aspects of treatment such as medicine dosage and side effects (Wafula et al., 2012).

A study among community pharmacists which explored their knowledge and practices toward the use of medicines used in treating a common skin condition showed that, many community pharmacists were not familiar with the various classes of medicines used for treating skin conditions, yet recommended them to patients. Community pharmacists also demonstrated poor communication to patients regarding such medicines (Thandar et al., 2017).

In a study conducted among pharmaceutical retailers involving community pharmacists and drug retailers in India, 31.8% of respondents did not know what generic medicines were. About 30% of the respondents thought that generic medicines are of inferior quality as compared to branded medicines, however 63.6% of the surveyed pharmacists and drug retailers agreed that generic medicines can be considered therapeutically equivalent with the branded one (Basak & Sathyanarayana, 2012).

2.4 Pharmaceutical retailing in Ghana

In Ghana, medicines distributed under state funded programs are generally procured, distributed and dispensed through the government infrastructure of Central Medical Stores and smaller regional and district-level warehouses which supply community-level health clinics (McCabe et al., 2011). In the absence of accurate pharmaceutical market statistics, it is estimated that Ghana's pharmaceutical market (for both over the counter products (OTC) and prescription medicines) is made up of approximately 30% locally produced and 70% imported products that originate mainly from India and China, of which the latter arguably being of better quality and without doubt cheaper than those locally produced.

Pharmaceutical market supply is divided approximately 50/50 between the private sector and the public donor sector. The local manufacturing sector is focused mainly on providing over the counter products in the local OTC market which exists for several reasons (McCabe et al., 2011). The pharmaceutical sector in Ghana, comprising of both private and public channels, is composed of producers of drugs, wholesalers, distributors and retailers. The hub of the pharmaceutical wholesale market is located in the country's capital city. It is responsible for supply of medicines and other pharmaceutical products to registered pharmacies, and chemical sellers operating in small towns and villages across the country. The demand for pharmaceutical products in Ghana is competitive, with many retailers. This demand has been influenced by economic factors such as income and increasing populations (Anum et al., 2010). Unfairly, the supply and distribution of medicines in the public sector is largely centralized and characterized by inadequate storage facilities, poor forecasting of needs, stock pilfering, insufficient human resources, and limited financing all resulting in progressive stock outs. The pharmaceutical retail business in Ghana is highly

dominated by private entities, and conducted by pharmacies that employ registered pharmacists who dispense, as well as chemist shops managed by pharmacy technicians who dispense OTC products solely (Related Trade Rights, 2007; McCabe et al., 2011). Both private and public pharmaceutical sources intersect in various ways and on all levels. In terms of quantity, the private sector is central in the supply chain for pharmaceuticals in Ghana.

Data shows that even public buyers in the periphery are increasingly dodging the Central Medical Stores by procuring directly from private providers (Seiter & Gyansa-Lutterodt, 2009). Private sector wholesalers and manufacturers with integrated distribution operations offer the convenience of delivery and allow buyers to purchase pharmaceutical products in smaller amounts more often, matching the cash flow pattern better than the once-a-year purchasing cycle in the public supply chain domain. This is one major factor for which the public sector supply chain in Ghana is heavily dependent on the supplies of a more flexible private sector" (Seiter & Gyansa-Lutterodt, 2009). Many countries in the sub-region have a problem with street peddling of pharmaceuticals. According to the Ghana Food and Drugs Authority (FDA), the country has a reasonably safe retail pharmaceutical supply chain and does not have a major problem with street trading of pharmaceuticals, although this does occur to some extent in rural and peri-urban areas (Related Trade Rights, 2007). Evidence by private pharmacists and the Food and Drugs Authority (FDA), the country seem to have less problems with the illicit drug market, which is rather widespread in other countries in the African region, and which exposes particularly the poor to the risk of buying forgery or inferior drugs from licensed or unlicensed sellers. This does not mean that such a market does not exist in Ghana. According to FDA and other local sources, it is challenging to suppress illegal selling of prescription drugs in unlicensed outlets as well

as the sale of unregistered drugs trafficked into the country, and in pharmacies and chemical shops (Seiter & Gyansa-Lutterodt, 2009).

2.4.1 Drug Classification

Medicines are classified into 3 categories, according to the UK pharmaceutical industry; those that are obtainable only through the issue of a prescription, which have the status of Prescription only Medicines (PoMs). Those available over the counter from a pharmacist, which have pharmacy (P) status, and 3. Medicines available in outlets other than pharmacies (e.g. markets, and other public places) which have general sales list (GSL) status. Medicines with both P and GSL status known as over the counter drugs (OTC) (House of Commons Health Fourth Report, 2015).

2.5 Licensing of a pharmacy or chemical shop in Ghana

The country has further stretched out the access to medicines by allowing people with no or limited training in health care or pharmaceutical dispensing to sell a few medicines, usually antimalarial, analgesics, and other over-the-counter drugs through outlets known as chemist shops (Parker et al., 2012). In contrast to pharmacies, chemist shops (also known as patent medicine vendors), are generally more numerous, do not typically employ a trained pharmacist, and are legally allowed to sell only non-prescription drugs (over the counter products) and pre-packaged medicines. The owners of chemist shops are usually literates, who may or may not have a retail license, or health accreditation such as being trained as a nurse, nursing assistant, pharmacy assistant, or traditional medicine practitioner (Parker et al., 2012). In Ghana, the owners of chemical shops are often farmers, teachers, or nurses. Licensed chemical shops are independently owned businesses run by non-pharmacists, who have at least minimum a secondary school education and are licensed by the Pharmacy Council to sell a variety

of over the-counter medicines. They are usually small, single owner businesses with low revenue and profit (DMPA Sales at Licensed Chemical Shops in Ghana , 2010). Pharmacists with pharmacies in urban areas also run chemical shops to enhance their earnings, however this can diminish their pharmacy services, since the knowledgeable staff are not usually available to advise patients (Arhinful, 2009). Licensed chemical sellers (LCSs) regularly receive training from the licensed chemical association and pharmacy council; however, no training is required to obtain a license (Seiter & Gyansa-Lutterodt, 2009). Pharmaceutical licensing involves a local producer paying to obtain the rights to manufacture, distribute and use pharmaceutical products (Related Trade Rights, 2007). In the country, compulsory licenses are delivered by the Ministry of Justice (Attorney General) following legal orders issued by of the Minister of Health. Ideally, a foreign patent holder and a local producer, under fair licensing conditions, should be able to enter into an agreement to take advantage of lower local production costs and new markets as well as delivering essential products to the diseased population that needs them. This ideal situation however has been difficult to achieve for a number of reasons, resulting in lose-lose situation for all parties (Related Trade Rights, 2007).

2.6 Licensing of over the counter medicine sellers

According to the Health Professions Regulatory Bodies Act, 2013 Act 857 Ghana 2013), the Board may grant a license to an over the counter medicine seller if satisfied that; The applicant is fit to carry on the business of the retail supply of restricted medicines other than prescription only medicines or pharmacy only medicines, or The area where the applicant proposes to carry on the business is deprived of a pharmaceutical service.

Consequently, the Board may revoke a license granted to an over the counter medicine seller if the over the counter medicine seller is in default of a provision of clause, or if a condition specified in the license has ceased to exist. The Board however may impose a penalty not exceeding two hundred and fifty penalty units instead of revoking a license where an over the counter medicine seller contravenes with the laid down protocol (Health Professions Regulatory Bodies Act, 2013).

2.7 Legal issues on pharmaceutical retailing

Enforced legislation is an ideal requirement for good pharmacy practice. In Ghana, a National Medicines Policy (NMP) document, existing as a legal guideline forms the basis of government's responsibility to ensure access of its citizens to good quality drugs at affordable prices, endorsing drug regulations, developing professional standards, and promoting the rational use of drugs (Arhinful, 2009). The Ghana National Drugs Programme (GNDP) established in 1997 had driven objectives including promotion of rational drug use, strengthening of quality assurance to ensure safety and effectiveness of products, and establishment of financing mechanisms to ensure equity and access to essential drugs (Related Trade Rights, 2007). Following the judgment of some senior members of the Ministry of Health (MoH), Ghana is not fully implementing its national drug policy due to a lack of political will.

The Essential Drug List (EDL) according to report, is the only implemented part of the drug policy. Subsequently it has been stated that there is a need for the Ministry of Health (MoH) to encourage local manufacturers to produce drugs on the EDL, in order to gain greater coordination between public health objectives and health manufacturing policy (Related Trade Rights, 2007).

The Food and Drugs Board is a pharmaceutical regulation authority in Ghana. It is responsible for providing information on legislation, regulatory procedures, prescribing information, authorized companies, and approved medicines (Arhinful, 2009). The Medical and Dental Council of Ghana is the statutory governmental agency that regulates the standards of training and practice of medicine and dentistry in Ghana, while the Pharmacy Council is responsible for the regulation of the pharmacy profession. The Pharmacy Council has been mandated to license pharmacists and chemical sellers. Licensing and inspection of pharmacies and chemical stores, as well as the assurance of good pharmacy practice, is the sole responsibility of the Ghana National Pharmacy Council. However, there are sometimes joint task teams organized between the Food and Drugs Board (FDB) and the Pharmacy Council to conduct particular operations (Arhinful, 2009; Seiter & Gyansa-Lutterodt, 2009). The country's drug policy emphasizes prescription by generic name and generic substitution, making it obligatory in both the public and private sectors but the policy is poorly especially in the private sector due to poor implementation. Ghana does not have a national medicine price monitoring system for retail price, also there are no regulations mandating retail medicine price information to be made publicly accessible. There are however official written guidelines on medicine donations that provide rules and regulations for donors and provide guidance to the public, private or Non-Governmental Organization (NGO) sectors on accepting and handling donated medicines (Arhinful, 2009).

Pharmacy practice in Ghana had been regulated under Pharmacy Act, 1994 (ACT 489) by the Pharmacy Council until 2011 when the Health Institutions and Facilities Act (ACT 829) was passed, mandating the Health Facilities Regulatory Agency to also license and monitor facilities for the provision of public and private health care services (Registration & Licensing Policy, 2018). Subsequently, in 2013 the Health Professions

Regulatory Bodies Act, (ACT 857) was passed to replace Pharmacy Act, 1994 (ACT 489) which has specific sections prescribing how practitioners, their practice and where they practice should be licensed (Registration & Licensing Policy, 2018).

By law, new pharmacies or chemical sellers need to respect a minimum distance to existing businesses, but it is not clear whether this rule is enforced consistently. The existence of retail business is highly dense in urban areas particularly greater Accra and Ashanti region (account for > 80% of all drug retail outlets in Ghana), while citizens in rural areas may have to travel some distance to find a licensed pharmacy or chemical shop. The pharmaceutical society together with the pharmacy council are working on a model that would make it mandatory for pharmacy graduates to serve in a rural community first before they can set up a shop in more affluent areas. However, this would require funding for investment into local shops and supplies in addition to the pharmacist's salary. Without subsidies, small shops in poor rural areas may not be financially viable (Seiter & Gyansa-Lutterodt, 2009).

Regarding antibiotics, according to the Health Professions Regulatory Body Act, 2013 (Act 857), only medical doctors, physician assistants, midwives and nurses trained in prescribing are eligible to prescribe registered antibiotics (Health Professions Regulatory Bodies Act, 2013). Moreover, the Pharmacy Act, 1994 (Act 489) includes relevant sections on the dispensing and sale of medicines, including antibiotics (Pharmacy Act, 1994). According to several drug policies, antibiotics are classified as a particular category, which means that pharmacies cannot dispense them without a prescription (McCabe et al., 2011; Nafade et al., 2019).This connotes that over the counter antibiotics dispensing is generally illegal, however enforcement of these regulations is challenging. In Ghana, a wide range of antibiotics is available on the open

market, and acquiring drugs over the counter particularly antibiotics is a very common practice, despite available drug policies.

2.8 PR's Knowledge, attitude and perception in Ghana

In a study done by Asante et al, 2017 among prescribers in Ghana to assess their knowledge on antibiotic prescription and antibiotic resistance, it was evident that prescription practices among prescribers vary, and were mostly inappropriate among prescribers within the lower cadre. Generally, prescribers were identified to have adequate knowledge on antibiotic resistance however there was a gap in the knowledge and perception of optimal antibiotic prescription practices. Prescribers attributed antibiotic resistance burden to factors including poor prescription practices and limited control measures for antibiotic resistance (Asante et al., 2017).

More recently, a study evaluated antibiotics dispensing practices of medicine sale outlets in both rural and urban communities in the Eastern Region of Ghana. It was found that the number of antibiotics sales without prescription in rural medicine outlets was high, and the volume of antibiotics sold by such pharmacies was higher as compared to urban pharmacies. Factors that influenced the inappropriate use antibiotics included lack of controls in the dispensing of antibiotics, and use of antibiotics in ways inconsistent with biomedical recommendations (Ahiabu et al., 2018).

2.9 Impact and Benefits of pharmaceutical retailers

Pharmaceutical service providers in Ghana consists mainly of pharmacists, pharmacy technicians and over the counter medicine sellers. Pharmacy service providers play essential roles in facilitating patient access to prescription drugs. They are important members of the healthcare team and perform a vital role in the use of medicine, and the

provision of advice regarding appropriate medicines use. Similarly, they are well placed to improve the understanding of antibiotics and inform their prudent use by direct contact with consumers in the community and in the hospital (Farley et al., 2015). Drug shops and pharmacies, with their convenience, anonymity, and cost-savings, are an important source of health service for community members. Among the reasons the clients give are ease of access, availability of medicines, no waiting and convenient hours of operation, cheaper products, availability of credit or the option to buy drugs in small amounts. These shops are most times open for long hours, offered treatment that was quick and inexpensive, and the chemical sellers (who had not received formal training) were friendly local people who integrated well in the community (Goel et al., 1996; Smith, 2004). Retail pharmacies are one of the most important sources of advice on pharmaceuticals. Community pharmacists are capable of playing an important role in helping optimize antimicrobial use by educating patients and effectively interacting with prescribers, although currently, a number of barriers may be limiting their participation (Rizvi et al., 2018).

2.10 Control and Supervision of PR

Supervision sets out the legal position for the assembly, sale and supply, as well as dispensing, of medicines among PR (Rizvi et al., 2018). Supervision, according to regulation 220 of the Human Medicines Regulations 2012, presents that a person must not sell a medicinal product unless that person is a pharmacist, or unless the transaction is carried out on the person's behalf by another person, that other person is, or acts under the supervision of, a pharmacist. Regulation of pharmacy retailers is essential in promoting safe and rational dispensary practices. In Ghana, Section 24 of the Pharmacy Act, 1994 (Act 489) emphasizes on the use of pharmacies owned by pharmacists. It

stipulates that; A person who is not a pharmacist shall not describe himself or hold himself out to be a pharmacist by the use of the terms/titles such as 'pharmacist', 'chemist', 'dispenser of drugs', 'druggist', 'compounder of drugs', or any other similar term. Likewise, No person shall open or permit any other person to open any premises to the public under the description of 'pharmacy', 'dispensary', 'chemist', 'drug store' or any other similar description unless a registered pharmacist is on the premises to supervise the dispensing of drugs or medication (Friestad & Wright, 1994).

2.11 Who is a pharmaceutical retailer (PR)?

For the purpose of this study, a pharmaceutical retailer is any one handling drugs, particularly antibiotics and does the act of dispensing or selling. This consists of all categories both private and public pharmaceutical retailers, comprising of the following; health facility pharmacists, community pharmacist at the community pharmacy, over the counter chemical or drug sellers, community drug sellers and drug peddlers. In Sub-Saharan Africa (SSA), pharmaceutical retailers fall within the category of people who specialize in selling medicines, and those licensed to sell a limited range of pre-packaged medicines alongside foodstuffs and household items. Pharmaceutical retail shops primarily include pharmacies, legally recognized non-pharmacy drug shops, unregistered drug shops, community-owned drug shops and drug peddlers" (Wafula & Goodman, 2010).

2.12 The role of Pharmaceutical Retailers (PRs)

The role of pharmacists towards health care has been a centre of dialogue both inside and outside the profession for several years. Pharmacists have the prospect to contribute

to the main healthcare, nonetheless, there are insufficiencies in the value of existing professional practice, of specific interest, the improper sale of antibiotics (Akinyandenu & Akinyandenu, 2014).

Equally, specialized care and basic health-care services rest on the assistance of knowledgeable and well-trained staff as well as health-care workforce. However, notwithstanding the high burden of disease in sub-Saharan Africa, several countries have a scarcity of health workers that is estimated to continue well into the future. New approaches for developing a strong health-care workforce are needed to help accomplish worldwide health coverage and health equity (Liu et al., 2015).

In sub-Saharan Africa, seeking care from drug vendors who are also known as chemical sellers is a common practice, most of whom are owners of the shops they operate. People often seek care from drug vendors for common but potentially deadly illnesses, such as malaria, diarrhoea and bacterial infections (Goodman et al., 2007). In Ghana many people receive care from public or private organizations. Sometimes patients get their prescriptions serve at private pharmaceutical retailers when they are not available at public facilities. Majority of Ghanaians prefer these retailers because it is easier to access their services because there are no long queues as compared to the public facilities. They rely on licensed chemical sellers (LCS) and pharmacies for treatment. Mostly, some of these LCS are not legally trained to deliver healthcare but run their own drug stores. The Ghana Pharmacy Council authorizes licensed chemical sellers to sell non-prescription drugs. LCS and pharmacies must apply yearly for an operating license from the Council as required in the Pharmacy Act 1994 (489).

There are over 1,600 pharmacy outlets, both retail and wholesale, and about 8,000 chemical retail sellers. About 75% of these pharmacies are located in the cities which together have access to less than 30% of the populace. This shows that very small

population of the country are covered by retail pharmacies and hence the heavy dependency lies on chemical sellers by our rural folk. In over 60% of the cases, rural chemical sellers are first-line providers of medicines (Seiter & Gyansa-Lutterodt, 2009).

A pharmacy also called drugstore or community pharmacy or chemist's depending on the country's location is a pharmaceutical shop where pharmaceutical products and medicine are sold. At the pharmacy, prescriptions are satisfied and advice on clients' compliances on medication are given by the pharmacist. A pharmacy would normally be close to a street or at a marketable place of a community. A pharmacy is a higher facility as compared to the drug shop or chemist shop. Pharmacists are sometimes assisted by pharmacy technicians, dispensing assistants and counter assistants at the pharmacies. Drug shops or chemist shops as known in certain countries which are often more than pharmacies in rural communities do not normally employ a trained pharmacist, and are legally permitted to sell only non-prescription drugs and pre-packaged medicines. They sometimes sell antibiotics like pharmacies which they are not supposed to sell. Drug shops usually have a small room in the back or a hidden box somewhere and antibiotics are hidden there which are sold to clients upon request. The owners of these shops are certainly well-educated and may or may not have some type of retail license to render services such dispensing of drugs as well as offering counselling on medication when necessary. Pharmaceutical retailers are steadily becoming key players in stimulating access to medicines in low and middle-income countries (Wafula et al., 2012).

The sale of prescription-only medications without a prescription is a significant regulatory subject. Internationally, over 50% of antibiotics are retailed without a medical prescription. Even though over the counter sale of antibiotics is common in the

developed world, this practice is more obvious in developing countries such as Ethiopia, where regulation policies are additionally weak. Finding from a study conducted in Alexandria, Egypt showed that 65.4% of community pharmacies retailed antibiotics without a prescription (Damisie et al., 2019).

2.13 Conceptual view of pharmaceutical retailing

Pharmaceutical practice encompasses everything, which is related to availability of medicines, access and use at the individual and the population levels (Scahill et al., 2017). The conceptual framework below hence encapsulates the formulation, distribution, access and use of medicines (antibiotics). It incorporates the role, attitude and knowledge of the human capital (pharmaceutical retailers) involved in the delivery of pharmacy services, and its impact on end users of pharmaceutical products. The model also ensures the maintenance and sustainability of public-private drug seller initiatives that increase access to and appropriate use of quality pharmaceutical products and services.

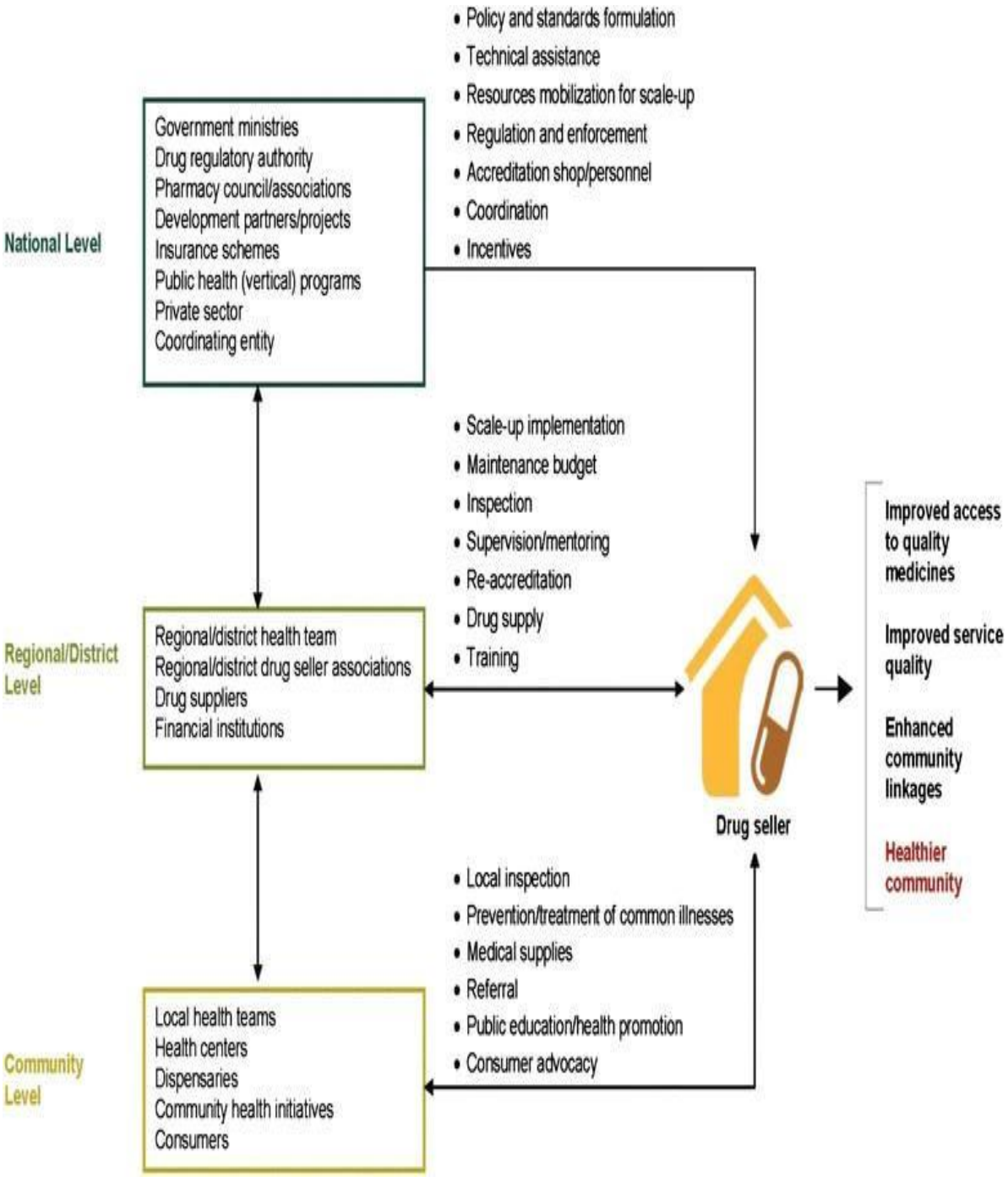

Figure 1:"Accredited drug seller initiative conceptual framework"; adopted from the ADDO case study (Friestad & Wright, 1994).

2.14 Theoretical perspective

The focus of this study, regarding the knowledge, attitudes and perceptions of pharmaceutical retailers towards dispensing of antibiotic in the Shai Osudoku district

of Ghana can be examined through the lens of the theory of structuration. Structuration is a social theory relating to the production and reproduction of social systems that is established on the exploration of both social structures being (social forces/institutions)and agents the (individuals), but without giving importance to any (Afari-Asiedu et al., 2018). Structuration is the continuousness of the former and the reproduction of the present structure. Giddens' theory of structuration is intended to illumine the contrast and dialectical interaction of agency and structure. This occurs through the study of human practices, which he claims are recursive, in order that activities are not taken into being by social actors but are continually recreated by them through the very means whereby they express themselves as actors. In and over their activities agents create the conditions that make these activities possible (Greener, 2008). It discovers the level to which, and how social forces and individuals outline our social reality. 'Structures' are regulations and means that individuals appeal upon in their activities/practices and that produce and reproduce social systems (Afari-Asiedu et al., 2018). Structuration theory has an evident demand for strategy-as-practice investigators. Giddens makes an uninterrupted appeal, consequently, proposing concepts of agency, structure and structuration that have fundamental importance to practice research. His opinion of human agency confirms that people's activity matters, practice requires learning because it makes a difference to outcomes. At the same time, his concept of social structure permits for both restraint and enablement. To apprehend activity, we must join institutional embeddedness. The concept of structuration conveys together structure and agency to provide them flow continuousness, nonetheless the possibility of structural change (Whittington, 2015).

Positioning our framework within structuration theory, the knowledge, attitude and perception of the PRs is a new act that they are exhibiting presently, but it is a continuity

of what others have done. Though the continuity of the past activities of the PR may be undesirable it does not serve as a barrier to the present situation, but it serves as a medium of social change which like any others, occur at a stage. The PR being the actors are aware of the social structures being the policies of dispensing antibiotics in Ghana. As social actors the PR know a great deal about the profession or work they do as dispensers of antibiotics. In Ghana structures have been put in place for dispensing antibiotics. Abiding by the structures constrain the actions of PR nevertheless they go against the structure for their gains. The pharmacy council as well as the pharmacy act are the antibiotic regulatory structures in Ghana and human agency being the community members are not reciprocally independent, but relatively they consist of two corresponding mechanisms of the framework that governs the sale of medicines, including antibiotics. This theory could be of assistance to comprehend the connection of practices in operational associations and how established individual practices unite to provide system integration.

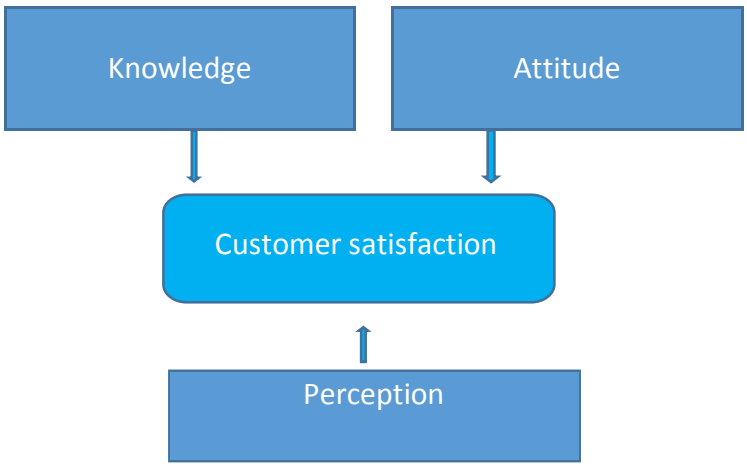

Figure 2: Knowledge, attitude and perception model

CHAPTER THREE: RESEARCH DESIGN AND METHODS

This chapter clarifies the various methods used in collecting data for the study. This is an exploratory qualitative study method that required a detailed analysis therefore an in- depth interview was used explore the views of pharmaceutical retailers in dispensing antibiotics.

3.1 Study design

This is an exploratory qualitative research, there was not much information about the topic, and hence the need to conduct this study. The study investigated into a condition or situation which offered understanding to the researcher. This type of research delivers specific information where little evidence exists.

3.2 Study area description

The study was conducted in Shai-Osudoku district in the Greater Accra region of Ghana. The district is located in the south-eastern part of Ghana, one of the 16 Districts in the Greater Accra Region. The District was re-demarcated in June 2012 when it was carved out of the Dangme West District by L I 2137. One of the four purely rural Districts in the Region, which have not yet been caught up by the rapid urbanization of the peripheral areas surrounding the city of Accra. It is the District with the largest surface area in the Greater Accra region. It occupies a total land surface area of about 721 square kilometres (Shai Osudoku district health directorate annual report).

The district is fairly rural with some scattered communities. The Shai-Osudoku district is made up of farming communities. It has a large market place where people from

nearby communities come to sell their wares including drug peddlers and vans selling different kinds of medicines.

Shai-Osudoku district has categories of health facilities ranging from the Hospital to a Community-based Health Planning Services (CHPS) Compound including other private and Christian Health Association of Ghana (CHAG) facility. The facilities consist of 1government hospital, 1 private hospital, 3 health centres, 10 CHPS, 1 private clinic, 1 CHAG hospital and 1 private maternity home. (Shai Osudoku District Directorate 2019 annual report). There are 35 licensed chemical shops, 3 pharmacies as well as 2 chemical shops unlicensed within the district. (Dodowa Health Research Centre, ABACUS data 2017).

3.3 Sampling and selection criteria

All possible selling or dispensing points for antibiotics (pharmaceutical retailers) within the study area were mapped. The mapping was the first step of eligibility to partake in the study. This included all recognized antibiotic retailers and those not recognized from government hospital pharmacy to the drug peddler. The study was conducted in two phases. In phase 1, community key informants (CKIs) in the various communities who are mostly involved in the health programmes organized in their communities assisted with the mapping of the pharmacies, drug shops as well as drug peddlers. After the mapping the sampling size of the study was determined by using the highest number of daily antibiotics encounter among the various categories of retailers. Subsequent checks were done to ensure that antibiotics were being sold by the selected retailers. After that, the we conducted an assessment on sales of antibiotics from their hospital records and sale books and ranked those with the highest daily encounter of antibiotics over a period of one month who were then considered eligible for selection

as part of the first group of retailers who fell within the figure for the sample size and successively participated in the study. The highest among the various categories were chosen. In all 5 pharmacists, 3 chemical sellers and 2 drug peddlers were interviewed. A total of ten (10) in-depth interviews. The in-depth interviews with the PRs were exhaustive and reached a point of saturation, subsequently no different information occurred after the last interview conducted. The phase 2 comprised of training of field workers, recruitment of pharmaceutical retailers and conducting of in-depth interviews. Antibiotic retailer ≥ 18 years old were eligible for the in-depth interview. Employees in the various supply points, who were involved in the daily interaction with customers rather their employers were interviewed. Proprietors or owners of dispensing points who do not interact directly with customers were excluded from the study.

3.4 Informed Consent

Participants were provided with information on the study after which their consent was requested for by the interviewer. The information was provided verbally and in writing. This was read audibly to the participants. They were then be allowed to decide if they want to be part of the study or not. Interview was conducted only after written consent was provided.

3.5 Data Collection

Two interviewers were trained on the interview guide for the data collection as well as other issues that are relevant for the data collection. The interview guide was pretested in a different community with similar characteristics as the study area. Results from the pre-test was used to finally revise the guide. Regulations concerning confidentiality were emphasized thoroughly during the training. Supervision of field workers was

continuous during the interviews to attest quality of the data collected. The selected antibiotic retailers were informed about the purpose, the procedures, and the unidentified character of the in-depth interview. Study information were provided verbally as well as written.

Measures were put in place to ensure that the study staff did not interfere with their regular duties of the antibiotic retailers not even when illegal practices were observed. They were also assured that the data collected will not be identified with their facility. Written retailers' consent was collected from all participants before commence of the in-depth interview. The in-depth interviews were conducted at a period and place that provided adequate privacy and was jointly approved by the retailer and field worker. As standard, the in-depth interviews were audio recorded. All participants agreed for the interviews to be audio recorded. The interviews lasted for about 60 minutes each.

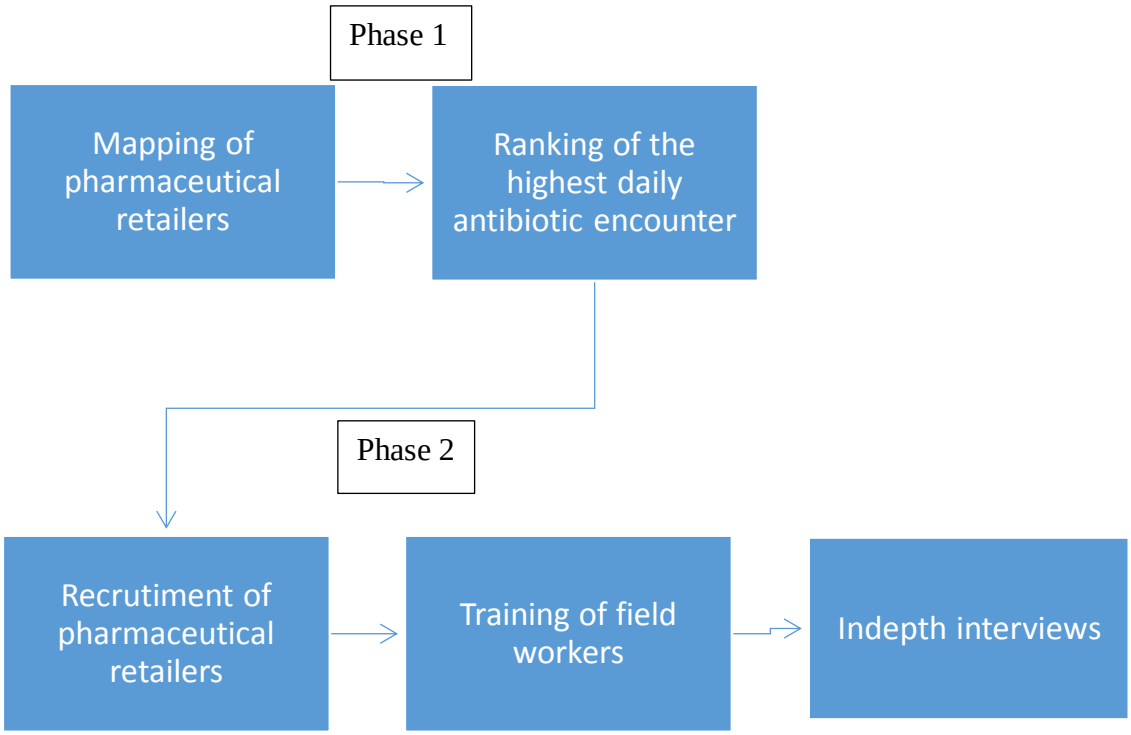

Figure 3: Overview of study design

3.6 Source and type of data

The study made an extensive use of secondary sources of data from the INDEPTH Antibiotic Access and Use Study (ABACUS) conducted in the Shai-Osudoku district in **February 2017.** The PI of this study was a one of the lead researchers.

Type of data that was gathered included background information of the facility including type of business being operated thus a pharmacy or licenced chemical. Data collected was qualitative. There was however two quantitative data on the age of participants and the number of years the health facility, pharmacy or health has been in operation.

3.7 Data analysis

Majority of the interviews were conducted in English language with a few in the local dialect. The audio recordings of interviews that were conducted in the local dialect were transcribed into English language from the local dialect by fieldworkers who are fluent in both Dangme and English. Thematic content analysis was used for the data analysis. Transcripts were read and descriptively coded by the Principal Investigator (PI). The themes were classified using broader patterns of meaning and reviewed to ensure they fitted the data. Finally a comprehensible narrative was created that included quotes from the interviewees.

3.8 Themes

Ten major themes were identified: Knowledge of antibiotics use; Customer diseases status; Drug dispensing practice; Instructions on antibiotics dispensed; Mixing antibiotics with other medicine; Selling incomplete dose or overdose of antibiotic; Return with unused drug; Expiry Date; Knowledge about Antibiotic resistance; What

step should be taken for proper use of antibiotics; Rules and regulation for selling antibiotics.

3.9 Ethical Considerations

The protocol was reviewed by the Ethics Review Committee of the Department of Development policy at the School of Public Service and Governance, at the Ghana Institute of Management and Public Administration (GIMPA). Information about the study was made known to participants and their consent requested by trained interviewers. Study information was provided verbally, written and read clearly to the participants as well. Participants were given time to consider if they want to be part of the study or not. Only adults (≥18 years old) were eligible to partake in interviews conducted in the study. Participants were assured of unrecognizability and confidentiality during and after the study.

Participants were not expected to benefit immediately from data collected in during the study, however, there were indirect benefits to the public. Their involvement in the study offered awareness into the exact needs in their communities with respects to stabilizing antibiotics efficacy.

Chapter Four: Results and Discussion

The main objective of the study was to explore the knowledge, attitudes and perceptions of antibiotics retailers' with regard to antibiotic dispensing. The chapter presents results that were produced through this study which includes a description of the demographics of participants and emerging themes.

4.0 Results

The Results section is made up of two sub-sections, including;

a. Demographic characteristics of the respondents, and
b. Comprehensible narrative on themes with selected quotes to support the findings.

4.1 Demographic information of participants

A total of ten (10) respondents participated in the study, comprising 5 pharmacy assistants 3 chemical sellers and 2 drug peddlers. Respondents included 1 female pharmacy assistants and 9 males aged 29 years to 66 years. Educational level of respondents include Senior High School (SHS), Advance level (A' Level) and Tertiary. These participants operated in either health facility pharmacies, community retail pharmacies, chemical shops or engaged in drug peddling. Participants either owned these businesses or worked in there as senior pharmacists, managing directors and counter medicine assistants. The businesses have been in existence between five (5) years to eighteen (18) years.

Comprehensible narrative on themes with selected quotes to support the findings.

4.1.1 Knowledge of antibiotics use

The research theme that directed this study was the knowledge of antibiotics usage. Generally, participants knew antibiotics treat infections such as bacterial and fungal infections. According to one respondent, there are types of antibiotics but he normally sells the broad spectrum, which treats all kinds of infections.

> *"So that one, whatever is wrong with you, the doctor can prescribe it [antibiotic] and then you take it and it will deal with it." (Pharmacy respondent # 1).*

Another participant stated that antibiotics are used for treating patients with chronic diseases who do not respond to other treatment regimen.

> "*Antibiotics are used to treat people with chronic disease. They are used to treat people who have persistent illness, when a client's condition is not subsiding or not getting better we use antibiotic to treat*". *(Pharmacy respondent # 2)*

Participants added that antibiotics are required to treat specific conditions.

> *"There are ways of using antibiotics and how they are to be taken. Not every illness requires antibiotics" (Drug peddler # 1).*
>
> "*If condition is severe we normally add the antibiotics to the treatment*" (*Pharmacy respondent # 5)*

The commonest antibiotics sold by respondents are Ampicillin, Amoxicillin and Chloramphenicol.

"In the first place, because we sell according to prescription we normally sell all the antibiotics. But the most common ones you usually sell are Ampicillin, Amoxicillin and Chloramphenicol." (Pharmacy respondent # 4)

4.1.2 Customer diseases status

In general clients who complain of cough with or without phlegm sometimes with itchy throats are given antibiotics. Clients with common cold, rashes and sores are also given antibiotics. The dosage of antibiotics dispensed or sold at the chemical shop depended on the severity of illness and age of the customer. A respondent indicated that he gives antibiotics only when cough is severe. Others were of the view that antibiotics should not be given to people immediately they complain of a condition; some investigation should be done before. According to a drug peddler he sells chloramphenicol to customers who present symptoms indicating sore in the stomach. They either take them orally or pour the powder directly onto their surface wounds.

'Sometimes customers with wounds ask for the red and yellow antibiotics or ampicillin' (Drug peddler # 1)

4.1.3 Drug dispensing practice

At the hospital pharmacy, a prescription form is dropped into a tray by a patient and waits to be called because patients are served on a first-come, first-served basis. If the antibiotic is covered by health insurance, pharmacy staff picked the antibiotic by label, pre-audit them and call the clients by names to cross check if really they are the clients. If not so sure of the identity of the person, further questions are asked. To identify a person whose prescription came through the software used at the hospital pharmacy, an ID card is used as a form of identification. Written and oral instructions are given to

clients. Drugs that are not covered by the health insurance are paid for and all prescription is entered into the software irrespective of how it was issued. Generally dispensers revealed that there are steps to follow when dispensing medicine. Customers are asked what is wrong with them and whether any action has been taken regarding medication. If any medication is being taken, they are asked when the last one was taken. It could be that they have taken the medication an hour ago and think it is not working, since medicines takes time to work. These questions are asked to prevent reactions due to an additional medicine that is being prescribed. The nature or severity of the illness of an individual sometimes determines the medication to be given. Customers sometimes demand for specific antibiotics after describing their illnesses/conditions. The PRs stated that these demands are mostly dependent on what clients have heard or seen others do.

> '*Customers can talk in a way that you feel forced to do what you are not supposed to do, you feel sorry for them'. (Pharmacy respondent # 5)*

Mostly customers come with prescriptions. Others come to describe their illness whilst others come to mention specifically what they want. There are customers who go to the pharmacies and chemical shops after a phone call consultation with their doctors about which antibiotics to buy. Clients sometimes buy drugs upon recommendations from friends or families who have had similar experiences.

> "*A man had headache and stomach ache and used a particular drug which relieved him of the illness. He recommended that same drug when someone also had the same illness, the customer refused any other drug expect what he wants because that is what has worked for somebody" (Pharmacy respondent # 1)*.

"A woman had circumcised her male baby and I recommended penicillin ointment, she too was saying no she will use chloramphenicol, put it in palm kernel oil and then put it on it. I gave her all the instances that the child may get infections but she refused. When you refuse them what they want they go to a different shop where it will be sold to them". (Pharmacy respondent # 1).

According to a drug peddler, market women are mostly his customers and these women always have particular drugs they buy. He normally does not ask them any questions because they are in a hurry to sell their wares.

'They are always in a hurry, I doesn't get much time to ask about reasons for buying the drugs'. (Drug Peddler# 2)

'We deal with market women. When some of them go to hospital and they prescribe a drug for them, they go to the pharmacy to buy the drug but if they don't get all they will buy those that they didn't get at the pharmacy from me'. (Drug Peddler# 2)

Occasionally the market women present prescription from doctors, but as a drug peddler he cannot read the doctor's handwriting so he directs such people to go to the chemical shops.

'Sometimes if the handwriting is not clear then I just tell them to go to the drug store because doctor's handwriting is not all that readable' (Drug Peddler# 2)

These women mostly ask for pain killers to cure body aches and headaches. They sometimes ask for blood tonics and specific antibiotics. He said he always ensures he sells the right medicines to customers because he has been cautioned by the owner of a

pharmacy where he buys drugs that, if he sells wrong medicine to people he would lose his job. He always advice customers who have bought a particular medicine for more than three times for the same condition to see a doctor for further treatment.

Whenever a customer needs a particular antibiotics, he first ask about the usage, if he thinks that antibiotic will not be needed for such condition, he refuses to sell to the customer. The drug peddler spoke about the cordial relationship between him and his clients and how they always show appreciation to him whenever they are cured after using medicines they bought from him. In some cases he sells the drugs on credit especially when the drug is needed but the customer does not have the full amount to pay for the drugs.

4.1.4 Instructions on antibiotics dispensed

Clients are mostly given instructions on how to take antibiotics. This is done whether drugs were dispensed or purchased with or without prescription. Although prescribed medications are normally explained by the prescribers, most dispensers still give both written and verbal instructions. Instructions given to clients are generally about how, when and how long to take it.

> "*That is a must even if it is written or the doctor has said it, you still have to tell them how to take it and then let them know whether it is before or after food and that is also very important and then the time lapse, if it is three times a day or every six hours." (Pharmacy respondent # 5)*.

According to a respondent, it is important to inform patients taking antibiotics about the change of odour of their urine in order to allay their fears. Clients are asked if they are allergic to antibiotics before dispensing to them. Though sometimes those with prescription are not asked with the idea that the prescribers might ask them.

At the next pharmacy, clients are given both verbal and written information. They are told what to do and then it is written on the box of the drug. They are also asked if they are allergic to the antibiotic before dispensing. According to him the clients sometimes ask questions after information or instructions are given them. Clients sometimes ask questions like;

> *"Do antibiotics like alcohol can I take my alcohol before antibiotics or can I take this drug with alcohol." (Pharmacy respondent # 4)*.

At another pharmacy, information or instructions are given to only those who come without prescription. It is assumed that those with prescription had been to the hospital or a health facility and so the instructions and explanations have been done already.

> *"If it is on the prescription, I don't really do that because I think they're coming from the hospital and they know everything about the drug."(Pharmacy respondent # 1).*

A drug peddler confirmed that he does not give instructions to his customers who are mostly market women, because they are sometimes in a hurry when they are buying the drug. These are antibiotics that they buy regularly so they just pick the drug without any instruction.

> *"They mostly buy it without prescription because is like they have taken some before and the doctor told them to take this dosage, so they just come and mention the drug that they want then I just give it to the person." (Drug Peddler# 2)*

Sometimes they buy upon recommendation from a health worker who also gives them instructions on how to take it. Nonetheless, he sells chloramphenicol regularly to them and refers them to a pharmacy to buy other antibiotics he feels they are beyond his standard especially those with prescription from a doctor.

A respondent from a chemical shop said he tells his clients to eat before taking their medication especially antibiotics. He explained further that he gives verbal instruction first before he writes the same instruction on an envelope in which he puts the drugs. He feels most of his clients understand the verbal instructions better than the written.

> *"Most of them you write but they do not understand like 2, 3 times, 2, 4 times, 1, 3 times, they do see but they don't understand but orally it is explained that you take 2 in the morning, 2 in the afternoon and 2 in the evening. Then you have to make sure that you take your meal before taking it."(Chemical shop respondent # 2)*

At a health facility pharmacy, the dispenser ensures that he is dealing with the right patient so that medications and instructions are not given to the wrong person. He does this by calling the client by name. When the client responses, he first cross check if it is really the client. If he is not too sure, he asks for some other details in order to be sure that he is giving the drugs to the right person. He then explains how the drugs should be taken to the client. This is done drug after drug. He then asks the client to repeat instructions for each drug. Though the drugs are mostly labelled with instructions, clients are still given verbal instructions since it is not everyone that can read and understand.

"The medicines are clearly labelled with instructions. But it is not everyone that is literate. Even with the literate, reading and interpreting might be difficult. So it is always good to let the person repeat in order to know if the person understands it." *(Pharmacy respondent # 2)*.

At another health facility, the respondent stated that they give both verbal and written instruction which is written on an envelope. With the written instructions he normally asks patients especially the aged to seek help from others if they do not understand. He usually does not find out if clients are allergic to certain drugs because he feels it is the responsibility of the prescribers.

A chemical shop attendant stated that he does not give instructions or information to his customers.

"No, no I don't even give any verbal or written information. Like information on what?" (Chemical shop respondent # 3)

When he was asked whether he finds out if his clients were allergic to any drug, this was his response; *"No, no I have never done that." (Chemical shop respondent # 3)*

4.1.5 Mixing antibiotics with other medicine

Generally mixing antibiotics with other medicines depends on the patient's condition and the doctor's prescription. At a community pharmacy, the pharmacist affirmed he does not mix antibiotics with other drugs. He takes his time to advice clients according to their condition and what medication they need. For instance when people come to him with cough and they request for antibiotics he tells them they do not need antibiotics, they only need a cough mixture. However, another pharmacist at a health facility mixes antibiotics with other drugs if only the clients have been diagnosed of

illness that needs antibiotics and other drugs. Sometimes, patients need clarity on why so many drugs have been prescribed and therefore it is the duty of the pharmacists to explain the reasons. At another pharmacy, antibiotics were mixed with other drugs sometimes, especially with the cough mixtures and antimalarial drugs.

> *"It depends on the conditions of the patients, if you are having a respiratory tract infection they give you antibiotics if you are also having malaria they give you" antimalarial (chemical shop respondent # 3)*

4.1.6 Selling incomplete dose or overdose of antibiotics

Sometimes patients who go to the pharmacies and chemical shops do request for less or more of a particular antibiotic. Though some retailers claim they do not sell half dose or more doses of antibiotics. Some of the PRs affirmed that they deal specifically with the doctors' prescriptions. Nonetheless, the drug peddlers interviewed do so for various reasons.

> *"She will buy what her money can buy if you observe it very well you will notice that she will still be having some of the drug the time you meet the next market day and then she buys the rest of the drugs then it will make a complete dosage. That's what we do for them" (Drug Peddler# 1)*

Others are of the understanding that, it is dangerous to give incomplete doses of antibiotics and other medicines. They suggested part of the medication could be supplied if customers do not have enough money to purchase the full prescription.

> *'If it is twenty one and they haven't got the money, you let them know that oh okay you can supply them for 3 days to start with because you can't go home without medication but by the time that they come back and take the rest, by then they might have gotten the money, something like that or if there is an*

alternative that is the same medication right but that is cheaper. Then you can give them that one.'(Pharmacy respondent # 5)

A respondent admitted that he sells incomplete doses of antibiotics. He gives out according to the amount of money the customer has.

"We will give you what you can afford." *(Chemical shop respondent # 2)*

A respondent at a chemical shop indicated that it is a practice he does not indulge in, but he knows the drug peddlers do that. A drug peddler confirmed this with an explanation that, market women are mostly their clients and they usual request for incomplete antibiotics which they sell to them and he sees it as a favour for the women because that is what they can afford at that moment. He continued by saying they will buy the rest the next time they meet them and they sometimes sell drugs to them on credit.

"I credit them drugs maybe she bought some drugs that cost GH 5.00 but she tells you she has only GH 3.00 then the next market day, they pay the rest of the GH 2.00 left" (Drug Peddler# 2)

4.1.7 Return of unused drugs

At a hospital pharmacy, the pharmacist admitted that unused drugs like IV fluids and injections can be returned to the pharmacy and the money refunded to the patient if only he or she has been discharged. He wondered why a patient would return unused antibiotics because he or she is supposed to finish the course.

"Why would the patient bring it back? If it is an antibiotic you are supposed to finish the course." (Pharmacy respondent # 2)

"Let's say for instance someone comes to buy this infusion or injection and by the time they get to the hospital the relative has passed away as for that situation you have to take it because if the person sends it home he is not going to use it, so we collect it and keep it somewhere."(Pharmacy respondent # 4)

At another health facility pharmacy, respondent made it clear that the practice is mostly found amongst pregnant women and hypertensive patients, with the reason that they have enough of the same drugs at home. He also added that on no occasion have the drugs been accepted back.

"They do especially antenatal drugs they come they tell you we have a lot of this drugs in the house then you ask them why don't you take the drugs because you have been given thirty days and they will start given you excuses why they don't take the drugs."(Pharmacy respondent # 3)

A participant at a community pharmacy stated that returning of drugs is a practice they do not encourage even though cases to make reference to are rare. Another participant at a chemical shop who has never experienced that wondered whether it happens. He feels it is not a good practice since that may affect the efficacy or potency of the medicine. A drug peddler confirmed that he does not accept return drugs from customers.

"*So far as you come and buy and you have taken it to your house I can't take it because I don't know what happened in my absence but if you buy and in my presence you want to return it, I will consider by taking it."(Drug peddler #1)*

Another drug peddler explained that, customers never return unused drugs to him because he will not accept them. He said some customers sometimes tell him they did not take all the medicines, because they felt alright after taking part of the drugs. He mentioned that he advises such customers to continue with the drugs anytime they experience the same conditions for which they bought the drugs.

A participant at a chemical shop answered that, he has a notice at the shop that reads *'Drugs sold here are not returnable' (Chemical shop respondent # 2)*. So he does not accept unused drugs.

4.1.8 Expiry Date

Generally all respondents stated that they are aware of expiry dates and so they regularly check all drugs for their expiry dates. At a pharmacy, a participant said he checks the expiry dates on the medicines every week, thus at the weekends. He does that to identify the medicines that are closer to the expiry date. He has white stickers to identify those that are close to expiry dates. These medicines with the white stickers are checked from time to time, so they are taken out of the shelf and destroyed when expired.

> *"You have to check. It is either almost every week. You can't do daily but every weekend we do it" (Pharmacy respondent # 5)*

An interviewee at a pharmacy indicated that there is a routine check on expiry dates on drugs. She also added that it is the practice of their suppliers to come for expired drugs from them, but she added quickly that the practice is no more**.** Another pharmacy respondent declared that, they check the expiry dates of drugs.

"We don't sell, we have some here, it will expire next month but we've taken it out of the shelf, when it is one month we just take it out of the shelf. The pharmacy council do pass here all the time. They pass here to collect them and also when it is plenty and they are not here, we just take it to them. They have a way of disposing them". (Pharmacy respondent # 1)

In the case of a drug peddler, he has never experienced any of his drugs expired. He stated that, should it happen he will throw the medicines away or consult sanitary inspectors to dispose them.

The other drug peddler said he checks the expiry dates of all medicines he sells, because most customers assume that drug peddlers sell expired drugs. Customers also check expiry dates before they buy his medicines. According to him, he buys his medicines from a pharmacy and so he normally sends expired medicines back to them for replacement. A respondent from a chemical shop confirmed that suppliers take expired drugs back and replace them with non-expired drugs.

"Normally when it is about a month for the drug to expire I always inform my supplier and they ask me to keep what is left for exchange" (Chemical shop respondent # 2)

At a health facility pharmacy, the participant also mentioned that they remove all expired drugs from the shelves and just keep them till staff from the district health directorate come for them.

Additionally, a respondent from another health facility said he checks the expiry dates regularly. At the facility, they dispense old drugs when they have new drugs to avoid keeping them on the shelves for a long time. Also the expiry dates on the drugs are

double checked before issuing to patients. He however admitted that there have been cases where they had to discard drugs they found to have expired.

Largely, majority of the respondents did not know where and how expired drugs are disposed. Expired drugs are given to the suppliers for disposal.

4.1.9 Knowledge about Antibiotic resistance

All respondents have an idea of what the term **'antibiotic resistance'** means with the exception of a respondent from a community pharmacy and a health facility pharmacy who had challenge explaining it. Thus a community pharmacy respondent said she does not know what the term means. Even after an attempted explanation from the interviewer, she still could not figure out what it was.

The respondent from the health facility pharmacy struggled to explain the phrase but tried to put the two words together to attempt an explanation which she was not even sure of what she said.

> *"The body resist to the medicine or?" (Pharmacy respondent # 3)*

At the hospital pharmacy, the pharmacist has this to say;

> *"When a strain you think is sensitive to a particular drug then it gets to a time whatever infection or the strain not responding to that drug again, then we say the bacteria has developed resistance or the person has contracted the resistance"(Pharmacy respondent # 2)*

At another community pharmacy, the respondent stated;

> "*Antibiotic resistance is when you use antibiotics too much for a longer time, when you use it again it doesn't work". (Pharmacy respondent # 1)*

He related the caused to frequent intake of antibiotics that is not prescribed by a prescriber. He further explained that this may lead antibiotic resistance that is anytime antibiotics is used to treat any condition, it will not work as expected.

At another pharmacy, the respondent mentioned that, if the full course of antibiotic is not taken that can cause a resistance.

> *'Because you didn't take the full course and let say the bacteria, didn't directly die. Let me use the word die. It didn't kill all the bacteria in your system, you see because it is not the full course, what you do is that, you get use to the half whiles if you have completed it, the full course would have cleared them from your system. So they get immune to it and once that immunity comes in, the next time you go in for the full course, you take it, it doesn't work.' (Pharmacy respondent # 5)*

A drug peddler's knowledge about antibiotic resistance is that it occurs as a result of continuous intake of antibiotics. In his opinion, this may affects the liver and can even results in death.

> "*When you continually take antibiotic and it no longer works for you or cure that particular illness*". *(Drug peddler #1)*

The other drug peddler seems to agree with him, he says, frequent use of antibiotics can results in antibiotics resistance, according to him abuse of antibiotics can lead to antibiotics resistant.

> '*We abuse the drugs and at long run it will lead to antibiotic resistance and death' (Drug peddler #2)*

A participant at a chemical shop was of the same view that people who abuse antibiotics experience antibiotics resistance.

> *'It is those that have being abusing antibiotics in the sense that somebody may be having just headache they still go for antibiotic that's amoxicillin, every corner you can get antibiotics so when the drug gets used to the system is like it doesn't work again'.(Chemical shop respondent # 2)*

The last but not the least response to this theme also touched on abuse of antibiotic being the cause of antibiotic resistance.

> *"like you have a problem which you need not use antibiotics and you used it, at the end of the day when you're suffering from the same condition, a problem which antibiotics is needed to be used it will not take effect because you have already abused the antibiotics drugs"*(*Chemical shop respondent # 3)*

4.1.10 What step should be taken for proper use of antibiotics?

In general, the responses focused mainly on educating community members on proper use of antibiotics. The education must emphasize the importance of seeing a doctor to diagnose and prescribe antibiotics before usage. They should not just go to the pharmacy to buy any antibiotics of their choice. They must take the full course of antibiotics according to prescription. A pharmacist at a health facility suggests that the regulatory agencies should find means of stopping the chemical sellers from stocking their shop with antibiotics because they do not have much knowledge about the drugs. Education on proper antibiotics usage could be done through the media, posters and workshops facilitated by pharmacists. There was a suggestion on in-service training for health facility staff who dispense antibiotics. Other suggestion for channels of education include drama on radio and TV and education at the various hospitals. People

who sell drugs can be given training on how to administer and use antibiotics. Other places mentioned that education can take place include durbars, cinema, schools and churches.

> *"First of all I think a lot of abuse takes place in the community so people shouldn't have access to antibiotic so easily without prescription*" *(Pharmacy respondent # 2)*

> *"You see the doctor, let the doctor diagnose and prescribe it, aha and once you've been given you can take it." (Pharmacy respondent # 5)*

> *"Through public communication, through radio, the media, yeah even house to house can even be possible."* (*Chemical shop respondent # 2)*

According to a drug peddler, the best way to inform people about proper use of antibiotics is the use of an information van by health workers to go round the communities educating the populace especially the market women on the proper use of antibiotics. A respondent at a chemical shop agreed with the involvement of the community members. He also suggested community sensitizations as the most effective way of educating people on the use of antibiotics. He added that it will be more participatory compared to radio and television. He proposed that the sensitizations could be done in various languages for the people to understanding it better.

> *"Like what we are doing now and if you can come with information van then inform us on the usage of drugs. If the market women get this information, the*

selling of the drug will be easy for us because they already know the reason for buying the medicine"(Drug peddler #2)

"We normally hear you on radio but most of us don't listen to radio so if you come with an information van to a vantage place like the market then you will be giving information on some common drugs"(Drug peddler #1)

4.1.11 Rules and regulation for selling antibiotics

Majority of respondents are aware there are rules and regulations regarding the sale of antibiotics. Respondents stated that organizations such as the Food and Drugs Authority (FDA), Standard Board and the Pharmacy Council in charge of the rules and regulations. Their specific roles so far as the rules and regulations are concerned could not be specified. A pharmacy respondent stated that one of the rules is to see a prescription before selling antibiotic to a customers. He further stressed that, this should be the main regulation. The opinion of another pharmacy respondent was that if this rule is to be enforced it could affect their businesses since most of their customers come to buy without prescription. In his response, a third pharmacy respondent on this same issue of prescription before dispensing an antibiotic, affirmed it is a challenge to the business because without prescription he refuses to sell antibiotics to customers which makes them angry. He certain most drug sellers know the rules of selling antibiotics because it is part of their training but do not adhere to it.

He then narrated an encounter that gave him an impression that others do not follow the rules. He said, "*Somebody was having measles or something of that sort and I told her to go to the hospital. She said ok, in the evening she sent someone to come and buy the drug for her, but the way she describes what is happening, I said go and call the person and come, when she came and I was asking them, the one who followed her here said*

let go elsewhere and we will get some to buy and then they left" *(Pharmacy respondent # 1)*

He emphasized that the pharmacy council must check on them regularly. His fear is that if he strictly complies with the rules in selling antibiotics, customers will refuse to buy from him and go to other retailers who will sell antibiotics to them without prescription. This will not only affect his business but antibiotic resistance which is a public health problem will increase.

According to a drug peddler, he knows there are rules and regulations for selling antibiotics, but not all PRs know them. Moreover, the people who know the rules and regulations do not practice them. He believes the regulations are only strict on the chemical sellers who have license to sell medicines but not the peddlers. Since the licenses of the chemical sellers could be taken from them if they do not abide by the rules and regulations.

> "*There is no law to deal with anyone who sells medicine but they do regulate those that have the licenses*" *(Drug peddler #1)*

Both drug peddlers interviewed seem to believe they are not under the rules and regulations binding the sales of antibiotics. The second drug peddler does not know of any regulations on the sale of antibiotics. He considers the type of antibiotics he sells as very common and are not harmful to use. He confirmed if rules are being enforced on the sale of antibiotics, he will make no sale from his business, since people will no longer buy from him.

"*Owners of chemical shops and pharmacies know these regulations, they were not to sell drugs without prescription, but now they sell drugs without prescription because their interest is to make money*". *(Drug peddler #2)*

He recognizes the Ghana Health Service as responsible for checking if these regulations are followed, but he thinks the they are not doing effective follow ups, because most people who sell drugs do not follow any regulations, they sell for money. He suggested that, laws regarding the sale of antibiotics must be enforced through educating the public on the importance of getting prescriptions of antibiotics from doctors.

A pharmacy respondent stated that drugs are classified, and chemical sellers are not to stock the class of antibiotics, they are not allowed to stock though there is no policy about that yet, the policy is still in the draft stage. He see the chemical sellers as not knowledgeable to dispense antibiotics.

He mentioned the standard treatment guideline that shows how a condition should be managed, which drug can be used and those that are the national standard in the management of infections or conditions being it bacterial infection or any other condition. He stressed that there is no policy on antibiotic use and resistance. So for now the guideline is what can be seen to be close to a policy on the use of antibiotics.

"That's why I said they don't, they don't have adequate information. They are not knowledgeable enough to even give them out, some might not even know the dosage, the duration, the condition of which these antibiotics can be used yet they are handling them" (Pharmacy respondent # 2)

4.2 Discussion

In Africa and other LMICs, antibiotics are acquired through community pharmacies and chemical shops and sometimes through other vendors and drug peddlers. Community pharmacies are regularly perceived as the first point of contact with health care. In these countries community antibiotic use is high, causing risk of development of community antibiotic resistance. The deprived health care delivery structures in LMICs influence people to rely on community pharmacies for treatment without looking for medical discussion (Horumpende et al., 2018).

The main objective of the study was to explore the knowledge, attitudes and perceptions of antibiotics retailers' with regard to antibiotic dispensing in the Shai-Osudoku district in the Greater Accra region. The study was conducted in a context where pharmacies and drug shops are commonly the first line of health care in rural communities in most developing countries including Ghana, where there are inadequate private or public health facilities. These facilities are operated by PRs such as pharmacists and Licensed Chemical Sellers (LCS) who render services to their clients including the dispensing of antibiotics. Though the Licensed Chemical Sellers (LCS) are not permitted by law to sell antibiotics, they contribute expressively to the delivery of healthcare, including the illegal sale of antibiotics. Similarly, drug peddlers sell antibiotics illegally in the communities and market places as the LCSs do but the difference is that their practice of selling medicines in general is illegal by law in Ghana.

In Ghana, extensive variety of antibiotics is accessible on the open market, and buying drugs over the counter is a very common practice (Afari-Asiedu et al., 2018). Though the Pharmacy Act, 1994 (Act 489), prevents LCS from selling and dispensing Class

A/prescription only medicines, and B Class /pharmacy-only medicines including antibiotics this practice occurs in most licensed chemical shops in the country. From the analysis, two main findings occurred. First, interview results clearly stated that, antibiotics were improperly dispensed. Second, information appropriate for dispensing and instruction for taking antibiotics was mostly not done right or not done at all.
The outcomes of this study evidently confirmed that antibiotics could be effortlessly acquired and sold without presenting a medical prescription to the pharmacist.

Findings from the study showed that, antibiotics are used to treat infections which include bacterial and fungi infections. Though the results indicated that antibiotics are required for the treatment of specific conditions, there was an explanation that there are various types of antibiotics for different conditions. However, the broad spectrum which treats all kinds of infections is the most dispensed or sold. Similarly, Stacy explained that antibiotics also known as antibacterial combat infections caused by bacteria through killing or reducing the growth of bacteria. She further stated that there are many classes of antibiotics. Some types of antibiotics work best for particular types of bacterial infections (Sampson, 2018). A study conducted at the University of Leicester found that Antibiotics are molecules that destroy or impede the growth of bacteria and are used to treat bacterial infections (Leiscester, 2019).
This study found that antibiotics are used to treat patients with chronic diseases who do not respond to other regimen. Antibiotics turn out to be lifesaving medication in such situations. Similarly, a study conducted in Ethiopia stated that, antibiotics are essential drugs, mainly in the developing world, where infectious diseases are a common cause of death (Damisie et al., 2019). According to this study, the commonest antibiotics sold by respondents are Ampicillin, Amoxicillin and Chloramphenicol. In a previous study

antibiotics such as amoxicillin, ampicillin, cephalexin, tetracycline and chloramphenicol were reported as the best-selling antibiotics in the vicinity (Nguyen et al., 2019). Another study also revealed that amoxicillin was the most regularly used antibiotic. Additionally they stated that it might clarify the fact that amoxicillin is well-known and easily accessible as compared to other antibiotics. (Ateshim et al., 2019).

The results of this study clearly demonstrated that, clients are mostly given instructions on how to take antibiotics at the pharmacies and chemical shops. These instructions are both written and verbal and are given whether drugs were dispensed or purchased with or without prescription. Results from the study indicates that most of the clients understand the verbal instructions better than the written. Instructions given to clients are generally about how, when and how long to take it. Usually clients are told to eat before taking their medication especially antibiotics. However, the drug peddlers interviewed do not provide any information to their clients. They assumed their clients buy the same antibiotics all the time so they know what to do. According to our study participants, clients are sometimes asked if they are allergic to an antibiotic before dispensing it to them. However, clients are not given any information on side effects. Usually, those with prescription are not asked about allergies with the impression that the prescribers might ask them. Some dispensers do not find out if clients are allergic to certain drugs because they feel it is the responsibility of the prescribers. Similar to the findings of this research, another study also had most of the retailers interviewed not informing their clients about antibiotic side effects and potential drug allergies (Horumpende et al., 2018). In Addition, a study conducted in Southwest Ethiopia similarly found that none of the pharmacy professionals who participated in their study enquired about previous history of drug allergy (Damisie et al., 2019).

Occasionally patients request for less or more of a particular antibiotic at the pharmacies and chemical shops, though some retailers claimed they do not sell half dose or more doses of antibiotics. Some of these PRs affirmed that they deal specifically with the doctors' prescriptions and consider it dangerous to give incomplete doses of antibiotics as well as other medicines. This is to explore participants' attitudes towards dispensing antibiotics, and to identify whether customers request for incomplete dose of antibiotics, this is similar to the assessment of participants' attitude towards dispensing of antibiotics in a study conducted in 2019 (Irawati et al., 2019).Nonetheless, the drug peddlers interviewed declared that they do so for various reasons including clients not having money to purchase the full course of antibiotics and the fear of losing their customers. They sell according to the amount of money the customer has and recommend that the remaining medication could be bought later when customer gets money. Another reason to deliberate on as the results of our study is compared with another study conducted in Egypt that clarified the high dispensing disparity between PRs is the populace's attitudes concerning antibiotics and the role that PRs play in dispensing antibiotics.

According to the interview results of both studies, PRs considered clients' perceptions about antibiotics which is one of the main factors contributing to antibiotic misuse and subsequent antibiotic resistance. A study conducted in 2019 stated that PR often attribute non-prescription dispensing of antibiotics to the fear of failing to satisfy their consumers' demands and therefore losing their clients (Abdelaziz et al., 2019). The results of this study indicated that most PR dispense drugs including antibiotics to their clients mostly depending on the request of the clients and not according the dispensing regulations of the pharmacy council. Therefore, it is necessary to train the PR to acquire the needed skills for dispensing drugs. Similarly a study conducted in Tanzania also

stated that Pharmacy staff require constant basic training in dispensing skills (Horumpende et al., 2018).

This study examined retailers' knowledge on expired antibiotics since it is important the clients receive potent drugs from PRs or dispensers. Subsequently a law was passed in 1979 by the U.S. Food and Drug Administration (FDA) to ensure that drug manufacturers compulsorily stamp an expiration date on their products. This is the date that assures the manufacturer and the consumer of the full potency and safety of the drug (Gannon, 2019; Publishing, 2019). According to the results of this study, awareness of expiry dates among respondents was high and was frequently checked. Discussion with some the PRs indicated that this is done on weekly basis by differentiating antibiotics closer to expire dates from the others. These drugs are taken out of the shelf and disposed when expired. Most customers assume that drug peddlers sell expired drugs, however the results showed that drug peddlers check the expiry dates of all medicines they sells regularly. Expired drugs are disposed personally by discarding the drugs themselves or consulting sanitary inspectors to dispose them. Contrary to this study, another study found that left over antibiotics are kept in homes of consumers for months which eventually expires but are used when needed (Loria, 2018). It was clearly confirmed in the findings that PRs mostly do not dispose expired drugs themselves, they rely on their suppliers to do that. Majority of the respondents did not know where and how expired drugs are disposed. They were not aware of any established procedure by the Pharmacy Council or Food and Drugs Authority. All they do is to push expired drugs to their suppliers to deal with it. On the other hand a study conducted in Ethiopia on unused and expired medicines found that expired and damaged medications were discarded by a procedure arranged according to the disposal

guidelines established by the Ethiopian Food Medicine and Healthcare Administration and Control Authority (FMHACA) (Ebrahim& Teni, 2019).

This study found that customers go to PRs without prescription to describe their illness and request specifically for the type of antibiotic they want or just mention the antibiotic without their symptoms. Others go to the pharmacies or chemical shops after a phone call consultation with their doctors who instruct them on which antibiotic to buy. They sometimes buy upon recommendation from other health workers who also provides instructions on how to take the antibiotics. Similarly, Alhomoud et al in their study found that, clients call family members who are healthcare professionals to seek their knowledgeable opinions when they had issues concerning the precision of their self-diagnosis. This was perceived as a less-time spent and stress-free method than consulting a physician (Alhomoud et al., 2018).This finding shows an improper antibiotic dispensing practice which dispose the community to challenging drug side effects and community antimicrobial resistance. This study detected financial difficulty as a major reason why clients patronize the services of PR since they sell incomplete antibiotics to them if they do not have enough money to purchase the full course or sometime sell drugs to them on credit basis. Correspondingly to our study, findings from a research conducted in Tanzania indicated that incomplete doses of antibiotics were dispensed in virtually all encounters of the study. It was expected that the dispensers would decline dispensing an incomplete course of antibiotics. However, they ensued to dispense incomplete doses of antibiotic (Horumpende et al., 2018). On the other hand, another study had clients utilizing the services of PR due to extensive waiting period for consultation and effort in receiving appointments as obstacles that discouraged clients against the benefits of visiting a doctor for superficially simple and common infections. The participants stated that they would contact a physician in case

of emergency circumstances or critical situations (Alhomoud et al., 2018). According to the findings of another study conducted in Vietnam which is similar to this study, the worry of losing customers and the hunger for profit, as well as the untimeliness of getting a prescription are the main specified drivers for dispensing antibiotics without prescription (Nguyen et al., 2019).A study conducted in Cameroon stated otherwise by indicating that, self-medication could be acceptable when it is specified by a health worker since, it reduces the risks and dangers related with it, and it is seen as a responsible self-medication (Ekambi et al., 2019). The results of this study is similar to another study in Tanzania where inappropriate antimicrobial intake provided an insight on lack of practical knowledge in the practices of retailers dispensing antibiotics in community pharmacy situations. Comparable to other studies, this study exhibited a poor quality of community pharmacy practice due to non- prescription dispensing of antibiotics, lack of instructions on how to take antibiotics and not clarifying side effects to clients (Horumpende et al., 2018). Respondents declared that, clients sometimes act upon recommendations from friends or family members who have had similar experiences. At the markets the women regularly purchase antibiotics and so they just mention which antibiotic they need depending on their symptoms and they could do same for their children and other relatives. Prescriptions are not involved in all these which is an act of self- medication and could result in antibiotic resistance. In another similar finding, self-medication is described as the usage of drugs to treat symptoms or illnesses recognized by the users without prescription, or the recurrent or continued use of a medicine prescribed by a physician to treat recurring or chronic symptoms or illnesses of the user or their family members, especially children or aged (Vasquez& Ruiz 2019). Both studies have previous medication use and recommendation from relatives as some of the reasons for purchasing drugs without prescription.

4.3 Study strengths and limitations

This study investigated the knowledge, attitude and perception of PRs towards dispensing of antibiotics to community members. Though, it is illegal by law for drug peddlers to sell medicines in Ghana, community members especially in rural communities patronise their services. Due to the illegality of their services, drug peddlers are hesitant to participate in research-related interviews. Therefore to have two drug peddlers consent to participate in this study is a strength of the study.

The knowledge of PRs on antibiotics in general as well as expired antibiotics was examined. However, the perspectives of the populace they serve and the policy makers are not represented in this study which is a limitation to the study.

4. 4 Implications of findings

4.4.1 Implications For theory

The results from this study replicate the principles of the theory of structuration, which recognises the connection between individuals and the social structures that outline our social actuality. Acquisition of antibiotics at the community level is subjective by an interchange of structural and individual contextual factors. Regulations are in place at the structural level, to restrict suppliers of antibiotics, such as LCS place from selling antibiotics (apart from cotrimoxazole) and the drug peddlers who are not allowed by law to sell not just antibiotics but all medicines in general. Conversely, at the community level antibiotics are sold since the community demand for antibiotics is high. The Pharmacy Council and other related shareholders are encouraged to thoughtfully train specially the LCS at the community level to dispense some fundamental antibiotics in a way that will improve their safe usage. If the regulations are not amended, LCS will continue to sell antibiotics secretly to the populace, thereby

encouraging harmful use of antibiotics and eventually, resistance to antibiotics. Training LCS to dispense antibiotics would include a collaborative and contextualized method that would create the transformations in demands of regulation and the community acquisition to antibiotics. The Pharmacy Council through this method will achieve its commission of attaining the highest level of pharmaceutical provision in Ghana, whereas guaranteeing the accessibility of capable pharmaceutical care providers who practice approved standards and are available to serve the entire population.

4.4.2 For public health practitioners or clinicians

Antibiotic resistance is a public health problem that needs a collaborative effort of all stakeholders including both the public health practitioners and the clinicians to be resolved to improve on proper access and use of antibiotics. This study recognized a gap between the Pharmaceutical retailers' knowledge and attitude in dispensing antibiotics. This study also found that clients walk to PRs without prescription to explain their illness and request specifically for the type of antibiotic they need or just mention the antibiotic without their symptoms. This is a clear evidence of an attitude of inappropriate antibiotic use in the community which disposes the community to challenging drug side effects and community antimicrobial resistance. This could be avoided if the collaboration between healthcare providers and the PRs is strengthened. The results indicated that healthcare providers including doctors interact with patients verbally, sometimes through phone calls and instruct them to buy antibiotics without prescriptions. Therefore, it is necessary to create awareness through campaigns with the intention of drawing the attention of healthcare providers both public health practitioners and clinicians**,** the PR as well as community members about the health

implications of inappropriate antibiotic use and subsequent antibiotic resistance. The messages must be sketched in an easy-to-understand presentation, with content on the important health situations where antibiotics are abused. Studies have shown evidence of effective public campaigns to improve community antibiotic use in other countries (Nguyen et al., 2019). The campaigns should focus on clinical issues such as microbiological factors and how they occur as well as behavioural science and social promotion ideologies and methods. The campaigns should include in- service training for public health practitioners and clinicians on acquisition and usage of antibiotics with prescription.

Lack of recommended health training contributes to improper medication dispensing, which is specifically dangerous for antibiotics. In view of this, PR should be included in some of these trainings to bridge the gap between healthcare providers and the PRs regarding administration of antibiotics to the populace.

Since antibiotics can be obtained without prescription in the study area and most communities in Ghana especially the rural communities, research on effective approaches to limit unrequired antibiotic use should focus on doctors', pharmacists', LCS' and patients' knowledge and behaviours. Consequently, targeting the knowledge gap and employing various behaviour change interventions are likely to be effective. For instance, findings from a study indicated that, Malta has introduced an European Antibiotic Awareness Day as a determination to increase knowledge and awareness between the Maltese public, prescribers and pharmacists, to certify that regulations are enforced (Alhomoud et al., 2018).

4.4.3 For future research

Future studies must investigate the qualifications of PR and dispensers in general which this study did not critically look into detail. Furthermore other studies could as well

examine pharmaceutical retailers' knowledge on the effects and significances of antibiotic non-prescription practice. Also it's necessary to determine the perception of policy makers for a general assessment on how to meet the demand for antibiotics at the community levels especially the rural communities in Ghana, whereas concurrently ensuring that access to and use of these drugs is improved and safe. Furthermore, future research is also needed to estimate the economic consequences of such interventions for justifiable results

Further studies will be required to explore the reviews of the populace and perception of policy makers for a holistic view on the practice of dispensing antibiotics to community members in the Shai Osudoku district and Ghana holistically.

Chapter Five

3.1 Summary

Unsuitable use of antibiotics is a leading public health challenge in many Low and Middle Income Countries (LMIC). Various categories of PRs comprising of health facility and community pharmacists, dispensary technicians, licensed and unlicensed chemical sellers and drug peddlers are involved in the sale of antibiotics. Though licensed and unlicensed chemical sellers and drug peddlers are not supposed to sell or dispense antibiotics by law, they hide to sell which is a contributing factor of inappropriate use of antibiotics and a subsequent increase in antibiotic resistance.

This study assessed the knowledge, attitude and perception of PRs in dispensing antibiotics since they play a key role in dispensing medicines including antibiotics. Individuals habitually obtain antibiotics from both legal and illegal private providers without prescription. The PR render their businesses in the communities and at the market places making acquisition of antibiotics with or without prescription easier for their clients. This may lead to improper antibiotic accessibility to the community which has been recognized to be among the causes of antimicrobial resistance occurrence. Nevertheless, most participants were knowledgeable about the types of antibiotics and the conditions they treat, though they sell more of the broad spectrum antibiotics. These retailers may have inadequate training, understanding and abilities to operate in their field of work. They are aware of the rules and regulations but do not adhere to them. They are mostly prejudiced by monetary incentives to sell antibiotics and to conform to customer demands and prospects rather than the law.

According to the Health Professions Regulatory Body Act, 2013 (Act 857), in Ghana those who qualify by training to prescribe registered antibiotics are medical doctors, physician assistants, midwives and nurses. Furthermore, the Pharmacy Act, 1994 (Act 489) comprises relevant sections on dispensing and sale of medicines, including antibiotics. According to section 31 of the Act, '*no person shall do a business of supplying from any premises restricted drugs classified by regulations as class A drugs/prescription only medicines, class B drugs/pharmacy only medicines or class C drugs/over the counter medicines, unless that person has a valid general or limited license'*(Afari-Asiedu et al., 2018).Majority of medicine outlets in rural communities in Ghana are Licenced Chemical Sellers (LCS, over-the-counter medicine sellers), who are generally the first point of contact for healthcare. Section 29 of the Pharmacy Act, clearly constrains these LCS from selling class A and B medicines including antibiotics, excluding oral Cotrimoxazole which is generally in suspension and normally dispensed for the treatment of infectious diarrhoea, urinary tract infections and upper respiratory tract infections(Afari-Asiedu et al., 2018).A study conducted in Uganda showed that, Uganda has a drug dispensing regulation which is similar to Ghana that authorises drug shops in Uganda to sell class-C drugs (over the counter) that do not need prescription. Nevertheless, they are not accredited to sell antibiotics (Mbonye et al., 2019). The regulations from both countries thus, Ghana and Uganda highlight the significance of compliance with regulations by LCS, and the consequences it has for the safety of patients who patronize their services.

It is not only LCS and drug peddlers who violate the regulations, some community pharmacists also did not follow the rules and regulation. A study conducted in 2018 reported that, patients can purchase antibiotics from community pharmacies without a doctor's prescription, this is done both by requesting the drug by name or by just

clarifying the symptoms to the pharmacists (Mahmoud et al., 2018). Pharmacists alleged that demands for precise antibiotics by name and financial concerns were worthy reasons to easily dispense antibiotics without prescriptions.

This could be as a result of the pharmacists' lack of knowledge and lack of enforcement of the regulations. Nevertheless a limited number of pharmacists recognized that lack of regulations is a leading cause to irrational use of antibiotics (Mahmoud et al., 2018) Some of the PRs in our study had very limited understanding of antibiotic resistance, leaving just a few who could rightly define the term antibiotics resistance. All of them stated that sometimes they dispensed antibiotics without a prescription. The drug peddlers who mostly have market women as clienteles were pressure to provide reduced medication courses to them when they do not have enough money. They regularly dispensed a day or two days' worth of antibiotics to these women and the rest would be purchased on the next market day if they have money. The results of this study is really a wakeup call for a massive and intensive campaign to educate healthcare providers, PRs and the general public on prescription, acquisition, dispensing and use of antibiotics.

5.2 Contribution and Conclusion

In conclusion, this study highlights on the knowledge, attitude and perceptions of PRs in the Shai Osudoku district in Ghana. Access to antibiotics in the population is subject to an interplay of several factors. Regarding structural factors, regulations are in place to restrict PRs such as chemical sellers from selling antibiotics not to mention drug peddlers who must be stop since their services may cause harm to the people who patronize their services. However the findings from this study indicates that such regulations are not implemented effectively in the study area. The Pharmacy Council

and other related stakeholders are encouraged to reflect upon training chemical sellers within the study area and Ghana as a whole in the sales and dispensing of antibiotics in a way that will improve the safe use of antibiotics. Without effective implementation of this interventions, chemical sellers and drug peddlers would continue in the undiscriminating sales of antibiotics, in this manner by promoting unsafe use of antibiotics, while the problem of antibiotic resistance will continue thriving.

The results highlights the relations between antibiotic retailers and consumers in the community and discoveries promising targets for interventions. These findings can assist the government, policy makers and public health professionals to detect suitable intervention approaches to improve the administration and use of antibiotic in the community. Significant strategies that might be operational are law enforcement by the pharmacy council, uninterrupted medical education of pharmacy personnel at both facility and community levels, and behavior change campaigns that improve social promotion ideologies and methods that target the entire country. Furthermore, future research is also needed to estimate the economic consequences of such interventions for justifiable results.

5.3 Recommendation / Future work

The study documented an extensive antibiotic dispensing practice from community pharmacies and drug stores and the drug peddlers without prescription. The free availability of antibiotics might lead to improper antibiotic use, a predisposing factor for antibiotic resistance. The study identified feebleness in antibiotic dispensing which disclosed that retailers neither give instructions for the intake of antibiotic nor do they explain side effects. I therefore recommend a form of health education campaign to healthcare providers, retailers and the public at large. Another misconduct observed

during the interviews was the absence of observing prescription while dispensing antibiotics. I recommend consistent check-ups by the Pharmacy council and the FDA at community pharmacies and drug stores to check adherence to prescription as well as antibiotic dispensing policy and practice. PRs may not adhere to prescription only policy on antibiotics due to their hunger for profit. There is a critical need to initiate a training programmes among clinicians who prescribe antibiotics in order to reduce the capacities of antibiotic intake to alleviate the risk of increase of community antimicrobial resistance.

Prescribers must be indulged to follow national guidelines for antibiotic prescription. Pharmacists working at the health facilities and community pharmacies as well as pharmacy and chemical shop owners are accountable to adhere to rules and regulations governing antibiotic dispensing. In- service trainings on job and other professional to drug dispensers in general must be consistently highlighted.

Future studies must investigate the qualifications of PRs and dispensers in general which this study did not critically look into detail. Furthermore other studies could as well examine pharmaceutical retailers' knowledge on the effects and significances of antibiotic non-prescription practice.

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Appendix

Appendix F. Study information_supplier_in-depth interview

INDEPTH ABACUS study. Community-level antibiotic access and use in low- and middleincome countries; finding targets for social interventions to improve rational antimicrobial use.

Dear sir / madam,

The Dodowa HDSS in collaboration with the INDEPTH network is conducting a study on Antibiotic access and use with the aim to improve rational antibiotic use. We would like to inform you about this study.

Purpose: The aim of this study is to compare the use of medicines between 6 countries in Africa and Asia. It is important that medicines are accessible and properly used by all people living in these countries. **This is important in the case of antibiotics, to avoid the risk of the development of antibiotics resistance.** The INDEPTH ABACUS study will give us a snapshot of the current situation, and it will also tell us how to improve things in terms of supply and use of medicines in your community.

Invitation: We invite you because you supply medicines to the community that we study. We feel that your experience will be useful in understanding more about the supply and use of medicines in your community.

Method: If you are interested in joining this study, we will have an in-depth interview. The interview is about your daily experiences with the supply of medicines to customers. **It will take about 60 minutes,** and will be audio recorded. If you do not

want the interview to be audio recorded, alternatively you may consent with a written report. The interview will be held at a time and place that provides sufficient privacy, and is agreed upon by you and the researcher.

Risks and benefits: The interview could raise practices that may not be considered appropriate or legal. The study staff will not take action and will not interfere with your daily practice, regardless of what practices are encountered in the study. The audio recordings will be safely stored and will not be identified with you or your outlet. Your information will be kept strictly confidential, and will not be shared with people outside the research group. The results of this study will only be available for scientific and public health purposes. **The data collected will be stored for future use. However, ERC approval will be sought for such future use.** Your outlet will not be named in any publication. **The associated risk of participating in this study is minimal.** Although there are no direct benefits for you from being in the study, we anticipate that your input will help to improve the supply and use of medicines in the future.

Basics: You are free to choose if you want to take part in this study. Also, you can withdraw your consent at any time without further explanation, and without any adverse consequences. This project has been reviewed by, and received ethics clearance through, the Ghana Health Service Ethics Review Committee and the Dodowa Health Research Centre Institutional Review Board. This project is funded by the Wellcome Trust.

Your involvement in the INDEPTH ABACUS study is greatly appreciated. If you are happy to take part in the study, please read and sign the attached consent form. Thank you,

Dr Margaret Gyapong

Local Principal Investigator,

Dodowa Health Research Centre, Dodowa.

P.O. Box DD1

Tel. 0501336170

If you have a concern about any aspect of this project, please speak to the relevant researcher (0501336171), who will do his/her best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how he/she intends to deal with it. If you remain unhappy or wish to make a formal complaint, please contact the administrator of the Ghana Health Service Ethics Review Committee (using the contact details below) or the Study PI who will seek to resolve the matter expeditiously:

Dr Margaret Gyapong	Ms. Hannah Frimpong
Dodowa Health Research Centre	Ghana Health Service
GHS	GHS
Box DD1	Box 184
Dodowa	Accra
Tel 0501336170	Tel 0243162034

Appendix G. Informed consent_supplier in-depth interview

INDEPTH ABACUS study. Community-level antibiotic access and use in low- and middleincome countries; finding targets for social interventions to improve rational antimicrobial use.

Purpose: The aim of this study is to compare the use of medicines between 6 countries in Africa and Asia. It is important that medicines are accessible and properly used by all people living in these countries. **This is important in the case of antibiotics, to avoid the risk of the development of antibiotics resistance.** The INDEPTH ABACUS study will give us a snapshot of the current situation, and it will also tell us how to improve things in terms of supply and use of medicines in your community. **The in-depth interview will take about 60 minutes.**

Researcher: Dr Margaret Gyapong,

Local Principal Investigator,

Dodowa Health Research Centre, Dodowa.

P.O. Box DD1

Tel.0501336170

To be completed by participant

x The information letter has been read out loud to me or I have read the information letter. I have been given the opportunity to ask questions, and received satisfactory answers.

x I understand that this project has been reviewed by, and received ethics clearance through, Ghana Health Service Ethics Review Committee and the Dodowa Health Research Centre Institutional Review Board. x I understand that my participation is voluntary, and that I can withdraw my consent at any time without further explanation, and without any adverse consequences.

x I understand that this study involves an interview about the supply of medicines to customers.

x I understand that the interview will not be identified with me or my outlet. My information will be held strictly confidential, will not be shared with people outside the research group, will be stored safely, and will be destroyed 5 years after the interview.

x I understand that only group results, and not my individual results, will be available for scientific and public health purposes.

x I understand that there is no direct benefit for me from being in the study.

x I understand how to raise concerns or make a complaint. x I agree to take part in the study.

x I consent with audio recording *(tick what applies):* ⑤ Yes ⑤ No

Name of participant:……

Date (dd/mm/yyyy):……/……/20……

Signature: ……

Thumbprint: 

To be completed by field worker

x I declare that I have explained the study and its implications to the participant. He/she has understood the explanation, and provided his/her consent to participate.

Name of researcher:……

Date (dd/mm/yyyy): ……/……/20……

Signature:……

Participant study code: ……_..... [study site]_[antibiotic supplier]

Appendix H. Preparatory supplier in-depth interview guide

We need to be sure that we include the full range of the different types of antibiotic suppliers in the sample (licensed and otherwise), as identified in the mapping exercise in each HDSS. We should also include in the sample employees who work directly with customers.

In order to ensure that these interviews produce good insights, the interviewers will need to have a good background understanding of their country's regulations on antibiotic sales. This will need to be included in their training.

Informant data: Age, sex, location and type of business, length of time in the business (total and at current business), position in business.

The medicines

1) Please tell me briefly about the range of different medicines that you sell. Which are the popular ones?
2) What is/are the source/s of the various medicines that you sell? Do your suppliers bring the medicines to your shop, or do you pick them up yourselves from your suppliers?
3) What informs your decision to buy from the suppliers that you have mentioned? (Probe for details of quality, cost, credit facilities, packaging, incentives, etc.)
4) What are your experiences with getting your supply of different medicines? Probe regarding availability/shortages etc., for different categories of medicines:

    i. Anti-malarials ii. Painkillers iii. Cough medicines iv. Antibiotics

v. Haematinics vi. Any others

5) Where do you think the medicines you sell are manufactured? What are your impressions about the quality of the medicines from different origins? Are certain origins more popular than others?
6) From where do you receive information/learn about the different medicines that you sell? *[Probes: Do you feel you have enough information, or are there certain medicines that you would like to know more about? What would be the best way for you to learn about these medicines?]*
7) Which medicines do you usually sell to people who have coughs and colds? What determines the length of the course that you supply?
8) What do you know about antibiotics? Explain. What proportion of all the medicines that you sell are antibiotics? Which are your five most commonly sold antibiotics?
9) For which illnesses do you usually sell antibiotics? What determines the choice of antibiotic?
10) How and where do you store your antibiotics?
11) Do you check the expiry dates on the antibiotics you sell? What do you do with drugs that have passed their expiry date?
12) Do customers ever bring back unused drugs? If so, what do you do with them?

The customers

13) Can you describe one of your recent dispenses for me? How does this go?
14) Do many of your customers ask for particular medicines without any prescription

(*either* through self-medication, *or* on verbal recommendation of health workers)? Is

there a certain sort of customer who does this (e.g. male, female, young, old), and what are the most common conditions that they treat on this basis? Do they ask specifically for antibiotics?

15) Do you ever feel encouraged to sell your customers antibiotics that you think maybe they don't need? If so, is this encouragement perhaps related to your customers or to your suppliers? How do you respond to such situations? Details.
16) Do you ever give any sort of information (verbal or written) to your customers about the antibiotics that you sell them? What information do you give? Do they ever ask questions? Examples. *[Probe: do you ever ask about allergies?]*
17) Do your customers ever voice any concerns about the various medicines you sell? Details?
18) Are you aware of any medicine sellers in this area who *either* sell incomplete doses of antibiotics *[probe: if, for example, a customer doesn't have money for the whole dose. Or for any other reason.], or* who sell more antibiotics than are needed *[probe: for future use]?* Is it common for you to dispense a mix of antibiotics with other medicines? Are these practices generally seen as acceptable or not? Details.
19) Do you think that your customers sometimes fail to take their full course of antibiotic treatment? If so, why do you think this is?
20) Do you ask your customers if they have used antibiotics before and for what conditions/diseases, in particular when they are requesting a specific antibiotic?

Antibiotic resistance

21) Do you think you have a good understanding of what antibiotic resistance is, how it is caused, and what its implications are? Is there anything on this topic that you would like to know more about? Details.

22) What do you think would be the best way to inform people (both medicine sellers and the community) about proper antibiotic use and the dangers of antibiotic resistance?

23) Overall, what do you think should be done to improve appropriate antibiotic use and decrease antibiotic resistance in this country?

Regulatory issues

24) What are the regulations that you have to follow in order to sell antibiotics [probe regarding prescriptions]? What challenges, if any, do you face in following these regulations?

25) Do you think that most sellers know the regulations regarding selling antibiotics? If so, do they always follow them? If not, why not? Do you know whether these regulations are being checked or audited by authorities?

26) Are there any penalties for sellers who sell antibiotics without prescription? Details.

27) Do you think current government regulations are sufficient to control inappropriate antibiotic use? If not, how could things be improved?

28) What would happen to your business if antibiotic sales declined due to closer compliance with regulations on dispensing antibiotics? Would this be a problem for you or your business? If yes, how? What would you suggest as a means of resolving this problem?

We have finished the interview. Thank you for your participation.