SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCE

UNIVERSITY OF GHANA

FACTORS INFLUENCING ACCESS TO NON-PRESCRIBED ANTIBIOTICS FROM COMMUNITY PHARMACIES IN OSU, GREATER ACCRA

BY

NAADU JOAN PESSEY

(10286899)

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE

NOVEMBER, 2017

DECLARATION

I, Naadu Joan Pessey, hereby declare that, with the exception of cited literature, this dissertation is the result of my own original research and this has not been presented elsewhere either in part or in whole for purposes of the award of another degree.

Naadu Joan Pessey …… ……

(Student) Signature Date

Dr. Augustine Adomah-Afari …… ……..

(Supervisor) Signature Date

DEDICATION

This research is dedicated to my parents, Mr. Emmanuel Pessey and Ms. Doris Otoo, and my siblings, Michael and Edwina for their prayers and support.

ACKNOWLEDGEMENT

I am grateful to God Almighty for the grace and enablement to carry out this research. I wish to thank all lecturers of the HPPM department of the School of Public Health, College of Health Sciences, University of Ghana, especially Dr Augustine Adomah-Afari, for the immense support given me throughout the course of this study. I thank the management and staff of the Goodcare Pharmacies, Ansapharma Limited, Top-up Pharmacy, Ebenezer Chemists, and Richcord Chemists, all of Osu for permitting me to conduct such a study at their facilities.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AMA	Accra Metropolitan Assembly
ADMER	Antibiotic Drug Use, Monitoring and Evaluation of Resistance
AMR	Antimicrobial Resistance
AR	Antibiotic Resistance
FGDs	Focus Group Discussions
GDP	Gross Domestic Product
HAI	Healthcare Acquired Infections
IDU	Injection Drug Users
IPC	Infection Prevention and Control
NHIS	National Health Insurance Scheme
NPAs	Non-prescribed Antibiotics
OPD	Out-patient Department
POMs	Prescription-only Medicines
PRECEDE	Predisposing, Reinforcing and Enabling factors
RCTs	Randomized Control Trials
SSI	Surgical Site Infection
STIs	Sexually Transmitted Infections
TMP/SMX	Trimethoprim-Sulfamethoxazole
URTI	Upper Respiratory Tract Infection
UTI	Urinary Tract Infection

DEFINITION OF TERMS

Antibiotics	Chemical agents that kill or stop the growth of bacteria.
Antibiotic Resistance	The change that occurs in bacteria in response to antibiotic use, making antibiotics less effective.
Community pharmacy	A pharmacy that serves a particular community within which it is located. Community members may seek pharmaceutical care from such a facility where a pharmacist is typically present.
Enabling factors	Individual and organizational factors such as the perceived availability of non-prescribed antibiotics, accessibility and affordability of health facilities that facilitate access to the antibiotics without prescription
Infection	The invasion and multiplication of microorganisms such as bacteria, viruses, and parasites that are not normally present within the body. An infection may cause no symptoms and be subclinical, or it may cause symptoms and be clinically apparent.
Predisposing factors	Knowledge, attitudes and beliefs that promote the use of non-prescribed antibiotics by clients of pharmacies.
Prescription	An instruction written by a medical practitioner that authorizes a patient to be issued with a medicine or device.
Reinforcing factors	The knowledge, attitudes and dispensing behaviour of pharmacy staff that are barriers or incentives for the

access to non-prescribed antibiotics by from pharmacies.

ABSTRACT

Background: In Ghana, antibiotics are largely available in communities and may be obtained without a medical prescription amidst an inability to implement an existing policy on Infection Prevention and Control. Scanty data exists on their consumption in Ghana and in Sub-Saharan Africa, especially within communities.

Objective: This study assessed the predisposing, reinforcing and enabling factors influencing access to non-prescribed antibiotics from community pharmacies in Osu, Greater Accra Region.

Methods: Clients were consecutively included in exit interviews from the six pharmacies within the study location to obtain a sample size of 300. Staff surveys were used to describe the dispensing behaviour of thirty-one pharmacy staff purposively selected from the same pharmacies in Osu. Chi square tests and logistic regression was used to demonstrate the direction and magnitude of associations between the factors and the corresponding outcome of interest (use of non-prescribed antibiotics) for the client survey only. Cross tabulation of proposed factors with the dispensing of non-prescribed antibiotics was carried out for the staff survey without further analysis.

Results*:* The proportion of clients to have used non-prescribed antibiotics within the past 6 months was 51.7% while that of staff to have dispensed non-prescribed antibiotics was 83.9%. Clients who perceived the availability of non-prescribed antibiotics from pharmacies were the most likely to use non-prescribed antibiotics (p<0.02). Majority of the staff had adequate knowledge of antibiotics and antibiotic resistance, but had inappropriate attitudes and behaviour towards dispensing of non-prescribed antibiotics.

Conclusion: There is the need for the strict regulation of the dispensing of antibiotics from community pharmacies to minimise clients‘ perception of their availability without a valid prescription. Pharmacy personnel should be educated on the rational use of antibiotics and supervised by the relevant authorities to comply with regulations on the dispensing of antibiotics.

CHAPTER ONE

INTRODUCTION

1.1. Background to the study

The irrational use of antibiotics remains a global public health concern (Finch, Metlay, Davey, Baker, & Forum, 2004). Inappropriate use of antibiotics may include the use of wrong choices of drugs in the treatment of infections and their use as growth enhancers in agriculture and aquaculture as practiced in several countries, including Ghana (World Health Organization, 2015). It may also be in the form of sub-optimal dosing, which implies taking lower doses of an antibiotic than is required to treat an infection or the use of sub-standard antibiotics that contain less active ingredients than the manufacturer‘s claims (Centre for Disease Dynamics, 2015). The resultant effect of irrational antibiotic use is antibiotic resistance, which has been reported as a growing global risk and associated with other risks such as vulnerability to pandemics and increasing rates of chronic diseases. Antibiotic resistance and its associated risks are predicted to further over-burden the world‘s health systems in years to come (World Economic Forum, 2013).

The Global Risks Report has stated that though there have been some remarkable advances in the treatment of infectious diseases, the balance remains hugely tipped in favour of antimicrobial resistance (AMR). The burden of mortality due to AMR is estimated to be higher in low to middle income countries like Ghana than in developed countries like the United Kingdom (UK) (World Economic Forum, 2016). It is predicted that drug-resistant strains of certain microbes could cause the loss of an additional 10 million lives each year in a country like the UK by 2050 and worse is to be expected for the developing countries (World Economic Forum, 2016).

Studies carried out in Bolivia, Vietnam, Senegal, Thailand, Pakistan, Peru and Chile have shown that the use of non-prescribed antibiotics (NPAs) is associated with an increased risk of bacterial resistance, which affects the quality of healthcare provided (Morgan, Okeke, Laxminarayan, Perencevich, & Weisenberg, 2011). About 80% of all antibiotics used globally are in the community setting (Centre for Disease Dynamics Economics and Policy, 2015). Over 50% of this consumption is purchased privately from pharmacies and drug peddlers (Cars & Nordberg, 2005). Dispensers and patients alike contribute to the inappropriate use of antibiotics (Radyowijati & Haak, 2003).

As shown by figure 1.1, though there is evidence of antibiotic resistance in most middle to low income countries, very scanty data on the consumption has been gathered from many of these countries in Africa, not excluding Ghana. This not only makes it difficult to control new cases of endemic infections, but makes the evaluation of interventions made at national and regional levels next to impossible. Antibiotic resistance only recently became a priority in the health agenda world-wide therefore, many countries, particularly those in the developing world have no national agenda for tackling this problem (Centre for Disease Dynamics Economics and Policy, 2015).

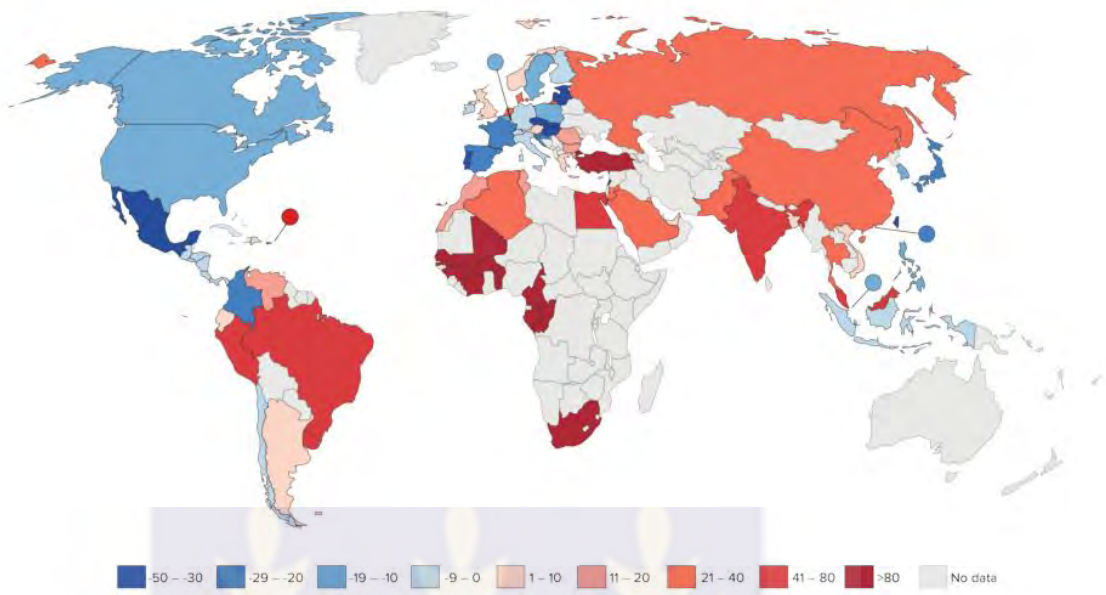

Figure1. 1. ***: Percentage change in antibiotic consumption per capita from 2000-2010* by country. Source: Centre for Disease Dynamics Economics and Policy (2015)***

**Data for Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama were available only as a group classified as Central America. Similarly, data for Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Gabon, Guinea, Mali, Republic of Congo, Senegal, and Togo were grouped and classified as French West Africa. The data for these countries represent the estimates for the corresponding regional groupings they belong to. For countries that did not have data available for 2000, the values for the earliest years for which data were available after 2000 were used to calculate the percentage changes. These countries and initial years are Algeria (2002), Bangladesh (2007), Croatia (2005), Netherlands (2005), and Vietnam (2005).*

1.2. Problem statement

In Ghana, there exists a surveillance project, the Antibiotic Drug use, Monitoring and Evaluation of Resistance (ADMER), which was established to do as its name suggests (Gyansa-Lutterodt, 2013). Gyansa-Lutterodt (2013), reports that, an Infection Prevention and Control (IPC) policy for health workers is also in existence in the country. The inability to implement this policy however, persists in this country where the purchase of antibiotics (among other prescription drugs) is possible from itinerant drug peddlers, over the counter medicine sellers and also from community pharmacies

where they may be obtained even without a valid prescription (Ministry of Health, 2012; Smith, 2004)

In order to tackle the larger problem of antibiotic resistance in Ghana and its effect on quality of healthcare, the factors that influence access to these drugs from community pharmacies cannot be ignored. This is because retail pharmacies are particularly, situated at vantage locations within many communities and this makes them easily accessible to patients (Smith, 2004). Moreover, as mentioned above, Ghana is facing challenges with the regulation of the sale of antibiotics from community pharmacies. In developing educational interventions targeting the irrational use of antibiotics, the PRECEDE model has been recommended for this health behavior (Finch, Metlay, Davey, Baker, & Forum, 2004; Gielen, McDonald, Gary, & Bone, 2008). The PRECEDE (predisposing, reinforcing and enabling factors) model of health behavior was used to examine the factors influencing access to NPA by clients of community pharmacies in Osu, Accra.

According to the model adapted, certain characteristics peculiar to clients (predisposing factors) about the use of antibiotics could influence access to these medicines without prescriptions at the community setting. The influence of norms that are inherent of dispensers (reinforcing factors) on the access to these medicines cannot be overlooked. Also, other organizational and individual factors may be barriers or incentives for the access to NPAs (enabling factors).

1.3. Justification

There is the need to gather data on the consumption of antibiotics in Ghana, especially in the community setting to help evaluate interventions made in combatting the problem of antibiotic resistance (Centre for Disease Dynamics Economics and Policy, 2015). A community such as Osu in Accra, has about 15 retail pharmacies serving it with three of them running a 24-hour service. It is known in Accra to be a popular entertainment hub with a youthful population and also as a popular tourist destination (Yankholmes & Acheampong, 2010). The attitudes and behavior of pharmacy staff as well as knowledge, attitudes and perceptions of clients of antibiotics possibly have an effect on their self-medication practices (Grigoryan *et al*., 2008). This study was therefore, relevant in assessing the factors influencing access to antibiotics, specifically from community pharmacies in Osu, Accra.

Predisposing factors

Some research has been done on consumption of NPA from retail pharmacies in the Cape Coast Municipality (Tagoe & Attah, 2009), and self-medication practices among students in Ghana's tertiary institutions (Donkor, Tetteh-Quarcoo, Nartey, & Agyeman, 2012). In both of these studies, the prevalence of NPA use was determined while one of the studies assessed the level of knowledge of clients of AR. As an addition, this study aims at determining attitudes and beliefs of clients of community pharmacies in Osu, toward antibiotics as well as their level of knowledge and its influence on the consumption of NPAs.

Reinforcing factors

Some studies have assessed the prevalence of irrational antibiotic prescribing for children under 5 years and for general OPD patients (Abdul-Nasiru, 2015; Bosu, 1996). The studies however, did not examine how the knowledge, attitudes and behaviour of the service providers towards antibiotics influenced their observed prescribing patterns. Since the attitudes of service providers may influence access to antibiotics in both the community and hospital setting, this study was relevant in determining which attitudes of pharmacy staff in Osu, could influence their dispensing behavior with respect to NPAs.

Enabling factors

Prescribers and dispensers alike have been known to cite the excuse of prescribing or dispensing antibiotics due to pressure from clients (Gebretekle & Serbessa, 2016). Though this has been widely alluded to, a definite association between perceived patient demand for antibiotics and access to antibiotics has not been established in several studies that have investigated the consumption of antibiotics, particularly with respect to dispensers (Radyowijati & Haak, 2003). In a study of the determinants of self-medication with antibiotics in Europe, Grigoryan and colleagues (2008), examined the influence of the enabling factors: perceived availability of antibiotics and reimbursement of prescribed antibiotics at the individual level. At the country level, the impact of country wealth and dispensing regulations on the self-medication practices were also examined. Similarly, this study sought to describe and determine the associations between the enabling factors (i.e. perceived client demand, perceived availability of NPA from pharmacies, the accessibility and affordability of health facilities) and access to antibiotics from community pharmacies in Osu.

1.4. Objectives of the Study

The objectives of the study are divided into general and specific as explained below.

1.4.1. General Objective

The general objective of the study was to determine the factors that influence access to non-prescribed antibiotics from community pharmacies in Osu, Greater Accra.

1.4.2. Specific Objectives

The specific objectives of the study were:

1. To assess predisposing factors that influence access to non-prescribed antibiotics by clients of community pharmacies in Osu, Accra.
2. To describe the reinforcing factors that influence access to non-prescribed antibiotics from community pharmacies in Osu, Accra.
3. To examine enabling factors for access to non-prescribed antibiotics from community pharmacies in Osu, Accra.

1.5. Research Questions

The following unanswered questions informed the objectives of the study:

1. What are the predisposing factors that influence access to non-prescribed antibiotics by clients of community pharmacies in Osu, Accra?

2. What are the reinforcing factors that influence access to non-prescribed antibiotics from community pharmacies in Osu, Accra?

3. What are the enabling factors for access to non-prescribed antibiotics from community pharmacies in Osu, Accra?

1.6. Outline of Dissertation

The write-up that follows is presented in five chapters. Chapter two entails the description of the key concepts of the study; quality of healthcare, access to NPAs, predisposing factors, reinforcing and enabling factors. Chapter three provides a detailed description of the study design, study variables, methodology, sampling strategy, questionnaire design, data analysis as well as ethical considerations made for this study. In the fourth chapter, a detailed description of data analysis for both the client and staff survey are presented with the aid of graphical representation and tables. Key findings of the study are interpreted and compared with the work done by other researchers in chapter five. Answers to the research questions are provided. A relationship is drawn between the conceptual framework and the key findings of the study. In the last chapter, a statement of the general significance and implication of the study findings to public health is presented. The effect of study limitations on the generalizability of the study are discussed. Appropriate recommendations are made based on the research findings.

CHAPTER TWO

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.0. Introduction

Herein, a review of related literature on the topic of interest is presented. The key concepts forming the basis of the study are also presented. Five sections are presented in this chapter. The concepts of quality of healthcare, community pharmacies, access to antibiotics and antibiotic resistance are examined in the first three sections respectively. Thereafter, the conceptual framework upon which the study is based is presented. A description of literature from other researchers on the proposed predisposing, reinforcing and enabling factors influencing access to NPAs as described in the conceptual framework are also presented. A chapter summary is presented in the last sub-section where gaps in available literature are pointed out.

2.1. Quality of healthcare

It is documented that since Paul Ehrlich, the Bayer chemists and Alexander Fleming's brilliant discovery of the first antibiotics in the 1900s, several others have been discovered or synthesized (Aminov, 2010). These "magic bullets" have tremendously improved medical therapy and given better prognosis for surgical interventions otherwise considered life-threatening in times past. Prophylactic use of antibiotics to prevent surgical site infections (SSI) has been widely studied by various researchers (Bagnall, Vig, & Trivedi, 2009). Bagnall *et al*. (2009), explain that surgical site infections are linked with increased cost of therapy, morbidity and mortality and rank topmost among the healthcare acquired infections (HAI).

Current guidelines for prevention and control of SSIs recommend the prophylactic use of antibiotics prior to and during surgical procedures and not after surgery to prevent bacterial resistance (World Health Organization, 2016). An example of such procedures is Caesarian delivery (Bagnall *et al*., 2009). A Norwegian obstetric study made findings that emphasized a significant association between prophylactic antibiotics and decreased occurrence of superficial SSIs in both planned and emergency deliveries (Skjeldestad, Bjørnholt, Gran, & Erisken, 2014). A similar study was carried out in Tanzania (De Nardo et al., 2015). Antibiotic use as shown in the above mentioned studies significantly improved health outcomes in patients making both medical and surgical interventions more effective.

In children, antibiotics are needed for the treatment of severe pneumonia and sepsis which are major causes of child mortality (Centre for Disease Dynamics Economics and Policy, 2015). Improved quality of healthcare for such children is possible with the use of effective antibiotics. However, the looming danger of a post-antibiotic era due to AR may further compromise quality and thus increase child mortality.

Efficiency, an indicator of quality healthcare (World Health Organization, 2006), may be achieved with improved health outcomes in effective antibiotic use. This occurs as a result of reduced expenditure on treatment of sequelae and complications that may occur due to bacterial infections. It is estimated that antibiotics account for 15% of all medical costs in the United States alone (Avorn & Solomon, 2000) including both irrational and appropriate therapy. The excess cost could be eliminated if effective antibiotics are available and used to treat bacterial infections rationally especially for

the critically ill. In an ideal situation, this could also decrease bacterial resistance to the valuable antibiotics.

Key concepts embodied within quality healthcare are accessibility, affordability, efficiency, efficacy, safety, equitability and acceptability (World Health Organization, 2006). The World Health Organization (2006), noted that in order for any health system to deliver quality of care to clients these principles should be adhered to. Community pharmacies have a role to play in this respect as discussed below.

2.2. Community Pharmacies

In many urban communities, the distribution of pharmacies is such that facilities are typically at the doorstep of members of the communities (Smith, 2004). Smith (2004) stated that while there was a huge deficit in pharmaceutical services available in rural communities of Ghana, more than 80% of the country's pharmacies were in towns and cities. Though access to pharmacies in Ghana does not necessarily translate to access to a pharmacist, this ease of access in urban areas is possibly what makes pharmacies the first point of call for many members of a community when they face varied health problems (Smith, 2004).

The pharmacist density per 10000 population in Ghana is reported as 0.81 with over 90% employed either fulltime or part-time at private retail and wholesale facilities. This is far below the optimum even with the additional workforce of 0.44 and 1.24 pharmacy technicians and medicine counter assistants per 10000 population respectively (International Pharmaceutical Federation, 2012). As highly trained

professionals, pharmacists are valuable in the provision of medical advice and other pharmaceutical services which are patient-centred. For this reason, in some developed countries, pharmacies have been used to identify ―invisible" and underserved populations such as injection drug users (IDU) and to expand health services to these persons who would have been otherwise missed (Zaller, Jeronimo, Bratberg, Case, & Rich, 2010).

A study by Mayhew and colleagues (2001), emphasized the important role of pharmacists in providing accessible treatment of Sexually Transmitted Infections (STIs) at the community level. The government of Ghana, therefore, recognizes pharmacies as the preferred point of treatment of STIs by patients and interventions to properly equip pharmacists to effectively diagnose and treat these infections at the community level have been considered (Adu-Sarkodie, Steiner, Attafuah, & Tweedy, 2000; Mayhew, Nzambi, Pepin & Adjei, 2001).

By law, pharmacists may treat ―simple ailments of common occurrence" in situations where the services of a physician are not readily accessible (Republic of Ghana, 2013). The law is however unclear on the extent of drug therapy that may be initiated as first aid. This provision appears to be in need of clarification when it concerns the dispensing of antibiotics which are legally classified of as Prescription-only medicines (POMs), implying that they shall only be dispensed with a valid prescription.

Perhaps the high administrative and other charges linked to a clinical consultations makes community pharmacies relatively affordable and preferred by the general public in Ghana's urban centres (Dalton & Byrne, 2017). Long waiting times

experienced by clients at health facilities may also be a reason for community pharmacies being the preferred point of call for clients when they fall ill (Adamu & Oche, 2013). If pharmacy staff are properly trained and supervised to provide the needed pharmaceutical services while ensuring the rational use of antibiotics in particular, it is possible to minimize the threat of AR and thus provide quality healthcare (Chalker, Chuc, Falkenberg, & Tomson, 2002).

2.3. Access to Non-prescribed antibiotics and antibiotic resistance

In a systematic review and meta-analysis, Costelloe and colleagues (2010) determined the effect of antibiotic prescribing in primary care on bacterial resistance in individual patients (Costelloe *et al*., 2010). The review covered 24 studies which comprised 5 randomized control trials (RCTs) and 19 observational studies in both adults and children (27,608 persons in total). Antibiotics obtained from primary care physicians were routinely found to be associated with the resistance of respiratory and urinary bacteria.

An increased exposure to antibiotics in the previous 12 months corresponded with a higher risk of bacterial resistance (Costelloe *et al*., 2010). These reviewed studies were from countries where the availability of antibiotics is by prescription only. However, the similarity between the consumption by primary care prescription and that from other sources in the community is the empirical treatment of cases with broad spectrum antibiotics even for self -limiting infections that are likely to be viral. Findings from countries where antibiotics are largely available without prescription, such as Ghana are therefore likely to be similar if not more pronounced.

The risk factors for AR to first line antibiotics used in the treatment of Urinary Tract Infections (UTIs) were examined in a study in Senegal. The study was a prospective cohort from June 2001 to June 2003 among out-patients who consulted for urinalysis at a laboratory facility in Dakar. Univariate analysis estimated risk factors for AR of *E. coli* isolates using χ^2 test and Fisher's exact test. Variables with $p<0.25$ were used in multiple logistic regression where adjusted odds ratios having $p<0.05$ were identified as risk factors. Among the factors considered significant, the use of antibiotics 6 months prior to urinalysis was found to be associated with resistance of the coliform bacteria to ampicillin, co-amoxiclav, nalidixic acid and trimethoprim/sulfamethoxazole (TMP/SMX). This exposure to antibiotics in the patients was attributed to the uncontrolled access to antibiotics in Dakar and the incompletion of antibiotic courses during treatment (Dromigny, Nabeth, Juergens-Behr, & Perrier-Gros-Claude, 2005).

Previously, other researchers have described the patterns of antibiotic use and AR in one rural and one urban community in Bolivia (Bartoloni *et al*., 1998). In that study, Bartoloni and colleagues obtained antibiotic consumption data through household, simulated client and staff questionnaire surveys at community pharmacies for treatment of various illnesses (1998). They determined the prevalence of AR by antibiotic susceptibility tests using *E.coli* isolates from stool samples of 296 and 25 children from the urban and rural communities respectively. Though the study was only descriptive and did not aim at establishing an association, a high prevalence of resistance to first line antibiotics was observed in both communities.

Antimicrobials were also readily available from pharmacies without prescription and some families reported purchasing antibiotics based on advice from physicians. The simulated client survey showed that a majority of pharmacies dispensed antibiotics inappropriately for both adults and children. The prevalence of resistance of *E. coli* isolates to ampicillin, TMP/SMX or tetracycline was over 70% and 90% among the children from the rural and urban community respectively (Bartoloni et al., 1998).

2.4. Conceptual Framework for Factors Influencing Access to Antibiotics from Community Pharmacies in Osu

The conceptual framework of the study is presented in figure 2.1 below. The framework shows that quality of healthcare is influenced by predisposing, reinforcing, and enabling factors to the access of non-prescribed antibiotics from community pharmacies. Each of these factors has individual variables that account for access to non-prescribed antibiotics. The components of predisposing factors are: knowledge, attitudes and perceptions of clients of community pharmacies. The components of reinforcing factors are: knowledge, attitudes and behavior of pharmacy staff. The components of enabling factors are: accessibility and affordability of healthcare facilities, perceived patient demand and perceived availability of NPAs

Predisposing factors

Inappropriate attitudes, incorrect beliefs and poor knowledge of antibiotics (predisposing factors) may result in an increased tendency to use non-prescribed antibiotics by clients of pharmacies. Consequently, these antibiotics may be used irrationally, thus encouraging bacterial resistance and compromising quality of

healthcare (Emeka, Al-Omar, & Khan, 2014; Widayati, Suryawati, de Crespigny, & Hiller, 2011).

Reinforcing factors

Inadequate knowledge and inappropriate attitudes of pharmacy staff (reinforcing factors) toward antibiotics could possibly influence their dispensing behaviour towards these drugs, making them accessible to clients without prescription. Where these dispensed drugs are used irrationally, bacterial resistance may occur and poor quality of healthcare is to be expected (Dameh, Norris, & Green, 2012; Roque, Soares, Breitenfeld, Figueiras, & Herdeiro, 2015).

Enabling factors

Where the cost of a doctor‘s consultation and access to health facilities is a difficulty for community members, they may instead visit pharmacies to seek healthcare (Saradamma, Higginbotham, & Nichter, 2000). Such clients may be served with antibiotics at these pharmacies. When pharmacy staff perceive clients as demanding antibiotics, they may be influenced to dispense these drugs for fear of losing the clients, fear of delaying needed treatment or for profit-making reasons (Roque, Soares, Breitenfeld, Figueiras, & Herdeiro, 2015). A client‘s perception of the availability or ease of obtaining NPAs from community pharmacies may in turn influence the demand for these drugs for self-medication (Grigoryan et al., 2008). In all the cases described, there is a likelihood of antibiotics obtained in this way to be irrationally used, leading to AR and compromised quality of care.

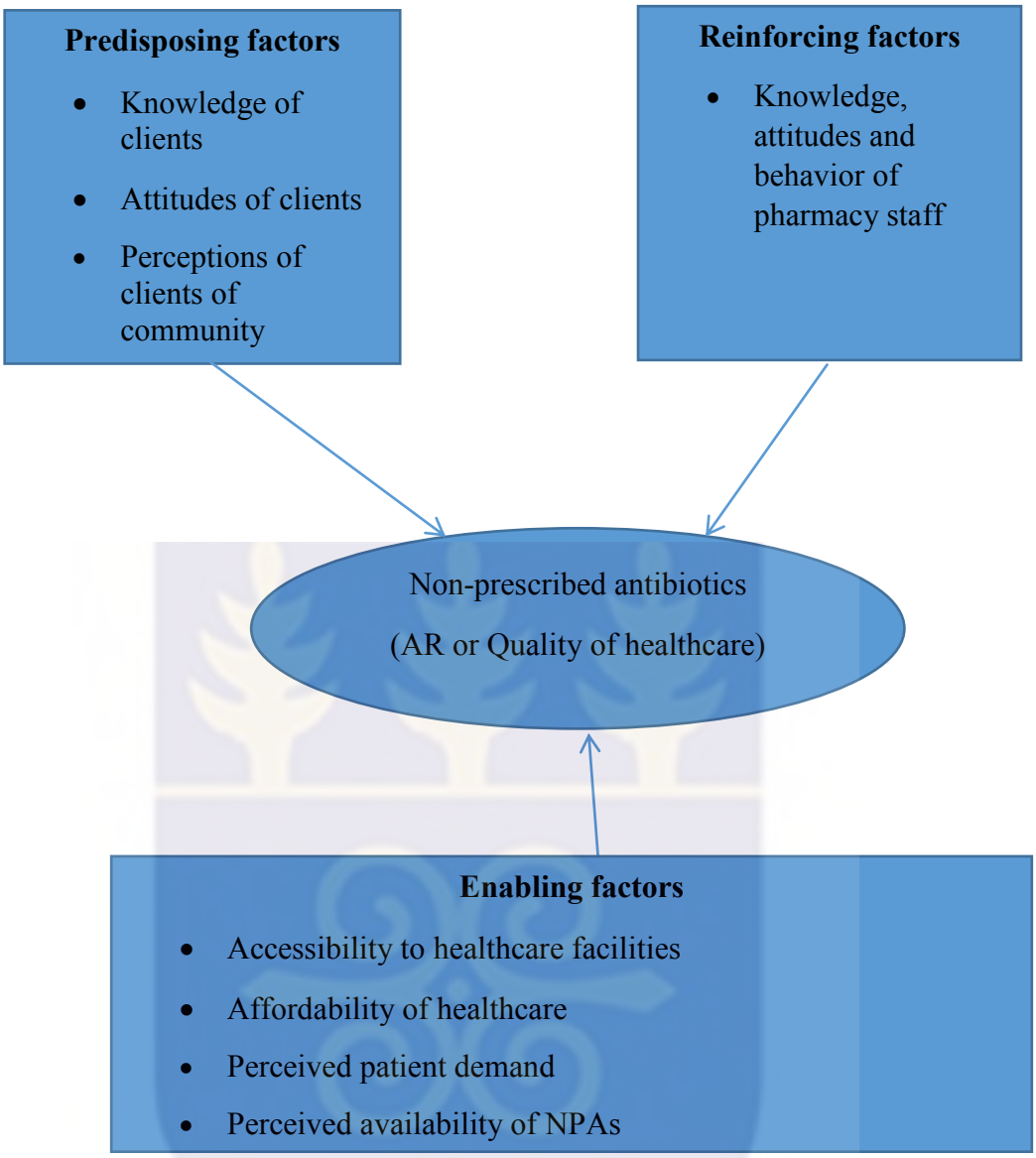

Figure 2. 1. : Access to NPAs- Adapted from the Precede Model. Source: Gielen *et al. (2008)*

2.4.1. Predisposing factors that influence access to non-prescribed antibiotics

Various studies have explored public knowledge, attitudes and beliefs about antibiotics using cross-sectional approaches (Emeka, Al-Omar, & Khan, 2014; Hwang, Gibbs, Podolsky, & Linder, 2015; Shehadeh *et al*., 2012; Togoobaatar et al.,

2010; Widayati, Suryawati, de Crespigny, & Hiller, 2011). The following is a review of some of these studies.

In Jordan, Saudi Arabia, the knowledge, attitudes and behaviour of adults towards antibiotic use were examined in a pilot study by Shehadeh and colleagues (2012). The study sought to determine the knowledge of respondents about the appropriate indications for antibiotic use, safety of antibiotics, knowledge about antibiotic resistance and also antibiotic prescription patterns. Main findings of this research indicated that respondents had a low level of knowledge about appropriate indications for antibiotics since 47.3% had <50% correct answers. The differences in antibiotic consumption and level of knowledge about antibiotic use varied with age of respondents. Younger respondents (aged 18-25) tended to have a higher level of knowledge than the older respondents and this was statistically significant. A majority of participants (60.7%) had poor knowledge about antibiotic resistance.

Single respondents aged 18 to 25 years were better informed about adverse effects of antibiotic use as they were aware of discolouration of teeth in children from the use of certain antibiotics. A third of the respondents admitted making requests for antibiotic prescriptions from physicians while half of them had been prescribed antibiotics over the phone for the treatment of common cold. This was done without physical examination and hence viral and other causes of the cold may not have been ruled out. Study findings were important in informing the direction of interventions targeted towards public education on antibiotic use (Shehadeh et al., 2012).

Similar findings were obtained by Emeka and colleagues (2014), who investigated the attitudes and knowledge of a cross-section of 463 adults in the Al-Ahsa province of

Saudi Arabia. A majority of respondents admitted purchasing antibiotics without prescription from pharmacies and also stated that they were informed about these antibiotics by physicians and pharmacists and past experiences with the use of the antibiotics (Emeka *et al*., 2014). Another study in Yogyakarta, Indonesia realized that appropriate knowledge and beliefs regarding antibiotics correlated with being a young, male participant with a higher educational level and a higher socio-economic status. Respondents generally had an average level of knowledge about antibiotics (Widayati *et al*., 2011).

All of these studies were however descriptive and did not seek to establish the magnitude of the association between the level of knowledge and attitudes of respondents and their patterns of antibiotic use. From the USA's annual survey data on Public Attitudes towards Science and Technology it has been discovered that knowledge about antibiotics shows disparities by age, sex, ethnicity and race. It was therefore advised that educational campaigns about rational antibiotic use should ensure that underprivileged societies are reached (Hwang *et al*., 2015).

Togoobaatar and colleagues, undertook a community-based cross-sectional survey to investigate antibiotic use in Mongolian children under five years of age (2010). 540 households in Ulaanbaatar (capital of Mongolia) with children under 5 were selected for the study by 2 stage cluster sampling. Factors influencing the receipt of antibiotics by the children under five were identified by logistic regression. The outcome variable was a child's receipt of antibiotics in the past 6 months and the explanatory variables were socio demographic (years of education of mother, ages of mother and child, wealth index score of household), mother's knowledge about upper respiratory

tract infections (URTIs) and antibiotics, antibiotic storage at home and distance to a family practice facility.

Key findings showed that caregivers in Ulaanbaatar community frequently use antibiotics for their children under five years. Factors impacting this behaviour included the age of child, caregiver's misconception about antibiotic use and availability of antibiotics at home. Researchers recommended that educational interventions should also aim at discouraging the home storage of antibiotics and clearing wrong beliefs about antibiotic use especially for URTIs in children under 5 years (Togoobaatar *et al*., 2010)

2.4.2. Reinforcing factors that influence access to non-prescribed antibiotics

In a study on the experiences, views and practices regarding use of antibiotics without prescription, 35 New Zealand registered community pharmacies were interviewed. (Dameh et al., 2012)**.** Dameh and colleagues (2012), explored pharmacist dispensing practice by presenting 6 hypothetical scenarios having varying legal provisions and expected consciousness of being caught for illegal dispensing of antibiotics as shown in figure 2.2 below. Coding and thematic categorization of interview data resulted in seven (7) key themes based on views, attitudes and practices of pharmacists regarding use of non-prescribed antibiotics. The themes identified were:

1. Legislation
2. Enforcement of legislation and consequences
3. Ethics
4. Pressure—peer, patient and employer

5. Education, training and clinical knowledge

6. Experience—professional and personal

7. Business orientation

Scenario	Explain if you would sell/use or supply an antibiotic without prescription in the following settings or situations
1	Thailand: where the sale of antibiotics without prescription is illegal but commonly practised. Both the pharmacist in charge at the pharmacy where you work and the pharmacies next door sell antibiotics over the counter. If you didn't you might lose business.
2	Ireland: where the sale of antibiotics without prescription is illegal and not common practice. However, your employer wants you to sell antibiotics over the counter to his friend/regular customer Mr X.
3	Personally: for a previously diagnosed urinary tract infection that was treated with a course of antibiotics by your doctor.
4	For a family member who has cold/cough signs and symptoms every winter that frequently develops into bronchitis. Your family doctor always prescribes the same course of antibiotics to cure it.
5	A tourist from Portugal walks into your pharmacy in NZ, and requests an antibiotic to treat his obvious wound infection.
6	Burkina Faso: where it is common and legal practice to sell antibiotics over the counter in pharmacies.

Figure 2. 2. : Six hypothetical scenarios examining community pharmacist practice. Source: Dameh et al. (2012).

The main determinants for pharmacists‘ dispensing of NPAs were their perception of the consequences of breaking the law and the regulations and legal provisions pertaining to the practice. Though the research confirmed that New Zealand pharmacists do not often supply antibiotics without prescription, many of the participants admitted self-supplying of NPAs as well as supplying of NPAs for relatives. The researchers recommended that countries that wish to curb the

inappropriate dispensing behaviour of pharmacists should ensure that it is illegal (Dameh *et al*., 2012).

In a similar qualitative study, Kotwani and colleagues relied on focus group discussions (FGDs) to explore the knowledge, attitudes and behaviour of pharmacists with respect to dispensing of antibiotics and AR. The FGDs involved 40 pharmacists from retail pharmacies, the public sector and pharmacy associations in New Delhi. Prescribing and dispensing behaviour, commercial interests, advisory role and intervention strategies for rational use of antibiotics were the four broad themes which evolved. (Kotwani, Wattal, Joshi, & Holloway, 2012). Issues raised in the study included the fact that pharmacists dispensed antibiotics irrationally under different situations. The number of antibiotic units dispensed by pharmacists in the public sector was generally higher than that dispensed from retail pharmacies. The excess units of antibiotics sometimes prescribed at public sector pharmacies was equally as inappropriate as the under-dosed units dispensed at retail facilities.

Practitioners generally believed that their recommendation of antibiotics to patients reflected the practice of prescribers in the municipality while prescribers are influenced by pressure from pharmaceutical companies when writing prescriptions for antibiotics. Low level of knowledge of the rational use of antibiotics was also attributed to the inappropriate behaviour in pharmacists. Recommendations made by researchers was that all stakeholders (pharmacists, prescribers, regulators, government, civil society organizations) should be involved in educational campaigns towards rational use of antibiotics (Kotwani *et al*., 2012).

The above studies used a qualitative approach and therefore study findings may not be generalized for the entire population but are helpful in eliciting the reasons behind inappropriate dispensing behaviour of pharmacists towards antibiotics. Few studies have used quantitative methods to examine this behaviour one of which is reviewed below.

In Portugal, Roque and colleagues (2015) undertook a study with the aim of examining the knowledge and attitudes of pharmacists towards antibiotic use and the possible influence on their tendency to dispense antibiotics without prescription using a cross-sectional design involving 763 registered pharmacists. The association between predictor variables and propensity of pharmacists to dispense antibiotics without prescription was modelled by logistic regression (Roque, Soares, Breitenfeld, Figueiras, & Herdeiro, 2015). The following attitudes of pharmacists were found to have a significant impact on their tendency to dispense antibiotics without prescription: complacency about patients, responsibility of patients and health care systems, and fear or precaution.

The knowledge of pharmacists about rational use of antibiotics was also shown to influence this tendency. The propensity of pharmacists to dispense NPAs was not significantly associated with years of experience and socio-demographic characteristics such sex and age. Of the three clinical situations assessed, dental ailments had the highest correlation with tendency to dispense NPAs (38.4%), followed by urinary tract infections (UTIs) (36.2%) and URTIs (14.7%). It was recommended that educational interventions should confront inappropriate attitudes of pharmacists, particularly concerning their complacency about patients, responsibility

of others and fear or precaution. This should aid in minimize dispensing of NPAs (Roque *et al*., 2015).

2.4.3. Enabling factors that influence access to non-prescribed antibiotics

Hu & Wang (2016) carried out a study on antibiotic utilization among Chinese migrants in Australia using a cross-sectional design and involving 469 participants. Chinese migrants without any perceived barriers to using primary health services in Australia were found to be less likely to use non-prescribed antibiotics. Among these migrants, over fifty percent of antibiotic users admitted non-prescribed use of the drugs. A lower risk of NPA use was associated with positive experience and perception of primary health services, primarily general practitioner (GP) services.

Mangione-Smith and colleagues (2006) undertook a cross-sectional study where they examined the association between physician-patient communication practices, perceived patient expectation for antibiotic treatment and irrational antibiotic prescribing for URTI of viral cause. Multivariate analyses exposed that when patients questioned the physician's treatment plan, physicians were more likely (20.2%) to perceive a demand for antibiotics. Physicians were also more likely (31.7%) to prescribe antibiotics when they perceived parents as expecting to receive them. On the other hand, when the physician ruled out the need for antibiotics parents were 24% more likely to question the treatment plan. Researchers recommended that instead of being concerned about what is not needed by an ill child, treatment plans should focus on making the child better in order to decrease inappropriate antibiotic prescribing (Mangione-Smith, Elliott, Stivers, Mcdonald, & Heritage, 2006).

Grigoryan and colleagues (2008) in a European study on factors influencing self-medication with antibiotics interviewed 1101 respondents from 11 countries using a cross-sectional design with self-administered questionnaires. Multi–level analysis including a regression analysis revealed that at the country level, higher GDP and the exact number of tablets dispensed in the pharmacies were independently associated with lower likelihood of self-medication. When availability of antibiotics without a prescription was perceived an increased tendency of self-medication by respondents was realized *(Grigoryan et al.*, 2008).

2.5. Chapter summary

In this chapter, literature on studies on the knowledge, attitudes and beliefs of survey respondents about the use of antibiotics have been explored. Studies were mostly descriptive and involved the use of the chi square and student t-tests for association between the outcome variables and the predisposing factors. Inferential analysis involving logistic regression of the determinants of a child‘s receipt of antibiotics in one study however assessed the effect of caregivers‘ wrong beliefs about antibiotic use on the outcome of interest. Similarly, this study sought to address the literature gap of studies involving quantitative methods for determining the association between the knowledge, attitudes and beliefs of clients of pharmacies and their use of NPAs over the past 6 months.

Some qualitative approaches to the study of factors influencing pharmacists‘ dispensing of NPAs have been described, as well as one study that involved the use of quantitative methods in the determination of reinforcing factors to the dispensing of

antibiotics by pharmacists. This study sought to also investigate the dispensing of antibiotics by pharmacy personnel in general and not only pharmacists by using quantitative methods. In the next chapter, the study design, study variables, study location, methodology, sampling strategy and data analysis among other issues considered in carrying out this study are described into detail.

CHAPTER THREE

METHODS

3.0. Introduction

This chapter presents the methods that were used to collect empirical data for the study. Ten sections are described herein. They include the study design, study location, variables, study population, sampling strategy, sample size determination, data collection, data analysis, ethical considerations, quality control and data quality

3.1. Study Design

The study was of a fixed or quantitative design using a cross-sectional strategy in the form of surveys. A cross-sectional approach of data collection is one that is normally used in observational studies where characteristics of a sample are simply measured or recorded by researchers on a single occasion. Surveys are generally cross-sectional in design. A number of researchers have used a cross-sectional strategies in examining factors influencing use of NPAs as reviewed above (Donkor *et al*., 2012; Grigoryan et al., 2008; Roque *et al*., 2015; Shehadeh *et al*., 2012; Togoobaatar *et al*., 2010). The cross-sectional strategy was preferred due to the short period available for this exploratory study. A longitudinal study of clients of the community pharmacy would require a longer period of time and more resources and may be considered in future research.

3.2. Study Location

The study location, Osu is found within the Osu Klottey Sub-Metro of the Accra Metropolitan Assembly (AMA). It is bounded by Gamel Abdul Nasser Avenue to the north-west and the Ring Road Extension to the north-east. To the south-east is the Atlantic Ocean while the Castle drive and the Starlets 91 Road form its boundary to the south-west (Google Maps, 2016). The Osu area was divided into three main representative regions namely, the _West of the oxford Street‘, the _Osu Colonial Township‘ as well the _Oxford Street and environs‘ in this study. Two community pharmacies were sampled from each of these regions for study purposes.

The Oxford Street (Cantonments Road) is centrally located within the area and is the main road that links Osu with the neighbouring Cantonments community. It spans southwards from the Danquah Circle towards the _Osu colonial township‘ where the indigenous community is chiefly found. The Oxford Street region is the recreational hub of the vicinity where a congregation of banks, restaurants, pubs and boutiques may be found. Osu Nyaniba and Osu Ring-way Estates are located to the east and west of the Oxford Street respectively. The Osu community of the Osu Klottey Sub-Metro is shown in figure 3.2 below.

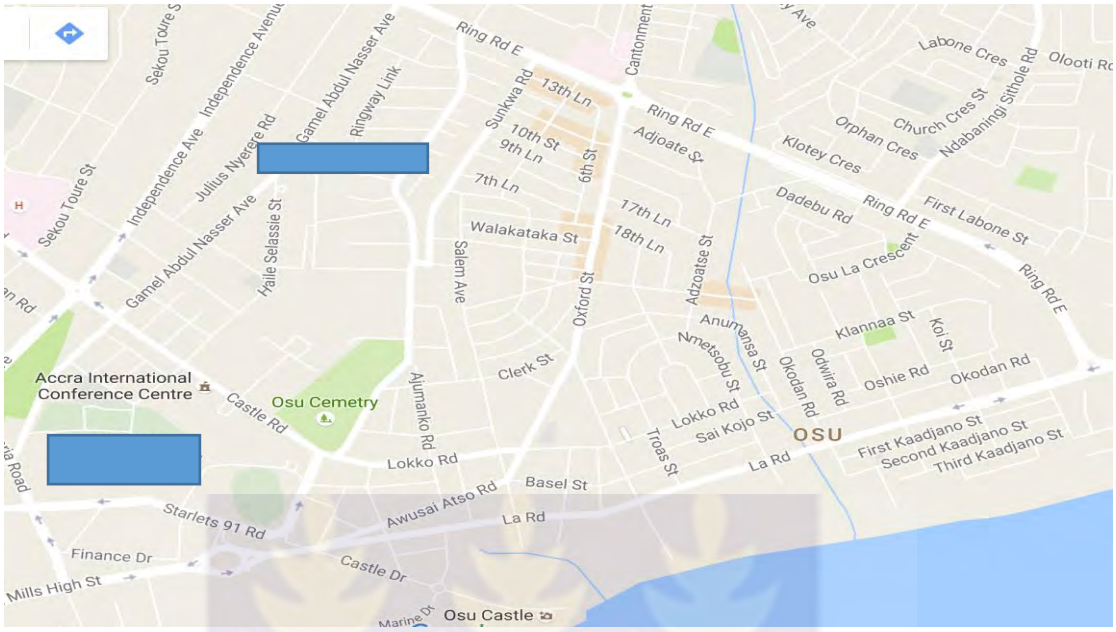

Figure 3. 1. : Map of Osu. Source: Google Maps (2016)

Demography / Population

The Osu Klottey sub metro (in which the Osu community is located) is within the Accra metropolis. The sub-metro has a population of about 121,723 with a sex ratio of 0.92 males to females. Majority (69%) of the population fall within the ages of 15 to 64 years while the dependent population (below 15 years and above 65 years) form 31% of the population. It is therefore a predominantly youthful population reflecting the age and sex structure of Ghana's entire population (Ghana Statistical Service, 2012c).

Economy of the sub-metro

Data from the 2010 population and housing census indicates that a majority (92%) of the working population in the Osu Klottey sub-metro are employed with the most common occupation being service and sales workers (35%) (Ghana Statistical

Service, 2012). Despite the thriving business environment, the traditional occupation of indigenes of the Osu area is fishing while the youth mainly engage in petty trading and other vocational jobs (Yankholmes & Acheampong, 2010).

Healthcare Provision / Facilities

There are 3 hospitals, 27 health posts and 7 other health facilities in the sub-metro which makes up 17% of the total number of health facilities in the Accra metropolis (Odoom, Tauro, Williamson, Yeboah, & Laird, 2013). Notable amongst them is the Accra Regional Hospital also known as the Ridge Hospital. There are about 15 community pharmacies found within the Osu area, three of which offer a 24 hour service.

3.3. Variables

The primary outcome variable is access to non-prescribed antibiotics as mentioned in the objectives of the study. Other predictor variables influencing the primary outcome variables were classified as predisposing factors, reinforcing factors and enabling factors.

3.3.1. Dependent variable

The dependent variable was: Access to non-prescribed antibiotics (AR or Quality of healthcare). It was measured by _the use of NPAs from community pharmacies by clients in the past 6 months‘ and _the dispensing of NPA by staff within the past 6 months‘.

3.3.2. Independent variables

The independent variables of the study were:

1. Socio-demographic characteristics of both pharmacy staff and clients (age, sex, ethnicity, religion, educational level etc).
2. Predisposing factors (Knowledge, attitudes and perceptions of clients of community pharmacies).
3. Reinforcing factors (Knowledge, attitudes and behaviour of pharmacy staff).
4. Enabling factors (Accessibility and affordability of healthcare facilities, perceived availability and perceived patient demand of NPAs from pharmacies).

3.4. Study Population

The study population consisted of clients and pharmacy staff of community pharmacies in Osu. Eligible and consenting clients were interviewed after they had been attended to at the pharmacies (exit interviews). Only eligible pharmacy staff who were on duty during the period of study were interviewed. The survey was carried out when staff were not attending to clients in order to have their full attention.

3.4.1. Inclusion Criteria

1. For the client survey, every other adult client who visited the participating pharmacies at the time of survey was eligible to participate.

2. All pharmacy staff involved in dispensing, including pharmacists on duty at the time of survey were eligible to participate in the staff survey.

3.4.2. Exclusion Criteria

1. Doctors, nurses and mid-wives as well as pharmacists were excluded from the client survey.

2. Other auxiliary pharmacy staff apart from dispensers i.e. cleaners, cashiers, security personnel and porters were excluded from the pharmacy staff survey.

3.5. Sampling Strategy

All pharmacy staff who agreed to participate were recruited for the study while clients of each pharmacy were selected by consecutive sampling. Community pharmacies were purposively sampled for this study. Though random sampling would have been preferred for the selection of pharmacies and clients, the difficulty in obtaining permission from pharmacy managers and clients prevented this randomization.

All staff present at pharmacies during the course of the study however participated in the staff survey due to the relatively smaller number of staff as compared to clients. A significant number of studies have used random sampling to recruit study participants in quantitative studies examining the consumption of antibiotics in communities (Grigoryan et al., 2008; Saradamma *et al*., 2000; Togoobaatar et al., 2010; Widayati *et al*., 2011).

3.5.1. Sampling Strategy for Clients

Every other eligible and consenting adult client who visited the pharmacies was consecutively sampled for the client survey. Where an adult client refused to

participate or was not eligible to participate, the next adult client who satisfied requirements was interviewed in place of the defaulting client. Consecutive sampling of clients was best suited as that strategy is normally used where the sampling frame is not fixed and where time is of essence in obtaining the required sample size (Martínez-Mesa, González-Chica, Duquia, Bonamigo, & Bastos, 2016). This is the case for the study population of clients of the pharmacies; the population is not fixed or known and randomly selecting a number of participants would be difficult.

3.5.2. Sampling Strategy for pharmacies and staff

Pharmacies in each representative zone were selected by purposive sampling to obtain two (2) pharmacies from each region giving a total of six (6) pharmacies. These pharmacies were selected based on their activity or popularity and the approval of management to participate in the study in order to obtain results that are representative of the community. All eligible pharmacy staff present at the facilities during the study period were sampled from the purposively selected pharmacies. At all six facilities that were sampled, at least one of the staff present during the period was a pharmacist.

Purposive sampling is a sampling strategy that is often used where a sample with peculiar characteristics is to be used in a study. It may be used where the sampling frame is not large and enrollment of participants into the study may be difficult. In purposive sampling, the researcher knows where to find the participants of interest and goes directly to them to carry out the study. Some researchers have employed purposive sampling in examining irrational drug use (Chandy *et al*., 2013; Cooper, 2013; Kalungia, Burger, Godman, Costa, & Simuwelu, 2016).

This strategy was used in sampling the pharmacies because for the purposes of the study, pharmacies whose patronage are higher within the community is preferred. Due to the higher patronage at such pharmacies, a better estimate of the health-seeking behaviour of a cross-section of the community may be obtained. The small number of staff present at the pharmacies also made it necessary to include all consenting and eligible staff for the staff survey.

3.6. Sample Size Determination

Fisher's formula for sample size calculation, which is $n= z^2pq/d^2$ (Daniel & Cross, 2013), was used in determining the sample size for the clients to participate in the study. The calculations for clients and the expected number pharmacy staff are shown below.

3.6.1. Sample size Determination for Clients

It was assumed that the proportion of clients who have used antibiotics in the past six months would be at least 71.5% of the total number of clients interviewed. This value was based on that obtained in a similar study carried out in the Cape-Coast Metropolis of Ghana (Tagoe & Attah, 2009) where 71.5 % of clients of the pharmacies had ***ever*** used an antibiotic without a prescription. The formula for calculating the sample size for clients was $n= z^2pq /d^2$ **(**Daniel & Cross, 2013)

Where, n = Sample size,

z = Reliability coefficient, which is at 95% confidence level.

p = proportion of clients who have used antibiotics in the past 6 months which is 0.715

q= (1—p) = (1-0.715) =0.285

pq = (0.715) x (0.285).

d = Error tolerance, which is 0.05.

By substituting the values into the stated formula:

$n = (1.96)^2 \times (0.715) \times (0.285) / (0.05)^2$

$= (3.8416) \times (81.51)$

≈ 313

Total sample size estimated = 313 clients.

During the period of data collection however, 300 respondents were obtained giving a response rate of 95.8%.

3.6.2. Sample Size for Pharmacy Staff

All pharmacy staff present at the time of survey were interviewed from each of the six pharmacies. Altogether, thirty-one (31) staff were interviewed. The distribution of the staff was as follows:

1. Eleven (11) from pharmacies located to the _west of the Oxford street‘,
2. Fourteen (14) from pharmacies located along the _Oxford Street‘ and
3. Six (6) staff within the _Osu colonial township‘.

3.7. Data collection – Questionnaire Design and Administration

Due to the different groups involved in this study, the cross-sectional surveys were carried out using a unique standard questionnaire for each participant group (pharmacy staff and clients). How the questionnaires were designed and administered to each of the groups have been explained below.

3.7.1. Questionnaire for Clients

A structured questionnaire adapted from a study by Grigoryan and colleagues (2008), was used for the client survey. Thus, a standard structured questionnaire was used by Grigoryan and colleagues (2008), to investigate determinants of self-medication with antibiotics in Europe. The questionnaire was divided into three sections. Section one examined the socio-demographic characteristics: age, sex, ethnicity, religion, employment status, educational level etc. Section two examined the predisposing factors: knowledge, attitudes and beliefs of clients of community pharmacies about antibiotic use. Section three included questions to investigate the enabling factors: accessibility to healthcare facilities and affordability of healthcare.

For the predisposing factors, a Likert scale was used to measure items related to the knowledge, beliefs and attitudes towards antibiotic use. Items were grouped in sub-sections (scales) for which mean scores were calculated for each scale. Inadequate knowledge, inappropriate attitudes and beliefs were denoted by higher scores for each section. The designated labels for the Likert scale responses were as follows: 1 – strongly disagree, 2 – disagree, 3 – neutral, 4 – agree, 5 – strongly agree.

The cross-sectional survey relied on client exit interviews from the sampled community pharmacies. This method of determining consumption of antibiotics has been shown to be effective and better suited for such surveys carried out in developing countries (Padget, Guillemot, & Delarocque-Astagneau, 2016). The questionnaires were interviewer-administered.

Table 3.1: Scales of attitudes, beliefs and knowledge, including the underlying items

PREDISPOSING FACTORS

1. Attitudes towards appropriateness of self-medication with antibiotics for diarrhoea.

*Items included:**

Just imagine you have diarrhoea. How appropriate is it in your view to get antibiotics without a prescription?

I. …Over the weekend in a normal situation
II. …On holiday abroad
III. …You have no time to go to the doctor
IV. …When it is difficult to contact the doctor
V. …When the doctor has no time to see you immediately
VI. …When a consultation with a doctor is too expensive
VII. …When you have a good experience with taking this antibiotic
VIII. …When your doctor always prescribes you this antibiotic
IX. …When the pharmacist advises you which antibiotic to take

2. Beliefs about antibiotics for minor ailments

*Items included: **Φ***

I. When one has a sore throat, one should take antibiotics to prevent getting a more serious illness
II. When one gets a cold antibiotics help to get better more quickly
III. By the time you yourself are sick enough to visit a doctor with a bad cold, you usually expect a prescription for antibiotics
IV. You usually know if you yourself need an antibiotic for a sore throat before seeing a doctor
V. Most of your friends/relatives think people should take an antibiotic for a cold

3. Attitudes towards situational use of antibiotics

*Items included: **Φ***

I. The use of antibiotics when you are sick in order to remain active (work, family, study) is appropriate
II. The use of antibiotics when you are sick for helping to get through an important event (e.g. exam, funeral or wedding) is appropriate

4. Knowledge about the effectiveness of antibiotics on bacteria and viruses

*Items included: **Φ***

I. Antibiotics can kill bacteria ***θ***
II. Antibiotics can kill viruses

** Measured on a 5 point scale (1="completely inappropriate" and 5="completely appropriate")*

***Φ** Measured on a 5 point scale (1="strongly disagree" and 5="strongly agree")*

***θ** For this item coding was reversed (1="strongly agree" and 5="strongly disagree").*

3.7.2. Questionnaire for Pharmacy Staff

A structured questionnaire adapted from a study by Roque and colleagues (2014), was used for the pharmacy staff survey. This questionnaire was developed by Roque and colleagues (2014), and was used for a similar study in Portuguese pharmacies (Roque et al., 2015) to determine the attitudes of pharmacy staff towards antibiotic dispensing. The questionnaire was divided into three sections. Section one examined the socio-demographic characteristics: age, sex, ethnicity, religion, and staff qualification. Section two examined two of the reinforcing factors: the knowledge and attitudes of pharmacy staff towards antibiotic misuse. The third section consisted of statements that would examine the dispensing behaviour of pharmacy staff in four hypothetical situations: diarrhoea, upper respiratory tract infection, urinary tract infection and any infection for which a patient undertakes to bring a prescription.

In measuring the reinforcing factors, a 5-point Likert scale was used to score items in the questionnaire relating to the knowledge and attitudes of pharmacy staff about antibiotic dispensing as well as the dispensing behaviour of staff in four hypothetical situations where they had the tendency to dispense NP antibiotics. The scale ranged from 1 to 5 where 1 is completely disagree and 5 is completely agree. Items were grouped under the three sections for which mean scores were calculated for each section. Inadequate knowledge, inappropriate attitudes, and behaviour were denoted by higher scores for each section.

Statements which expressed positive attitudes, perception and behaviour towards antibiotic use or dispensing were negated and the corresponding scale was inverted

during data entry with Excel. This was done for both the client and staff surveys. Each questionnaire took about 10 mins to completely fill and was self-administered by staff. In all, data collection spanned a period of five (5) weeks and was carried out concurrently with the client exit-interviews at each facility.

3.8. Data Analysis

The returned questionnaires were cleaned and processed using Microsoft Excel prior to entry into STATA version 14 for analysis. For each respondent of the client survey, scores for questions posed under the various predisposing factors of the questionnaire were summed up and recorded as percentages for each sub-section using Excel. For the _attitudes towards situational use of antibiotics‘ and the _beliefs about the situational use of antibiotics‘, a total score of greater than 50% represented poor attitudes and unhealthy beliefs respectively. Total scores greater than 45% and 41% represented poor _attitudes towards the situational use of antibiotics‘ and poor _knowledge about the effectiveness of antibiotics‘ respectively.

Likewise for the staff survey, scores for questions posed under the reinforcing factors were summed up and recoded as percentages for each sub-section with the aid of Excel. A total score greater than 41% represented inadequate knowledge about the use of antibiotics or AR inappropriate attitudes and inappropriate behaviour towards the dispensing of NPAs.

A cross-tabulation of socio-demographic variables, predisposing, enabling and reinforcing factors against access to non-prescribed antibiotics (dispensing and use) was done with the aid of STATA 14. Inferential analysis was carried out for the client survey only. Chi-square test for proportions was used to test for independence of the various factors. A simple logistic regression with crude odds ratios as well as a multiple logistic regression with adjusted odds ratios was determined for each of the predisposing factors and enabling factors with respect to clients who have used non-prescribed antibiotics.

3.9. Ethical consideration

The following ethical issues were addressed in this research.

Ethical Clearance and Institutional Permission

As a requirement to conduct research at a health facility, ethical clearance was sought from the Local Ethics Review Committee of the Ministry of Health / Ghana Health Service (MOH/GHS). A letter of introduction from the SPH and copies of the Ethical Approval letter for the study were delivered to pharmacy managers or owners of the retail pharmacies in Osu ahead of the study to seek permission at the facilities and for the staff of the facilities to be informed about the study.

Study Subjects

Though human subjects were in this study, the study did not involve the use of biological samples such as body fluids from participants.

Informed Consent

All participants of the research were well informed about the purpose of the study. An appropriately designed consent form was provided for all potential participants before admission into the study. (See appendices A and B). A written informed consent was obtained after the study was explained to the potential participants.

Privacy, Anonymity and Confidentiality

To ensure privacy, the interview of participants was done in a quiet environment with minimal interference. For pharmacy staff, the questionnaires were administered during periods when the staff were not attending to clients or performing any other task. Clients were also be interviewed in a secluded area either within or outside the pharmacy after they have been served by the pharmacy staff. The questionnaires were devoid of names of participants or identifiers which may be directly linked to them. This was to ensure anonymity.

Data usage and storage

Completed questionnaires were securely kept away from unauthorized persons. All electronic data generated from the questionnaires were saved in password protected folder(s) and only accessible to the principal investigator (PI) and supervisor. After data processing and analysis, the questionnaires were archived and would be shredded and discarded after five (5) years.

Benefits and Risks

This study would be useful in directing policy concerning the rational use of antibiotics in the community to improve healthcare. This would be an indirect benefit to the community including the pharmacy personnel. There were no potential risks to the participants of this study. Their participation however in filling the questionnaires required 5 to 10 minutes of their time.

Compensation

Since the study was not expected to have any potential risk to the client there was no material compensation of clients. Clients were however given advice on the rational use of antibiotics after each interview. The study outcomes will be useful to participants and the community in the long-term since it is hoped that results of the study would help inform policy that would seek to improve awareness about antibiotic resistance.

3.10. Quality Control and validity of the data

To ensure quality and validity of results the following procedures were carried out.

3.10.1. Training of Research Assistants

The research assistants were adequately trained for the data collection using well-designed questionnaires. Their training entailed the necessary protocols to ensure that all the needed information from respondents were adequately captured in an ethically sound manner. Research assistants were also trained on the general comportment and composure expected of them at the study sites. Daily monitoring of the work done by

assistants and rechecking of questionnaires for completeness was ensured by the principal investigator.

3.10.2. Pre-test of the Instruments

Both questionnaires for the staff and client surveys were pretested at a pharmacy in Tse-Addo, a nearby community to assess the suitability and acceptability before the main data collection.

3.11. Chapter summary

The current study comprised a fixed design using quantitative methods. The study location was the Osu community, a popular entertainment hub in Accra. Osu is located within the Osu Klottey sub-metro of the AMA. The study populations were clients and staff of pharmacies in Osu. Clients were consecutively sampled from six (6) pharmacies to obtain a sample size of 300 while thirty-one (31) pharmacy personnel on duty during the study period were purposively sampled to participate in exit interviews and staff surveys respectively. Standard questionnaires adapted from the work of other researchers were self-administered by staff and interviewer administered for clients.

Ethical approval for the study was obtained from the Ghana Health Service-Ethical Review Committee. Data quality and validity was ensured by pre-testing of survey instruments at a pharmacy in Tse-Addo, Accra and by the training of field assistants in data collection. The outcome variable of interest was ‗access to NPAs within the past six months'. It was measured by the use and dispensing of NPAs by clients and

pharmacy personnel respectively within the past six months. Independent variables for the study were the socio-demographic characteristics of respondents, predisposing factors to the use of NPAs by clients, reinforcing factors to the dispensing of NPAs and enabling factors to access to NPAs.

Analysis of data was done with the aid of STATA 14 where descriptive analysis was carried out for both the client and staff survey. Chi-square tests for association were performed for the client survey as well as a logistic regression of variables that showed a significant relationship with the dependent variable in the study and/or in literature. For the staff survey, the descriptive analysis was simply a cross-tabulation of independent variables with the outcome of interest. No tests for association were carried out.

In the next chapter, the results of data analysis are presented. The relationship between the independent variables (socio-demographic, predisposing, reinforcing and enabling factors) and the outcome variables of interest are described and/or examined.

CHAPTER FOUR

RESULTS

4.0. Introduction

This chapter presents the results of statistical analysis obtained from both the client exit interviews and the staff surveys as described in chapter three. Both descriptive and inferential statistics have been employed in the analysis of results. The results are presented in six sections. In section 4.1 the socio-demographic characteristics of respondents, both clients and staff are described. Section 4.2 presents results of the influence of pharmacy location on access to NPAs. Predisposing factors, enabling factors influencing the use of NPAs are examined in sections 4.3, 4.4, respectively. In section 4.5 and 4.6, reinforcing and enabling factors influencing the dispensing of NPAs are presented respectively.

4.1. Socio-demographic Characteristics of Respondents

Two groups of respondents; clients and staff of community pharmacies in Osu participated in the study. A total of 300 clients and 31 staff were involved as described in chapter three. The socio-demographic characteristics of respondents included; age, sex, area of residence, educational status, and marital status. For the clients, enrollment on NHIS was also analysed while for staff, their professional qualifications were assessed (tables 4.1 and 4.2). Some socio-demographic characteristics have been cross-tabulated against use of NPAs by clients within the past six months; and dispensing of NPAs by staff within the past 6 months (tables 4.3 and 4.4). Chi square tests of associations were carried out for each of the categorical variables using a 95% confidence interval and *p*-values less than or equal to ($p \leq 0.05$) were considered as significant.

Table 4.1: Socio-demographic characteristics of client respondents

Characteristic	*Frequency* (*n=300*)	*Relative frequency* (%)
Sex		
Male	178	59.33
Female	122	40.67
Age		
18-37	207	69
38-57	71	23.67
58 and above	22	7.33
Area of residence		
Osu	180	60
Other	120	40
Marital Status		
Single	166	55.33
Married	115	38.33
Divorced	7	2.33
Cohabiting	9	3
Widowed	3	1
Religion		
Christianity	278	92.67
Islam	18	6.00
ATR	1	0.33
Hinduism	3	1.00
Educational Status		
Tertiary education	147	49.00
Secondary education	100	33.33
Primary educ. or below	53	17.67
NHIS enrollment		
NHIS enrollee	178	59.33
Non-NHIS enrollee	122	40.67

Source: Survey data, 2017

Table 4.2: Sociodemographic characteristics of staff respondents

Characteristic	*Frequency (n=31)*	*Relative frequency %*
Sex		
Male	15	48.39
Female	16	51.61
Age		
18-37	30	96.77
38-57	1	3.23
Area of residence		
Osu	10	32.26
Other	21	67.74
Marital Status		
Single	22	70.97
Married	9	29.03
Religion		
Christianity	29	93.55
Islam	2	6.45
Qualification		
Pharmacist	9	29.03
Technician/Technologist	4	12.9
Medicine Counter Asst.	18	58.06

Source: Survey data, 2017

4.1.1. Cross-tabulation of socio-demographic characteristics of clients against use of NPAs

Of the 300 clients interviewed, 178 (59.3%) were females while 122 (40.7%) were males. There was a higher incidence of antibiotic use observed among female respondents than among males. This was however, not significant (p>0.05). Majority of respondents, 207 (69.0%) fell within the age category of 18 to 37 years (younger adults). Antibiotic use within the past six months decreased with age, but this difference was also not significant (p>0.05). About 278 (92.7%) of the clients were

Christians, while only 1 (0.33%) client was of the African Traditional Religion. Consumption of NPAs was not significantly associated with the religion of the respondents (p>0.05).

Although a larger proportion of clients who had used NPAs was single, 166 (55.3%) compared to those who had not used NPAs. The association between marital status and NPA use was not significant (p>0.05.). The educational status of clients was significantly associated with the use of NPAs (p<0.05). Clients who had primary education or below formed only, 53 (17.7%) of the total sample. However, 36 (12%) of respondents reported ever using NPAs within the past six months. A large number of clients, 109 (36.3%) had used NPAs among the respondents with tertiary education, which represented the highest number with respect to educational status.

NHIS enrolment by clients was not significantly associated with the use of NPAs within the past six months (p>0.05). The number of clients who were actively enrolled with the scheme was 178 (59.3%). The highest proportion of NPA users was amongst respondents enrolled with the NHIS, 95 (31.7%). Table 4.3 below summarizes the socio-demographic characteristics of clients in a cross-tabulation against the use of NPAs within the past 6 months.

Table 4.3: Cross-tabulation of socio-demographic characteristics of clients against use of NPAs

Characteristic	*NPA use within past 6 months*		*P-value*
	Yes	*Total (n=300)*	
***Age** (%)*			
18-37	109 (36.33)	207 (69.00)	
38-57	39 (13.00)	71 (23.67)	0.146
58 and above	7 (2.33)	22 (7.33)	
***Sex** (%)*			
Male	67 (22.33)	122 (40.67)	0.351
Female	88 (29.33)	178 (59.33)	
***Area of residence** (%)*			
Osu	93 (31.00)	180 (60.00)	1.000
Other	62 (20.67)	120 (40.00)	
***Religion** (%)*			
Christianity	142 (47.33)	278 (92.67)	
Islam	11 (3.60)	18 (6.00)	
ATR	1 (0.33)	1 (0.33)	0.568
Hinduism	1 (0.33)	3 (1.00)	
***Marital Status** (%)*			
Single	87 (29.00)	166 (55.33)	
Married	61 (20.33)	115 (38.33)	
Divorced	2 (0.67)	7 (2.33)	0.697
Co-habiting	4 (1.33)	9 (3.00)	
Widowed	1 (0.33)	3 (1.00)	
***Educational status** (%)*			
Tertiary			
Secondary	74 (24.67)	147(49.00)	
Primary or below	45 (15.00)	100 (33.33)	0.024
	36 (12.00)	53 (17.67)	
***NHIS enrolment** (%)*			
Yes	95 (31.67)	178 (59.33)	0.476
No	60 (20.00)	122 (40.67)	

Source: Survey data, 2017

4.1.2. Cross-tabulation of socio-demographic characteristics of pharmacy staff against dispensing of NPAs

Staff consisted of 15 (48.4%) men and 16 (51.6%) women. A higher proportion of male staff (45.2%) claimed to have dispensed NPAs than female (38.7%) staff. Among the 31 staff who participated in the survey, 26 (83.9%) claimed to have dispensed NPAs within the past 6 months. The proportion of staff cadre to have dispensed NPAs was highest among pharmacists (100%) than among technicians (75%) and MCAs (77.8%). Staff from all six pharmacies were aged below 58 years with 30 (96.7%) of them being younger adults aged between 18 and 37 years. In table 4.2 below, a cross-tabulation of socio-demographic characteristics of staff against their dispensing of NPAs is presented.

Table 4.4: Cross-tabulation of socio-demographic characteristics of pharmacy staff against dispensing of NPAs

Characteristic	*NPA disp. within past 6 months*	
	Yes	***Total (n=31)***
Age (%)		
18-37	25(80.65)	30(96.77)
38-57	1(3.23)	3(3.23)
Sex (%)		
Male	14(45.16)	15(48.39)
Female	12(38.71)	16(51.61)
Area of residence (%)		
Osu	8(25.81)	10(32.26)
Other	18(58.06)	21(16.74)
Religion (%)		
Christianity	24(77.42)	29(93.55)
Islam	2(6.45)	2(6.45)
Marital Status (%)		
Single	19(61.29)	22(70.97)
Married	7(22.58)	9(29.03)
Qualification (%)		
Pharmacist	9(29.03)	9(29.03)
Technician/Technologist	3(9.68)	4(12.90)
Medicine Counter Asst.	14(45.16)	18(58.06)

Source: Survey data, 2017

4.2. Pharmacy location

The analysis of NPA use by clients according to pharmacy location revealed that, there was no significant association (p>0.05) between pharmacy location and NPA usage by clients. The highest number of respondents to have used NPAs was clients who visited pharmacies located along the Oxford Street, 55 (18.3%) as shown in figure 4.1. With the exception of pharmacies found at the Oxford Street and environs,

staff from all the regions of the study area reported to have previously dispensed NPAs (figure 4.2).

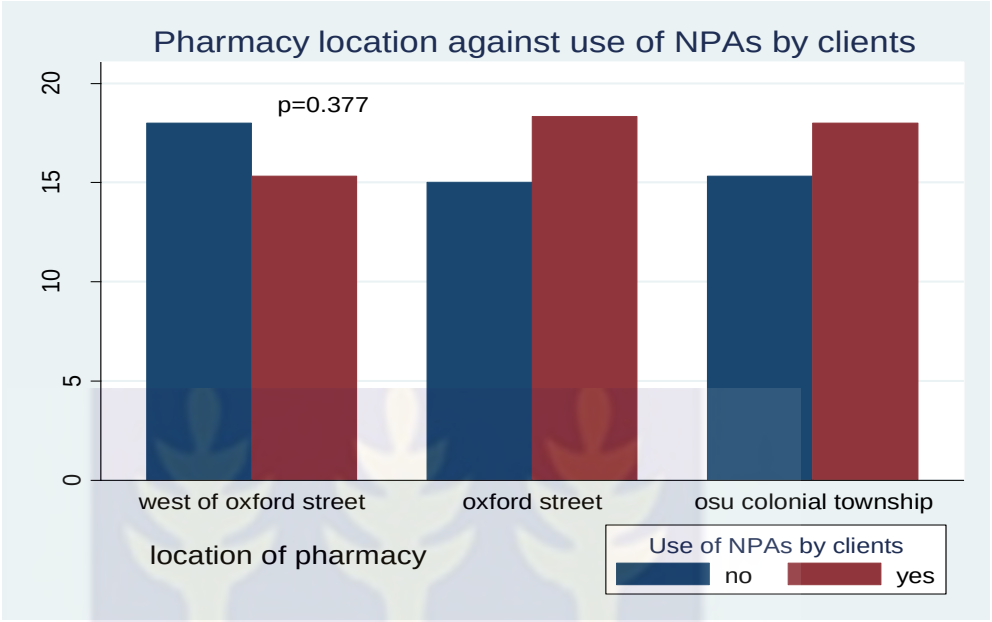

Figure 4.1: Graph of pharmacy location against relative frequency of NPA use within the past 6 months. ***Source: Survey data, 2017.***

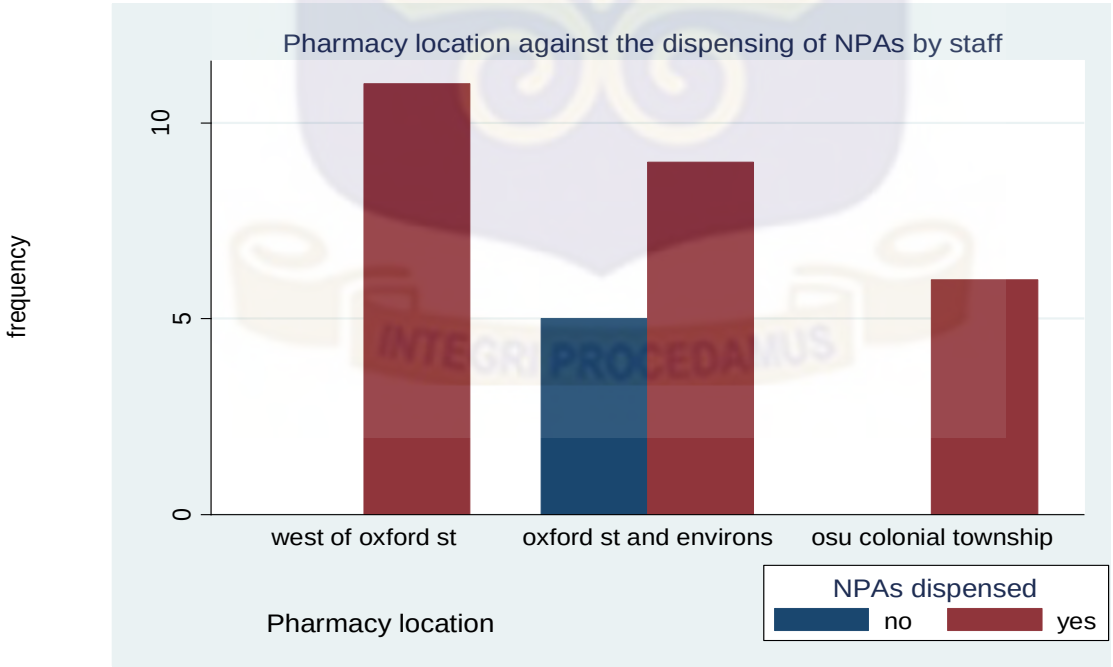

Figure 4. 2. : Graph of pharmacy location against frequency of NPA dispensed within the past 6 months. ***Source: Survey data, 2017***

4.3. Use of NPAs by clients of pharmacies within the past 6 months

In this section the factors influencing the dependent variable, ‗use of NPAs in the past 6 months' are examined. The predisposing factors, enabling factors and reinforcing factors were analysed to determine which factors had a statistically significant association with the use of NPAs. The magnitude of this association was also determined statistically and is presented below.

4.3.1. Predisposing factors influencing use of NPAs

The following proposed predisposing factors were examined in this study:

1. Attitudes toward self-medication with antibiotics.
2. Beliefs about the situational use of antibiotics.
3. Attitudes toward the situational use of antibiotics.
4. Knowledge of the effectiveness of antibiotics.

Table 4.5 presents a summary of the predisposing factors in a cross tabulation with the use of NPAs by clients within the past 6 months.

Attitudes towards self-medication with antibiotics

Cross-tabulation of the ‗attitudes of clients toward self-medication with antibiotics' and their use of NPAs indicated that out of 218 (72.7%) respondents who had unhealthy attitudes toward self-medication with antibiotics, a total of 122 (40.7%) had used NPAs within the past 6 months. This relationship implied that NPA use among clients increased with an increase in the number who had poor ‗attitudes toward self-medication with antibiotics' and was statistically significant ($p<0.02$).

Beliefs about the use of antibiotics for treatment of minor ailments

Antibiotic use by clients was higher among respondents who had unhealthy beliefs, 109 (36.3%) about the use of NPAs for the treatment of minor ailments such as sore throat and common cold, than among those with healthier beliefs, 46 (15.3%). This association was statistically significant (p<0.01).

Attitudes toward the situational use of antibiotics

Data analysis indicated that among 187 clients with poor attitudes toward the situational use of antibiotics, 110 (36.7%) had used NPAs within the past 6 months. This compared to 45 (15.0%) NPA users out of 113 respondents who had healthier attitudes toward the situational use of antibiotics. The relationship was statistically significant (p<0.01). This implies that, an increase in poor attitudes corresponds with an increase in the situational use of NPAs among clients.

Knowledge of the effectiveness of antibiotics

Comparison of the use of NPAs among clients who had inadequate knowledge of the effectiveness of antibiotics with that of clients who had adequate knowledge of the effectiveness of antibiotics revealed that, there was no significant difference between the two groups (p>0.05). The use of NPAs was however, higher, 95 (31.7%) among clients with inadequate knowledge of the effectiveness of antibiotics than among those with adequate knowledge, 60 (20.0%).

Table 4.5: Predisposing factors that influence use of NPAs from community pharmacies

Predisposing factors	*NPA use within past 6 months*		*P-value*
	Yes	***Total (n=300)***	
Attitudes towards self-medication with antibiotics [φ] *(%)*			
Healthy	33(11.00)	82(27.33)	0.015
Unhealthy*	122(40.67)	218(72.67)	
Beliefs about the use of antibiotics for the treatment of minor ailments *(%)*			
Healthy	46(15.33)	112(37.33)	0.005
Unhealthy *	109(36.33)	188(62.67)	
Attitudes towards the situational use of antibiotics *(%)*			
Healthy	45(15.00)	113(37.67)	0.001
Unhealthy †	110(36.67)	187(62.33)	
Knowledge about the effectiveness of antibiotics *(%)*			
Adequate	60(20.00)	126(42.00)	0.233
Inadequate [φ]	95(31.67)	174(58.00)	

* Percentage of respondents who answered to at least 50% of the items in the dimension incorrectly
† Percentage of respondents who answered to at least 45% of the items in the dimension incorrectly
[φ] Percentage of respondents who answered to at least 41% of the items in the dimension incorrectly

Source: Survey data, 2017.

4.3.2. Enabling factors influencing use of NPAs

The following proposed enabling factors were examined by cross-tabulation with the use of NPAs within the past 6 months:

1. Accessibility of healthcare facilities.
2. Affordability of healthcare.
3. Perceived availability of NPAs.

Results of the analysis are presented below and summarized in table 4.6.

Accessibility of healthcare facilities

The perception of clients of the accessibility of healthcare facilities was positively associated with antibiotic use since 138 (46.0%) of respondents had used NPAs and answered _yes‘ to _easy accessibility of health facilities‘. This association was however, insignificant (p>0.05).

Distance from the nearest health facility and accessibility of health facilities

The cross-tabulation of the _distanœ from the nearest health facility‘ with the clients‘ perception of the accessibility of health care facilities showed that there was a statistically significant relationship between the two variables (p<0.001). Majority of respondents answered _yes‘ to _easy access to health facilities‘ when the nearest health facility was found _within the same neighbourhood‘ of residence. This relationship is depicted in figure 4.3 below.

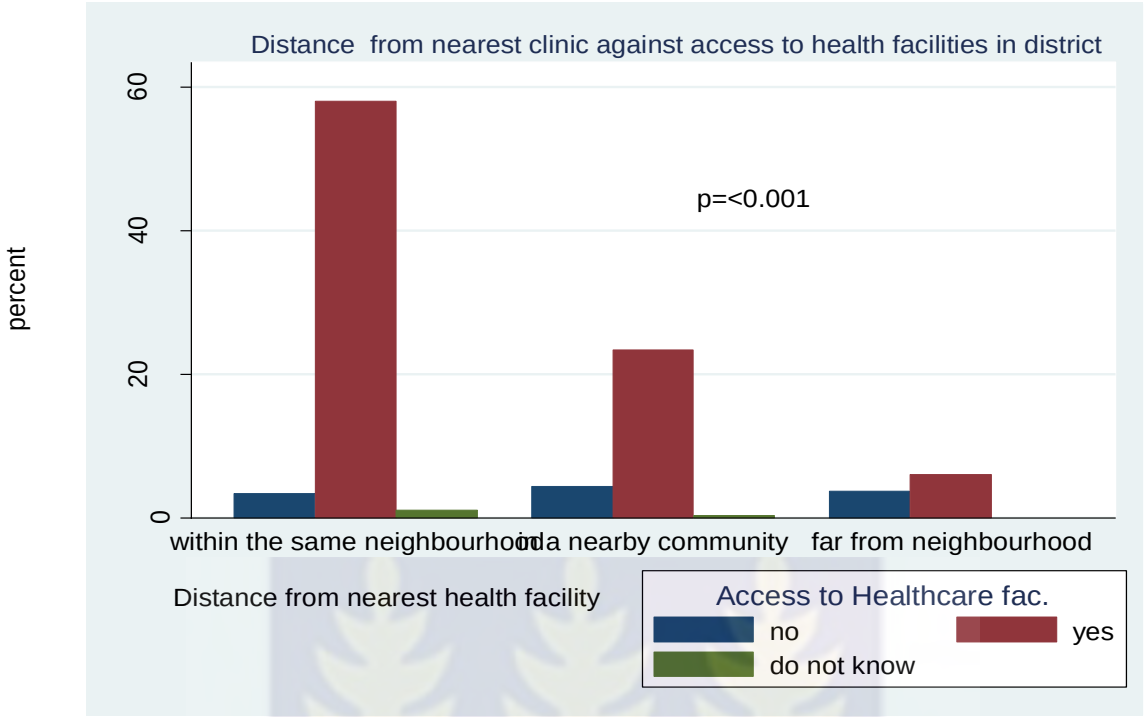

Figure 4. 3. : Graph of distance from the nearest health facility against access to health facilities in the district. Source: Survey data, 2017.

Source: Survey data, 2017

Affordability of healthcare

The use of NPAs within the past 6 months was found to be higher, 117 (39.0%) among clients who perceived health facilities in their districts of residence as affordable as compared to those who did not find them affordable 31 (10.3%). This difference was however, insignificant (p>0.05).

NHIS enrolment and affordability of health facilities in district of residence of clients

The perception of the affordability of healthcare facilities was also higher among NHIS enrollees than among non-NHIS enrollees. This difference was however, not significant (p>0.05) as shown in figure 4.4 below.

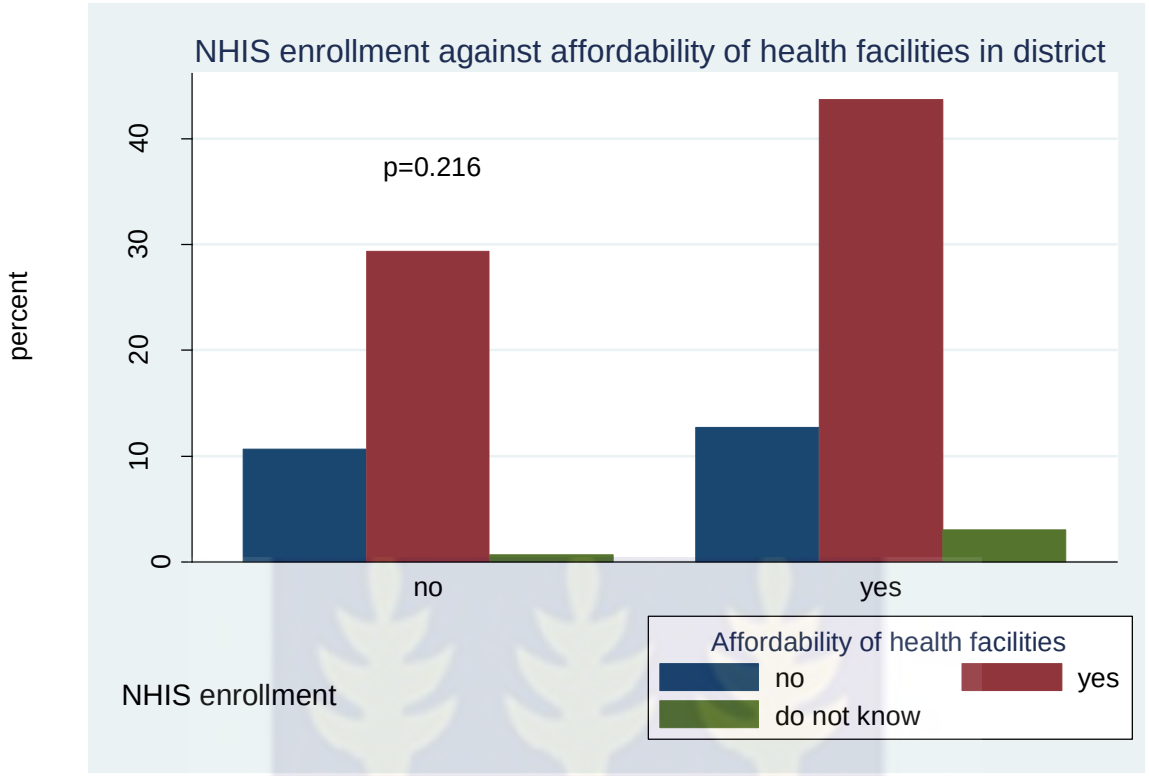

Figure 4.4: Graph of NHIS enrolment against affordability of healthcare. Source: Survey data, 2017

Perceived availability of NPAs

A higher number of clients, 226 (75.3%) who perceived that antibiotics could be obtained from the pharmacies without a valid prescription also corresponded with the large number of clients who had used NPAs, 129 (43.0%). This association was statistically significant ($p<0.01$).

Table 4.6: Enabling factors that influence use of NPAs from community pharmacies

Enabling factors	*Antibiotic use within past 6 months*		*P-value*
	Yes	***Total (n=300)***	
Access to health facilities within one's district *(%)*			
Easily accessible	138(46.00)	262(87.33)	
Not easily accessible	14(4.67)	34(11.33)	0.290
Do not know	3(1.00)	4(1.33)	
Affordability of health facilities within one's district *(%)*			
Affordable	117(39.00)	219(73.00)	
Not affordable	31(10.33)	70(23.33)	0.297
Do not know	7(2.33)	11(3.67)	
Perceived availability of NPAs from pharmacies in Osu *(%)*			
Yes	129(43.00)	226(75.33)	
No	26(8.67)	71(23.67)	0.002
Do not know	0(0.00)	3(1.00)	

Source: Survey data, 2017.

4.4. Dispensing of NPAs by staff within the past six months

In this section, reinforcing and enabling factors influencing the dispensing of NPAs by staff of community pharmacies are examined.

4.4.1. Reinforcing factors influencing the dispensing of NPAs

The proposed reinforcing factors assessed include the following:

1. Knowledge about rational use of antibiotics and AR
2. Attitudes towards dispensing of antibiotics
3. Dispensing behaviour of staff in four hypothetical situations

Knowledge of rational use of antibiotics and AR

Cross tabulation of the knowledge of staff of AR with their dispensing of NPAs within the past 6 months showed that a large proportion, 22 (70.9%) had adequate knowledge of AR, but had also dispensed NPAs while 4 (12.6%) had inadequate knowledge of AR and had dispensed NPAs.

Attitudes towards dispensing of antibiotics

The results indicated that 19 (64.5%) respondents who had poor attitudes toward dispensing claimed to have dispensed NPAs while 6 (19.3%) with healthy attitudes reported dispensing NPAs.

Dispensing behaviour of staff in four hypothetical situations

From the four hypothetical situations, a composite measure of the tendency of staff to dispense NPAs (dispensing behaviour) was obtained. A higher number of staff, 25

(80.7%) had the tendency of inappropriate dispensing behaviour and had also actually dispensed NPAs recently as compared to the number that had appropriate dispensing behaviour, 1 (3.2%).

Table 4.6: Reinforcing factors influencing dispensing of NPAs by staff

Reinforcing Factors	**NPA dispensed within the past 6 months**	
	Yes	***Total (n=31)***
Knowledge of rational use of antibiotics and AR *(%)*		
Adequate	22(70.97)	25(80.65)
Inadequate*	4(12.90)	6(19.35)
Attitudes toward dispensing of antibiotics *(%)*		
Appropriate	6(19.35)	9(29.03)
Inappropriate*	20(64.52)	22(70.97)
Dispensing behaviour in four hypothetical situations *(%)*		
Appropriate	1(3.23)	1(3.23)
Inappropriate*	25(80.65)	30(96.77)

* Percentage of respondents who answered to at least 41% of the items in the dimension incorrectly

Source: Survey data, 2017.

4.4.2. Enabling factors influencing the dispensing of NPAs

As described below, the perceived patient demand, a proposed enabling factor for the dispensing of NPAs was examined in two situations:

1. Where the patient may obtain a prescription for the antibiotics and accuse staff of delaying treatment, and
2. Where the patient is known to have difficulty in obtaining a medical consultation.

Perceived patient demand

In the case where the patient may obtain a prescription for the antibiotics and later accuse staff of delaying treatment, all 8 (25.8%) respondents who disagreed with this statement had dispensed NPAs while 16 (51.6%) out of 21 respondents who agreed with the statement had also dispensed NPAs (figure 4.5). On the other hand, 14 (45.2%) staff agreed that NPAs were sometimes dispensed because a patient was known to have difficulty in obtaining a medical consultation all of whom had also dispensed NPAs recently. Comparatively, 9 out of 12 staff who disagreed with the statement had also dispensed NPAs. This difference is shown in figure 4.6 below.

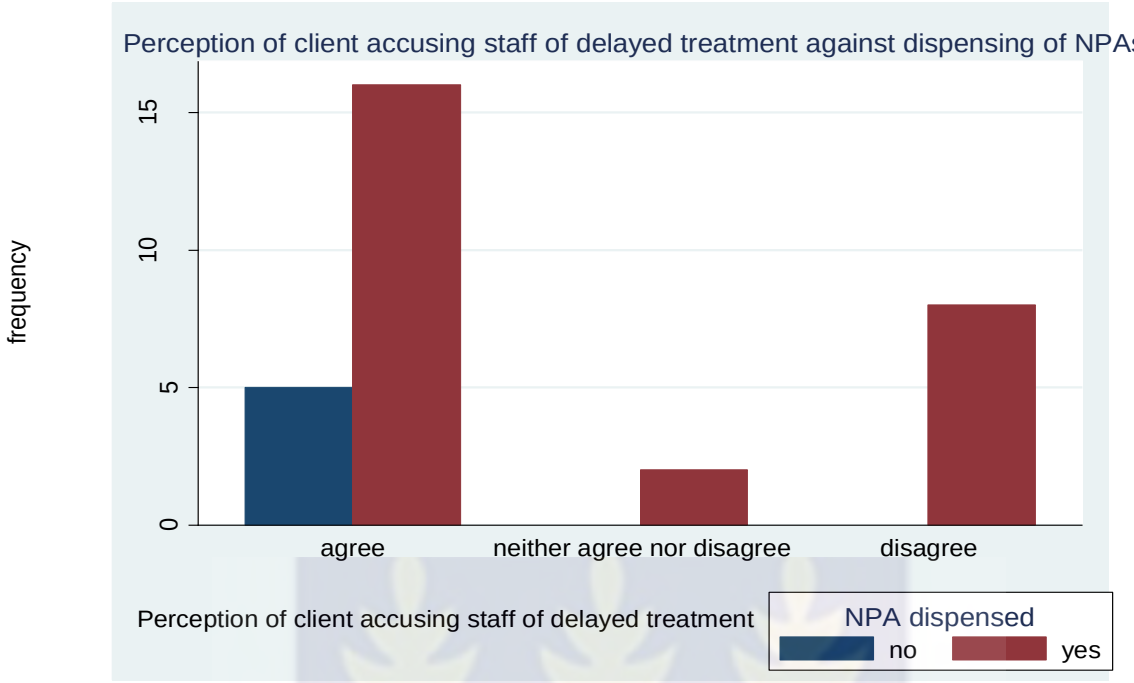

Figure 4. 5. : Graph of the perception of patient accusation of delayed treatment against dispensing of NPAs by staff. ***Source: Survey data, 2017***

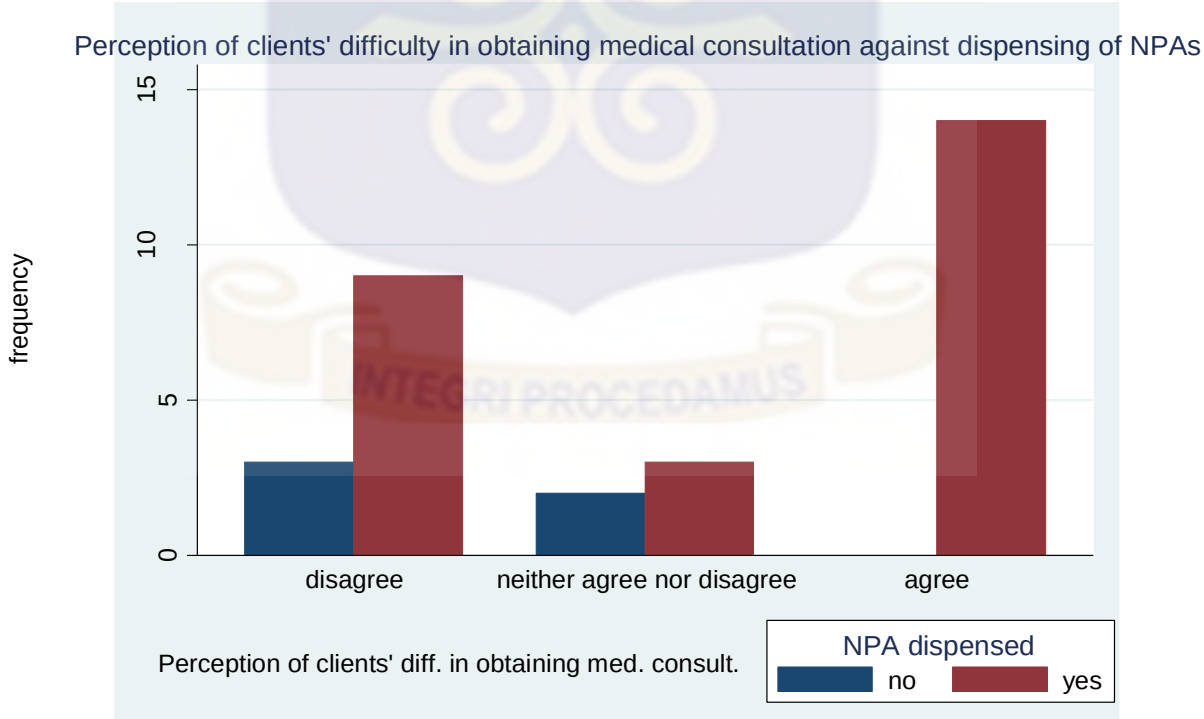

Figure 4.6: Graph of the perception of difficult medical consultation against dispensing of NPA by staff. ***Source: Survey data, 2017.***

4.5. Association between some selected variables and use of NPAs by clients.

The table below represents the odds ratios of factors influencing the use of NPAs by clients of pharmacies in Osu. Both the crude and adjusted odds ratios are presented for age, educational status, the proposed predisposing and enabling factors to the use of NPAs by clients in table 4.7 below.

Persons aged 38-57 years were 9% and 21% more likely to have used NPAs compared to those aged 18-37 years in the simple and multiple logistic regression respectively though this was not significant (p>0.05). Older respondents aged 58 years and above were 58% and 30% less likely to have used NPAs from the crude and adjusted odds ratios obtained respectively as compared to the referent group of younger adults (18-37 years).

Given that a respondent had primary education or below, the crude and adjusted odds of having used NPAs were 2.09 and 2.19 respectively as compared to those with tertiary education. This was significant for both the simple and adjusted logistic regression (p<0.05).

With the exception of the knowledge of the effectiveness of antibiotics, all other proposed predisposing factors were significantly associated (p<0.02) with the use of NPAs in the simple logistic regression. None of them showed a significant association in the multiple logistic regression. Clients with healthier attitudes toward self-medication with antibiotics were 47% and 20% less likely to have used NPAs as compared to those with unhealthy attitudes from the simple and multiple logistic regression respectively.

Given that a client had healthier beliefs about the use of antibiotics for the treatment of minor ailments, the likelihood of having used NPAs was 49% and 41% less than if a client had unhealthy beliefs from the crude and adjusted odds ratios respectively. Where respondents expressed healthier attitudes towards the situational use of antibiotics, they were 64% and 39% less likely to have used NPAs as compared to where they had unhealthy attitudes.

Neither the affordability nor the accessibility of health facilities showed a significant association with the use of NPAs from both the simple and multiple logistic regression. Respondents were however, 44% (COR) and 71% (AOR) more likely to have used NPAs where they perceived health facilities as affordable as compared to where they did not. Additionally, clients who perceived health facilities as easily accessible were 4.29 times (COR) and 2.10 (AOR) times as likely to have used NPAs as compared to those who did not. Given that a client perceived the possibility of obtaining NPAs from pharmacies in Osu, the likelihood of the client having used NPAs was 2.30 (COR) and 2.20 (AOR) times than in a client who perceived otherwise. This relationship was statistically significant ($p<0.02$) for both the crude and adjusted odds ratios.

Table 4.7: Odds Ratios of factors influencing the use of NPAs by clients of community pharmacies in Osu (by categories)

Factor	*Crude OR (95% CI)*	*Adjusted [a] OR (95% CI)*
Age		
18-37	1.00	1.00
38-57	1.09 (0.66-1.88)	1.21 (0.67-2.19)
58 and above	0.42 (0.16-1.07)	0.70 (0.24-2.08)
Education		
Tertiary	1.00	1.00
Secondary	0.80 (0.48-1.34)	0.83 (0.47-1.46)
Primary or below	2.09 (1.08-4.05)*	2.19 (1.05-4.55)*
Attitudes towards self-medication with antibiotics [Φ]		
Unhealthy	1	1
Healthy	0.53 (0.32-0.89)**	0.80 (0.44-1.45)
Beliefs about the use of antibiotics for the treatment of common ailments [Φ]		
Unhealthy	1.00	1.00
Healthy	0.51 (0.31-0.89)**	0.59 (0.34-1.04)
Attitudes towards the situational use of antibiotics [Φ]		
Unhealthy	1.00	1.00
Healthy	0.46 (0.29-0.75)**	0.61 (0.35-1.05)
Knowledge about the effectiveness of antibiotics [Φ]		
Inadequate	1.00	1.00
Adequate	0.76 (0.48-1.20)	0.93 (0.56-1.54)
Accessibility of health facilities in district		
Not easily accessible	1.00	1.00
Easily accessible	1.58 (0.77-3.28)	1.33 (0.59-2.99)
Do not know	4.29 (0.40-45.57)	2.10(0.16-27.17)
Affordability of health facilities in district		
Not easily accessible	1.00	1.00
Easily accessible	1.44 (0.84-2.48)	1.71 (0.95-3.09)
Do not know	2.20 (0.59-8.21)	2.21 (0.52-9.37)
Perceived availability of NPAs		
No	1.00	1.00
Yes	2.30(1.32-3.99)**	2.20(1.21-4.02)**
Do not know	1.00	1.00

*P<0.05, **P<0.02. [Φ] Mean score computed for each dimension; higher score indicates more inappropriate attitudes and more incorrect beliefs. [a] Adjusted for all items in the table

Source: Survey data, 2017.

4.6. Chapter summary

The results of statistical analysis indicated that a proportion of 51.7% of client respondents and 83.9% of staff respondents had used and dispensed NPAs respectively within the past 6 months. Of the socio-demographic variables analysed, the educational status of clients was the only one to have a significant association with the use of NPAs from both the chi square tests ($p<0.05$) and results of simple ($p<0.02$) and multiple ($p<0.02$) logistic regression.

Among the predisposing factors to the use of NPAs by clients, the _inappropriate attitudes toward self-medication with antibiotics', the _incorrect beliefs about the use of antibiotics for the treatment of common ailments' and the _inappropriate attitudes toward the situational use of antibiotics' each showed a statistically significant relationship with the outcome of interest from the chi-square tests.

Majority (80.7%) of staff respondents had adequate knowledge of antibiotics and antibiotic resistance, but 71% had inappropriate attitudes while 97% had the tendency to dispense NPAs in four hypothetical case scenarios (diarrhoea, URTI, UTI and any infection for which a client undertakes to bring a prescription).

With respect to the perceived patient demand as a proposed enabling factor, 14 (45.2%) were of the perception that antibiotics were sometimes dispensed because clients may have difficulty in obtaining a medical consultation. All the14 staff had also dispensed NPAs within the past six months. About 16 (51.6%) out of 21 of staff who acknowledged that NPAs were sometimes dispensed for fear of patient accusing staff of having delayed treatment had dispensed NPAs recently.

The perceived availability of NPAs from pharmacies in Osu was the only enabling factor that was found to be associated with the use of NPAs by clients within the past six months from chi-square tests. Clients were 2.3 and 2.2 times more likely to have used NPAs where the possibility of obtaining antibiotics without a doctor‘s prescription was perceived as compared to where it was not in the simple and multiple logistic regression respectively. This relationship was significant for both cases ($p<0.05$).

In the next chapter, the key findings of statistical analysis are discussed based on the research objectives. The results are compared with that obtained by other researchers. Linkages between the results and the conceptual framework are drawn in the discussion.

CHAPTER FIVE

DISCUSSION OF EMPIRICAL FINDINGS

5.0. Introduction

Access to NPAs from community pharmacies is a phenomenon, which cannot be ignored in tackling the growing threat of antibiotic resistance. Based on the PRECEDE model of health behaviour, some proposed factors influencing access to NPAs (use and dispensing) have been analysed in the previous chapter. The key research findings have been discussed in relation to existing literature in this chapter.

The following write-up is organized under five sections. The influence of the socio-demographic characteristics of respondents on access to NPAs is presented in section 5.1. In section 5.2, the predisposing factors influencing access to NPAs are examined. The reinforcing and enabling factors influencing access to NPAs are discussed in sections 5.3 and 5.4 respectively. At the end of the chapter, a summary is presented in section 5.5.

5.1. Socio-demographic factors

This study reports a proportion of 51.7% of NPA usage within the past 6 months among 300 clients who participated in the client exit interviews. A proportion of 83.9% of staff from the 6 participating pharmacies had dispensed NPAs within the past 6 months.

The proportion of clients who had used antibiotics for self-medication was lower than that obtained in a similar study that was carried out in the Cape-Coast metropolis of

Ghana, where the proportion of NPA usage among clients was 71.5% (Tagoe & Attah, 2009). The difference may be largely due to the fact that unlike the study in Cape-Coast where NPA usage by clients was not specified over a period, this exit survey sought to determine NPA usage only within the past 6 months.

Of the socio-demographic variables analysed with NPA usage among clients, education was the only one that was significantly associated with the outcome variable in the cross-tabulation using the chi square test. Bivariate and multivariate logistic regression showed that persons with primary education or below were 2.09 (CI: 1.08-4.05, $p<0.05$) and 2.19 (CI: 1.05-4.55, $p<0.05$) times more likely to have used NPAs respectively as compared to those with tertiary education status. This relationship was statistically significant ($p<0.05$) and it is similar to findings from an Ethiopian study on the factors associated with inappropriate use of antibiotics. Lower levels of education and inability to read and write were shown to have increased the likelihood of self-medication with antibiotics among respondents (Gebeyehu, Bantie, & Azage, 2015). It has been hypothesized that due to opportunities of professional or formal sector employment and perquisites of medical insurance that educated persons are more likely to enjoy, they may be better able to afford a medical consultation. Hence, there is the possibility that they may have less of a need to indulge in self-medication with antibiotics (Saradamma *et al*., 2000).

Age was shown to be significantly related to self-medication with antibiotics in the above mentioned study by Gebeyehu and colleagues (2015), where persons aged less than 25 years and between 25 and 34 years were more likely to have used NPAs as compared to persons aged above 54 years. Similarly, findings of this study showed

that persons aged above 58 years were 59% and 33% less likely to have used NPAs as compared to those aged 18-37 years in bivariate and multivariate logistic regression respectively. The association of age with NPA usage was however, not significant.

The staff survey elicited that a majority (58%) of staff were Medicine Counter Assistants of which 77.8% had dispensed NPAs recently. All nine pharmacists and 3 out of the four technicians admitted to have dispensed NPAs. Though the current analysis is descriptive, a similar study carried out in Zambia showed that staff qualification was significantly associated with the non-prescription sale of antibiotics (Kalungia *et al*., 2016). On the contrary, the trend in that study was such that higher qualification of personnel corresponded with a decreased likelihood to sell NPAs (Kalungia *et al*., 2016). Possibly, the small number of staff involved in this current research was not adequate to determine the relationship between staff qualification and dispensing of NPAs. Thus, if the survey had been carried out on a larger scale, a significant variation may have been elicited.

5.2. Predisposing factors influencing access to NPAs

As described in an European study by Grigoryan and colleagues (2008), this study also showed that the unhealthy attitudes of clients toward self-medication with antibiotics (for diarrhoea) was significantly associated with their use of NPAs from chi-square tests. The same was true with the unhealthy beliefs about the use of antibiotics for minor ailments and unhealthy attitudes towards the situational use of antibiotics. The relationships between these variables and the outcome variable were statistically significant (Grigoryan *et al*., 2008). Results of multiple logistic

regression in this current study however, indicated that none of the proposed predisposing factors showed a strong association with the use of NPAs by clients within the past 6 months (p>0.05). The likelihood of NPA usage was however, higher among persons with unhealthy attitudes, beliefs and inadequate knowledge of antibiotics as compared to those with healthier predisposing characteristics.

Among the predisposing factors for this study, the inadequate knowledge of clients of the effectiveness of antibiotics did not show any significant relationship with the use of NPAs within the past 6 months from both the chi square tests and logistic regression. The same was observed in the above mentioned European study (Grigoryan *et al*., 2008). A large proportion of respondents (58%) however, had inadequate knowledge of the effectiveness of antibiotics, which was not different from findings of other researchers who assessed public knowledge of the difference between infections caused by bacteria and viruses and indications for the use of antibiotics (Mazi, Stru, & Hryniewicz, 2017; Shehadeh et al., 2012). It has been recommended that instead of simply making reference to ailments as ‗infections' when patients consult a physician, there should be a distinction made between viral and bacterial infections (Pereko, Lubbe, & Essack, 2015). Such educational interventions may increase public awareness about the effectiveness and indications for antibiotics and encourage rational use of these medicines.

5.3. Reinforcing factors influencing access to NPAs

Though a large proportion (80.7%) of staff had adequate knowledge of antibiotics and resistance, majority (83.9%) in this study had dispensed antibiotics without a medical

prescription within the past six months. A proportion of 71% of personnel had inappropriate attitudes toward the dispensing of NPAs out of which a large proportion, (64.5%) had dispensed NPAs. In other research, it was discovered that several instances of increased agreement with statements concerning the knowledge or inappropriate attitudes toward antibiotic use and resistance corresponded with the tendency of Portuguese pharmacists to dispense them without a medical prescription (Roque *et al*., 2015). It has also been proposed that the unawareness of dispensing personnel about the legal classification of antibiotics as POMs may be a reason, which partially influences their inappropriate dispensing practices (Hadi *et al*., 2016).

All but one pharmacy personnel gave answers, which suggested an inappropriate dispensing behaviour in at least, two of the four hypothetical situations (diarrhoea, URTIs, UTIs and any infection for which a client undertakes to bring a prescription). Out of this number, 80.7% reported to have dispensed NPAs within the past 6 months. The dispensing of NPAs for the treatment of diarrhoea and URTIs has been observed in simulated client studies from pharmacies (Alabid, Ibrahim, & Hassali, 2014; Shet, Sundaresan, & Forsberg, 2015), which confirmed the common practice of dispensing NPAs for simple ailments without following standard treatment guidelines (Vialle-Valentin, Lecates, Zhang, Desta, & Ross-Degnan, 2012).

In a developed country as England, it has been proposed that the dispensing of trimethoprim, an antibiotic for the treatment of moderate to severe UTI be initiated by community pharmacists under strict clinical guidelines (Booth *et al*., 2013). This was based on a comparative study of the said service provided by community pharmacists with that provided by general practitioners. Such a development was aimed at

achieving improved treatment outcomes while ensuring rational antibiotic use (Booth *et al*., 2013). This current study only sought to examine the dispensing behaviour of pharmacy personnel in four situations, including UTIs, but did not determine if pharmacy personnel followed standard guidelines for the dispensing of antibiotics in those situations.

The use of a simulated client strategy is recommended for health care provider studies in developing countries and it is better suited for determining the behavior of pharmacy staff regarding antibiotic dispensing. Padget *et al*. (2016), suggest that such a strategy minimises pre-meditated responses from health providers, reflects a truer picture of the practice and may be considered in future studies to examine the reinforcing factors influencing access to NPAs (Padget *et al*., 2016).

5.4. Enabling factors influencing access to NPAs

Contrary to expectations, the accessibility and affordability of health facilities within the district of residence of clients did not show any statistically significant relationship with the use of NPAs within the past 6 months. A proportion of 87.5% of clients perceived that health facilities were easily accessible while 72.4% perceived them to be affordable. The distance of clients‘ residence from the nearest health facility showed a statistically significant relationship with the perception of accessibility of the health facility (p<0.001). Enrollment on the NHIS did not have any significant correlation with the perception of affordability of health facilities by clients (p>0.05). This does not agree with findings in literature where subscribers to

the scheme perceived healthcare as relatively affordable (Gobah & Zhang, 2011; Noi, 2012).

From a qualitative study comparing the experiences of NHIS subscribers with non-subscribers in the Ga-East Municipality (Greater Accra Region) as well as another cross-sectional survey in the Akatsi District (Volta Region), it was noted that formal healthcare was more easily accessible to NHIS subscribers than non-subscribers though there were a number of perceived barriers to enrollment onto the scheme (Gobah & Zhang, 2011; Noi, 2012). Economic barriers to accessing healthcare have been known to be key determinants of self-medication with antibiotics (Saradamma *et al*., 2000). Developing countries like Ghana are faced with the double responsibility of ensuring better access to antibiotics (where most needed) and the rational use of these medicines (Ocan *et al*., 2015).

Where clients perceived that antibiotics could be obtained without a prescription from pharmacies in Osu, there was a 2.2 (CI: 1.21-4.02, $p<0.02$) times increase in the likelihood of they having used NPAs within the past 6 months as compared to where this availability was not perceived. This result is consistent with findings of Grigoryan and colleagues (2008), where respondents in an European survey were 151% more likely to have used NPAs where they perceived their availability without a medical prescription than if they had not, though not statistically significant. It is therefore, important that the _Prescription only‘ status of antibiotics is enforced, especially with respect to the sale of antibiotics from community pharmacies in Ghana; to create an enabling environment for healthy behaviour (Vialle-Valentin *et al*., 2012). Much

advocacy and coalition building amongst stakeholders, including healthcare workers, patients and policy makers on the issue of antibiotic resistance is needed.

Some of the staff (29.0%) who agreed that antibiotics were sometimes dispensed because clients might have a difficulty in obtaining a medical consultation also admitted that they had dispensed NPAs. All the staff who disagreed with the statement above had also dispensed NPAs and constituted 45.2% of respondents. The fact that 29.0% of the staff agreed with the statement suggests that the decision to dispense antibiotics without a doctor‘s prescription may be influenced by the dispensing personnel‘s perception of a client‘s difficulty in obtaining a medical prescription similar to existing evidence (Roque *et al*., 2015).

A proportion of 25.8% of staff agreed that NPAs were sometimes dispensed because it was feared that the patient might accuse the staff of having delayed treatment and might later bring a prescription. All of such respondents had also dispensed NPAs recently, implying that the perception of pharmacy personnel in that regard could also influence them to dispense NPAs. In Saudi Arabia, a qualitative study elicited that community pharmacists‘ choice of whether to dispense a generic or branded medication was influenced by the appearance of the client in question, i.e. his or her disposition or social status (Albadr & Khan, 2015). A similar study design might give more insight into the influence of the perceived patient demand on the dispensing of antibiotics by staff of community pharmacies in Osu.

5.5. Chapter summary

In summary, a proportion of 51.7% of clients had used NPAs within the past 6 months while 83.9% of pharmacy personnel had dispensed NPAs within the same period. The educational status of client respondents was significantly associated with the use of NPAs within the past six months. Persons with primary education or below were 2.19 times as likely to have used NPAs previously as compared to those with tertiary education. Among the factors examined, clients' perceived availability of antibiotics was the strongest determinant of their use of NPAs. Clients were 2.21 times as likely to have used NPAs if they perceived the possibility of obtaining NPAs from pharmacies in Osu than if they did not.

Most of the staff who participated in the survey had adequate knowledge of the use of antibiotics and AR. Their attitudes toward the dispensing of antibiotics and their dispensing behaviour in four hypothetical scenarios were to a large extent inappropriate and might have possibly influenced them to dispense NPAs, making them easily accessible to clients. Thus, the irrational use of antibiotics is encouraged.

In the chapter that follows, a summary of the study is provided. Statements of conclusion on study findings are made as well as recommendations for policy makers and future research. The chapter also describes the limitations of the study and their effect on its generalizability.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.0. Introduction

In this last chapter, five sections are presented. A general recap of study objectives, methods and general findings is given. The summary is followed by conclusions of the study, which are broadly based on literature in the study area. Recommendations for policy makers, study limitations and finally, areas for future research are presented in the last three sections.

6.1. Summary of the study

This research was undertaken with the objective of examining the predisposing, reinforcing and enabling factors that influence access to NPAs from community pharmacies in Osu, Greater Accra. Quantitative methods within a fixed design were employed for the study. Both interviewer-administered and self-administered questionnaires were used for client exit-interviews and staff surveys respectively. Both questionnaires were adapted from that of other researchers (Grigoryan et al., 2008; Roque et al., 2015).

Three hundred (300) consecutively sampled clients and 31 purposively sampled staff of six pharmacies in Osu, participated in this study. Statistical analysis involved the application of STATA 14 using chi-square tests and logistic regression for association of independent variables with access to NPAs for the client survey. Cross tabulation of independent variables with the dispensing of antibiotics for the staff survey was carried out without further analysis.

Results showed that the most significant determinants of the use of NPAs were the educational status of clients; and the perceived availability of NPAs from pharmacies in Osu. Staff of pharmacies mostly had adequate knowledge of antibiotics and AR, but had inappropriate attitudes and behaviour toward the dispensing of antibiotics, which might have possibly been a reason for the high prevalence of NPAs dispensed within the past 6 months.

6.2. Conclusions of the study

Antibiotic resistance (AR) threatens healthcare quality due to its resultant effect of increasing the risk of pandemics and chronic disease (World Economic Forum (WEF), 2013). Rational use of antibiotics is necessary to help minimise the unavoidable occurrence of antibiotic resistance and to make essential antibiotics available where, when and to whom they are most needed. Where there is an increased access to NPAs, the risk of antibiotic resistance also increases thus compromising the quality of healthcare (Centre for Disease Dynamics, 2015).

Predisposing factors

The study concludes that unhealthy attitudes and beliefs of clients about antibiotics was associated with their use of NPAs. Though the magnitude of this association was not found to be significant in this study, public education programs ought to address the socio-cultural norms and practices, which shape the attitudes and beliefs of the public about antibiotics (Haak, 1988; Radyowijati & Haak, 2003).

Reinforcing factors

This study argues that since most staff had inappropriate attitudes and behaviour toward dispensing of NPAs, it was possible that the attitudes of pharmacy staff could influence their dispensing behaviour towards antibiotics, making them available from community pharmacies without a valid prescription. Efforts should be made to address this since dispensers of medicines, especially pharmacists, play a crucial role in the provision of pharmaceutical care (Smith, 2004). In some communities, they are the closest form of health workers available to serve therefore, they should be educated on the rational use of antibiotics and supervised to provide better service as suggested (Finch *et al*., 2004)

Enabling factors

This study concludes that access to NPAs from community pharmacies in Osu was strongly influenced by the clients' perceived availability of antibiotics from pharmacies without a valid medical prescription. As reported by earlier studies, it was obvious that regulations governing the dispensing of these medicines might be loose (Gyansa-Lutterodt, 2013). In consequence, it is recommended that countries like Ghana, which seek to minimise the over-the-counter availability of antibiotics require stricter regulations on the dispensing of these medicines at the community setting (Dameh et al., 2012; Grigoryan et al., 2008; Ocan et al., 2015).

Contribution to Knowledge

The contribution of the study to existing knowledge is vast as presented under the following themes: policy and practice, and methodology.

Contribution to policy and practice

The study makes contribution to policy, practice and management of community pharmacies in the country and other settings with similar experiences. It would be recalled that the health sector has provided guidelines on the rational use of drugs and especially, antibiotics with the view to minimising AR (Gyansa-Lutterodt, 2013). The findings from this study may seem to suggest some of the reasons underlying the ineffectiveness involved in the implementation of these policy directives.

In an era where the establishment of community pharmacies is increasing in the country, it is imperative for policy makers and practitioners, especially the Pharmacy Council and related institutions to seek to organise regular in-service training programmes for staff and management of community pharmacies on the need to adhere to the application of existing guidelines on antibiotics dispensing (Adanu et al., 2008; Seiter & Gyansa-lutterodt, 2009). A similar educational programme could be directed toward the users of drugs, including antibiotics. Perhaps, there may be the need for some policy reforms given the reality that some of the community pharmacies may not have qualified pharmacists at post at all times as required by law (Republic of Ghana, 2013). Thus, the people's exposure to accessing antibiotics without a valid medical prescription may be high. Efforts should be geared towards this menace before it gets out of hand.

Contribution to methodology

Several researchers have applied different methods to collect data for analysis with respect to the dispensing and access to antibiotics (Dameh et al., 2012; Emeka et al., 2014; Kotwani et al., 2012; Widayati et al., 2011). The application of a quantitative

research method using adapted tools (Grigoryan et al., 2008; Fátima Roque et al., 2015; Togoobaatar et al., 2010), has helped to unearth the applicability of international protocols to a local context. Through the use of a quantitative method (unlike a qualitative study), the researcher was able to quantify the responses provided by the participants in this study. Thus, it is acceptable to generalise the findings to the population in the catchment area of this research.

6.3. Recommendations

Based on the study findings, the following suggestions are put forward for consideration by policy makers and practitioners.

Educational programmes targeted at promoting the rational use of antibiotics should focus on encouraging the general public to adopt healthier attitudes such as using antibiotics only with a valid prescription and on correcting unhealthy beliefs about the use of antibiotics for minor ailments.

Regulation of the sale of antibiotics should be intensified by the relevant agencies, especially at the community setting to alter clients‘ perception of their availability over-the-counter and consequently, reduce their demand for NPAs from the pharmacies. In particular, pharmacy staff should be educated on the need to adhere strictly to guidelines for antibiotic dispensing, especially with respect to the prescription only status of antibiotics through continuous development programmes organized by the Pharmacy Council and other bodies. This could improve the dispensing behaviour of the staff towards antibiotics.

6.4. Study limitations

Both the use and dispensing of NPAs by clients and staff respectively were self-reported. The limitation of recall bias was however, minimised by limiting the period of recollection to within the past 6 months. During data collection, interviewers were trained to thoroughly explain to clients the question, ―Have you used an antibiotic within the past 6 months without a doctors' prescription?" This was done so as to include the re-purchasing of antibiotics that had already been served with a prescription as well as the use of antibiotics based on the advice of a pharmacist (or any other health worker apart from a physician) as part of the intended definition of NPAs. Clients were also told of examples of antibiotics to enable them identify the medicines they had used for self-medication within the 6 month period. Antibiotics were differentiated from cold preparations and pain killers, which are medicines commonly used for self-medication in Ghana.

Randomization of the sample of respondents for both surveys was not done. This was due to limitations of an infinite population that was not all available at a particular time in the case of clients. The small number of pharmacy personnel from the 6 pharmacies also made it more prudent to include all consenting staff present at the pharmacies during the data collection period. Non-randomization as a limitation was minimised by dividing the study area into four representative zones (as earlier described in Chapter three) and selecting two consenting pharmacies from three of the zones. Every other consenting client visiting the pharmacies during data collection was enrolled into the study to introduce some degree of randomization. Though none

of the managers of pharmacies in the fourth zone consented to participating in the study, the results are representative enough of pharmacies in Osu as about 80% (12 out of 15) of the pharmacies are concentrated in the other three zones.

Not all the clients who had used NPAs within the past 6 months purchased them from pharmacies in Osu. However, it was assumed that being clients themselves of pharmacies in Osu, they might potentially purchase NPAs in the future from these pharmacies. This is buttressed by the fact that over 70% of the clients perceived that it was possible to obtain antibiotics from pharmacies in Osu, without a valid prescription. This study may therefore, be generalized as a study of ―Factors influencing access to non-prescribed antibiotics from community pharmacies in Osu".

6.5. Future Research

Future research should examine the reinforcing factors to the dispensing of NPAs by staff using mixed designs involving methods such as mystery client visits of pharmacies, focus group and in-depth interviews of staff. This will help to better understand the phenomenon of dispensing of NPAs from community pharmacies. The effects of other factors such as financial incentives and the influence of pharmaceutical marketing on the dispensing of NPAs by staff of community pharmacies may also be examined in future research. It is hoped that a study such as this would be carried out on a national scale to inform policy reforms on the implementation of Ghana's new Antibiotic Policy within communities.

REFERENCES

Abdul-Nasiru, S. (2015). *Rational Prescribing of Antibiotics in Children under 5 Years with Upper Respiratory Tract Infections in Kintampo Municipal Hospital*. *Ugspace*. university of Ghana. http://doi.org/10.1017/CBO9781107415324.004

Adamu, H., & Oche, M. (2013). Determinants of patient waiting time in the general outpatient department of a tertiary health institution in North Western Nigeria. *Annals of Medical and Health Sciences Research*, *3*(4), 588–592. http://doi.org/10.4103/2141-9248.122123

Adanu, R. M. K., Hill, A. G., Seffah, J. D., Darko, R., Anarfi, J. K., & Duda, R. B. (2008). Sexually Transmitted Infections and Health Seeking Behaviour among Ghanaian Women in Accra. *African Journal of Reproductive Health*, *12*(3), 151–158. http://doi.org/10.2307/20617082

Adu-Sarkodie, Y., Steiner, M. J., Attafuah, J., & Tweedy, K. (2000). Syndromic management of urethral discharge in Ghanaian pharmacies. *Sexually Transmitted Infections*, *76*(6), 439–42. http://doi.org/10.1136/sti.76.6.439

Alabid, A. H. M. A., Ibrahim, M. I. M., & Hassali, M. A. (2014). Antibiotics Dispensing for URTIs by Community Pharmacists (CPs) and General Medical Practitioners in Penang, Malaysia: A Comparative Study using Simulated Patients (SPs). *Journal of Clinical and Diagnostic Research : JCDR*, *8*(1), 119–23. http://doi.org/10.7860/JCDR/2014/6199.3923

Albadr, Y., & Khan, T. M. (2015). Factors influencing community pharmacist decision to dispense generic or branded medicines; Eastern Province, Alahsa, Saudi Arabia. *Saudi Pharmaceutical Journal*, *23*(2), 143–146. http://doi.org/10.1016/j.jsps.2014.07.002

Aminov, R. I. (2010). A brief history of the antibiotic era: Lessons learned and challenges for the future. *Frontiers in Microbiology*, *1*(DEC), 1–7. http://doi.org/10.3389/fmicb.2010.00134

Avorn, J., & Solomon, D. H. (2000). Cultural and economic factors that (mis)shape antibiotic use: the nonpharmacologic basis of therapeutics. *Annals of Internal Medicine*, *133*(2), 128–35. http://doi.org/10.7326/0003-4819-133-2-200007180-00012

Bagnall, N. M., Vig, S., & Trivedi, P. (2009). Surgical-site infection. *Surgery*, *27*(10), 426–430. http://doi.org/10.1016/j.mpsur.2009.08.007

Bartoloni, A., Cutts, F., Leoni, S., Austin, C. C., Mantella, A., Guglielmetti, P., … Paradisi, F. (1998). Patterns of antimicrobial use and antimicrobial resistance among healthy children in Bolivia. *Trop Med Int Health*, *3*(2), 116–123. Retrieved from http://onlinelibrary.wiley.com/store/10.1046/j.1365-3156.1998.00201.x/asset/j.1365-3156.1998.00201.x.pdf?v=1&t=ii8u6tke&s=861bdf4354f1526f24cb97a6e96c56dc2b806c35

Booth, J. L., Mullen, A. B., Thomson, D. A. M., Johnstone, C., Galbraith, S. J., Bryson, S. M., & McGovern, E. M. (2013). Antibiotic treatment of urinary tract infection by community pharmacists: a cross-sectional study. *The British Journal of General Practice : The Journal of the Royal College of General Practitioners*, *63*(609), e244-9. http://doi.org/10.3399/bjgp13X665206

Bosu, W. K. (1996). *A Survey of Prescribing Patterns in the Wassa West District of Ghana with Special Reference to Antibiotics*. Universty of Ghana.

Cars, O., & Nordberg, P. (2005). Antibiotic resistance-The faceless threat. *International Journal of Risk and Safety in Medicine*, *17*(3–4), 103–110.

Retrieved from http://iospress.metapress.com/index/3KK2FBUE2NVPDK6U.pdf

Centre for Disease Dynamics, E. & P. (2015). *State of the world's antibiotics, 2015,CDDEP: Washington, D. C.*

Chalker, J., Chuc, N. T. K., Falkenberg, T., & Tomson, G. (2002). Private pharmacies in Hanoi, Vietnam: A randomized trial of a 2-year multi-component intervention on knowledge and stated practice regarding ARI, STD and antibiotic/steroid requests. *Tropical Medicine and International Health*, *7*(9), 803–810. http://doi.org/10.1046/j.1365-3156.2002.00934.x

Chandy, S. J., Mathai, E., Thomas, K., Faruqui, A. R., Holloway, K., & Lundborg, C. S. (2013). Antibiotic use and resistance: perceptions and ethical challenges among doctors, pharmacists and the public in Vellore, South India. *Indian Journal of Medical Ethics*, *10*(1), 20–7. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/23439193

Cooper, R. (2013). Surveillance and uncertainty: Community pharmacy responses to over the counter medicine abuse. *Health and Social Care in the Community*, *21*(3), 254–262. http://doi.org/10.1111/hsc.12012

Costelloe, C., Metcalfe, C., Lovering, A., Mant, D., & Hay, A. D. (2010). Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. *Bmj*, *340*, c2096. http://doi.org/10.1136/bmj.c2096

Dalton, K., & Byrne, S. (2017). Role of the pharmacist in reducing healthcare costs: current insights. *Integrated Pharmacy Research and Practice*, *Volume 6*, 37–46. http://doi.org/10.2147/IPRP.S108047

Dameh, M., Norris, P., & Green, J. (2012). New Zealand pharmacists' experiences, practices and views regarding antibiotic use without prescription. *Journal of Primary Health Care*, *4*(2), 131–140.

Daniel, W. W., & Cross, C. L. (2013). *Biostatics: A Foundation for Analysis in the Health Sciences* (10th Editi, Vol. 1). New Jersey: John Wiley & Sons. http://doi.org/10.1017/CBO9781107415324.004

De Nardo, P., Gentilotti, E., Nguhuni, B., Vairo, F., Chaula, Z., Nicastri, E., … Ippolito, G. (2015). Post-caesarean section surgical site infections at a Tanzanian tertiary hospital: A prospective observational study. *Journal of Hospital Infection*, *93*(4), 355–359. http://doi.org/10.1016/j.jhin.2016.02.021

Donkor, E. S., Tetteh-Quarcoo, P. B., Nartey, P., & Agyeman, I. O. (2012). Self-medication practices with antibiotics among tertiary level students in Accra, Ghana: A cross-sectional study. *International Journal of Environmental Research and Public Health*, *9*(10), 3519–3529. http://doi.org/10.3390/ijerph9103519

Dromigny, J. A., Nabeth, P., Juergens-Behr, A., & Perrier-Gros-Claude, J. D. (2005). Risk factors for antibiotic-resistant Escherichia coli isolated from community-acquired urinary tract infections in Dakar, Senegal. *Journal of Antimicrobial Chemotherapy*, *56*(1), 236–239. http://doi.org/10.1093/jac/dki158

Emeka, P. M., Al-Omar, M., & Khan, T. M. (2014). Public attitude and justification to purchase antibiotics in the Eastern region Al Ahsa of Saudi Arabia. *Saudi Pharmaceutical Journal*, *22*(6), 550–554. http://doi.org/10.1016/j.jsps.2014.02.014

Finch, R. G., Metlay, J. P., Davey, P. G., Baker, L. J., & Forum, I. (2004). Educational interventions to improve antibiotic use in the community : report from the International Forum on Antibiotic Resistance (IFAR) colloquium ,

2002. *The Lancet Infectious Diseases*, *4*(January), 44–53. http://doi.org/10.1016/S1473-3099(03)00860-0

Gebeyehu, E., Bantie, L., & Azage, M. (2015). Inappropriate Use of Antibiotics and Its Associated Factors among Urban and Rural Communities of Bahir Dar City Administration , Northwest Ethiopia, 1–14. http://doi.org/10.1371/journal.pone.0138179

Gebretekle, G. B., & Serbessa, M. K. (2016). Exploration of over the counter sales of antibiotics in community pharmacies of Addis Ababa, Ethiopia: pharmacy professionals' perspective. *Antimicrobial Resistance and Infection Control*, *5*(October), 2. http://doi.org/10.1186/s13756-016-0101-z

Ghana Statistical Service. (2012a). *Economic activity status of persons 15-64 years by region , district and sex , 2010 Economically active Total Employed Female Unemployed Female Economically Not active Districts Both sexes Both sexes Both sexes Both sexes All regions Jomoro Ellembelle Nze*. Retrieved from http://www.statsghana.gov.gh/docfiles/economic_activity_status_of_persons_15-64_years_by_region_district_and_sex,_2010.pdf

Ghana Statistical Service. (2012b). *Occupation of employed persons 15-64 years by region and district , 2010 Occupation of employed persons 15-64 years by region and district , 2010*. Retrieved from http://www.statsghana.gov.gh/docfiles/occupation_of_employed_persons_15-64_years_by_region_and_district_2010.pdf

Ghana Statistical Service. (2012c). *Population by region , district , age groups and sex. The 2010 Population and Housing Census. Accra, Ghana.* Retrieved from http://www.statsghana.gov.gh/censuses.html

Gielen, A. C., McDonald, E. M., Gary, T. L., & Bone, L. R. (2008). *HEALTH AND HEALTH*. (K. Glanz & B. K. Rimer, Eds.) (4th Editio). San Francisco, CA: Jossey-Bass.

Gobah, F. K., & Zhang, L. (2011). The National Health Insurance Scheme in Ghana: Prospects and Challenges: a cross-sectional evidence. *Global Journal of Health Science*, *3*(2), 90–101. http://doi.org/10.5539/gjhs.v3n2p90

Google Maps. (2016). Map of Osu. Retrieved October 11, 2016, from https://www.google.com.gh/maps/@5.5566487,-0.1841781,15z

Grigoryan, L., Burgerhof, J. G. M., Degener, J. E., Deschepper, R., Lundborg, C. S., Monnet, D. L., … Haaijer-Ruskamp, F. M. (2008). Determinants of self-medication with antibiotics in Europe: The impact of beliefs, country wealth and the healthcare system. *Journal of Antimicrobial Chemotherapy*, *61*(5), 1172–1179. http://doi.org/10.1093/jac/dkn054

Gyansa-Lutterodt, M. (2013). Antibiotic resistance in Ghana. *The Lancet Infectious Diseases*, *13*(12), 1006–1007. http://doi.org/10.1016/S1473-3099(13)70196-8

Haak, H. (1988). Pharmaceuticals in two Brazilian villages: Lay practices and perceptions. *Social Science and Medicine*, *27*(12), 1415–1427. http://doi.org/10.1016/0277-9536(88)90208-0

Hadi, M. A., Karami, N. A., Al-Muwalid, A. S., Al-Otabi, A., Al-Subahi, E., Bamomen, A., … Elrggal, M. E. (2016). Community pharmacists' knowledge, attitude, and practices towards dispensing antibiotics without prescription (DAwP): A cross-sectional survey in Makkah Province, Saudi Arabia. *International Journal of Infectious Diseases*, *47*, 95–100. http://doi.org/10.1016/j.ijid.2016.06.003

Hu, J., & Wang, Z. (2016). Non-prescribed antibiotic use and general practitioner service utilisation among Chinese migrants in Australia. *Australian Journal of*

Primary Health, 434–439.
Hwang, T. J., Gibbs, K. A., Podolsky, S. H., & Linder, J. A. (2015). Antimicrobial stewardship and public knowledge of antibiotics. *The Lancet Infectious Diseases*, *15*(9), 1000–1001. http://doi.org/10.1016/S1473-3099(15)00235-2
International Pharmaceutical Federation. (2012). *Global Pharmacy Workforce Report*. http://doi.org/10.1163/2214-8647_bnp_e618630
Kalungia, A. C., Burger, J., Godman, B., Costa, J. de O., & Simuwelu, C. (2016). Non-prescription sale and dispensing of antibiotics in community pharmacies in Zambia. *Expert Review of Anti-Infective Therapy*, (August). http://doi.org/10.1080/14787210.2016.1227702
Kotwani, A., Wattal, C., Joshi, P. C., & Holloway, K. (2012). Irrational use of antibiotics and role of the pharmacist: An insight from a qualitative study in New Delhi, India. *Journal of Clinical Pharmacy and Therapeutics*, *37*(3), 308–312. http://doi.org/10.1111/j.1365-2710.2011.01293.x
Mangione-Smith, R., Elliott, M. N., Stivers, T., Mcdonald, L. L., & Heritage, J. (2006). Ruling Out the Need for Antibiotics. *Archives of Prediatric and Adolescent Medicine*, *160*, 945–953. http://doi.org/10.1001/archpedi.160.9.945
Martínez-Mesa, J., González-Chica, D. A., Duquia, R. P., Bonamigo, R. R., & Bastos, J. L. (2016). Sampling: How to select participants in my research study? *Anais Brasileiros de Dermatologia*, *91*(3), 326–330. http://doi.org/10.1590/abd1806-4841.20165254
Mayhew, S., Nzambi, K., Pepin, J., & Adjei, S. (2001). Pharmacists‘ role in managing sexually transmitted infections: policy issues and options for Ghana. *Health Policy and Planning*, *16*(2), 152–160.
Mazi, B., Stru, I., & Hryniewicz, W. (2017). Surveys of public knowledge and attitudes with regard to antibiotics in Poland : Did the European Antibiotic Awareness Day campaigns change attitudes ?, 1–18. http://doi.org/10.1371/journal.pone.0172146
Ministry of Health, G. (2012). Towards a national policy platform for management of antibiotic resistance in Ghana. Ministry of Health, Ghana. Retrieved from http://www.ghndp.org/reactcso/images/downloads/concept_note_web.pdf
Morgan, D. J., Okeke, I. N., Laxminarayan, R., Perencevich, E. N., & Weisenberg, S. (2011). Non-prescription antimicrobial use worldwide: A systematic review. *The Lancet Infectious Diseases*, *11*(9), 692–701. http://doi.org/10.1016/S1473-3099(11)70054-8
Noi, E. N. N. (2012). *Comparative Study of the Experiences of NHIS subscribers and non-subscribers in accessing healthcare in the Ga-East municipality*. *University of Ghana http://ugspace.ug.edu.gh*. University of Ghana. http://doi.org/10.1038/253004b0
Ocan, M., Obuku, E. A., Bwanga, F., Akena, D., Richard, S., Ogwal-Okeng, J., & Obua, C. (2015). Household antimicrobial self-medication: a systematic review and meta-analysis of the burden, risk factors and outcomes in developing countries. *BMC Public Health*, *15*(1), 742. http://doi.org/10.1186/s12889-015-2109-3
Odoom, A. J., Tauro, B., Williamson, J., Yeboah, A., & Laird, C. (2013). *Access To Health Care for Persons With Intellectual Disabilities in Ghana : Mapping the Issues and Reviewing the Evidence*.
Padget, M., Guillemot, D., & Delarocque-Astagneau, E. (2016). Measuring antibiotic consumption in low-income countries: a systematic review and integrative approach. *International Journal of Antimicrobial Agents*, *48*(1), 27–32.

http://doi.org/10.1016/j.ijantimicag.2016.04.024
Pereko, D. D., Lubbe, M. S., & Essack, S. Y. (2015). Public knowledge, attitudes and behaviour towards antibiotic usage in Windhoek, Namibia. *Southern African Journal of Epidemiology and Infection*, *30*(4), 27–29. http://doi.org/10.1080/23120053.2015.1107290
Radyowijati, A., & Haak, H. (2003). Improving antibiotic use in low-income countries: An overview of evidence on determinants. *Social Science and Medicine*, *57*(4), 733–744. http://doi.org/10.1016/S0277-9536(02)00422-7
Republic of Ghana. Health Professions Regulatory Bodies Act, Act 857 (2013). Parliament.
Roque, F., Soares, S., Breitenfeld, L., Figueiras, A., & Herdeiro, M. T. (2015). Influence of community pharmacists' attitudes on antibiotic dispensing behavior: A cross-sectional study in Portugal. *Clinical Therapeutics*, *37*(1), 168–177. http://doi.org/10.1016/j.clinthera.2014.11.006
Roque, F., Soares, S., Breitenfeld, L., Gonzalez-Gonzalez, C., Figueiras, A., & Herdeiro, M. T. (2014). Portuguese community pharmacists' attitudes to and knowledge of antibiotic misuse: Questionnaire development and reliability. *PLoS ONE*, *9*(3), 1–6. http://doi.org/10.1371/journal.pone.0090470
Saradamma, R. D., Higginbotham, N., & Nichter, M. (2000). Social factors influencing the acquisition of antibiotics without prescription in Kerala State, south India. *Social Science & Medicine*, *50*(6), 891–903. http://doi.org/10.1016/S0277-9536(99)00380-9
Seiter, A., & Gyansa-lutterodt, M. (2009). *Policy Note : The Pharmaceutical Sector in Ghana*. Retrieved from http://apps.who.int/medicinedocs/documents/s16765e/s16765e.pdf
Shehadeh, M., Suaifan, G., Darwish, R. M., Wazaify, M., Zaru, L., Alja&apos, S., & fari. (2012). Knowledge, attitudes and behavior regarding antibiotics use and misuse among adults in the community of Jordan. A pilot study. *Saudi Pharmaceutical Journal*, *20*(2), 125–133. http://doi.org/10.1016/j.jsps.2011.11.005
Shet, A., Sundaresan, S., & Forsberg, B. C. (2015). Pharmacy-based dispensing of antimicrobial agents without prescription in India: appropriateness and cost burden in the private sector. *Antimicrobial Resistance and Infection Control*, *4*(1), 55–62. http://doi.org/10.1186/s13756-015-0098-8
Skjeldestad, F. E., Bjørnholt, J. V., Gran, J. M., & Erisken, H. M. (2014). The effect of antibiotic prophylaxis guidelines on surgical-site infections associated with cesarean delivery. *International Journal of Gynecology and Obstetrics*, *128*(2), 126–130. http://doi.org/10.1016/j.ijgo.2014.08.018
Smith, F. (2004). Community pharmacy in Ghana: Enhancing the contribution to primary health care. *Health Policy and Planning*, *19*(4), 234–241. http://doi.org/10.1093/heapol/czh028
Tagoe, D. N. A., & Attah, C. O. (2009). A Study of Antibiotic Use and Abuse in Ghana: a case study of the Cape Coast Metropolis. *The Internet Journal of Health*, *11*(2), 1–5.
Togoobaatar, G., Ikeda, N., Ali, M., Sonomjamts, M., Dashdemberel, S., Mori, R., & Shibuya, K. (2010). A survey of non-prescribed use of antibiotics for children in an urban community in Mongolia. *Bulletin of the World Health Organization*, *88*(12), 930–936. http://doi.org/10.2471/BLT.10.079004
Vialle-Valentin, C. E., Lecates, R. F., Zhang, F., Desta, A. T., & Ross-Degnan, D. (2012). Predictors of antibiotic use in African communities: Evidence from

medicines household surveys in five countries. *Tropical Medicine and International Health*, *17*(2), 211–222. http://doi.org/10.1111/j.1365-3156.2011.02895.x

Widayati, A., Suryawati, S., de Crespigny, C., & Hiller, J. E. (2011). Knowledge and beliefs about antibiotics among people in Yogyakarta City Indonesia : a cross sectional population-based survey. *BMC Research Notes*, *4*(1), 491. http://doi.org/10.1186/1756-0500-4-491

World Economic Forum. (2016). The global risks report 2016, 11th edition, 103.

World Economic Forum (WEF). (2013). *Global Risks Report 2013 Eighth Edition*. *World Economic Forum*. Retrieved from http://reports.weforum.org/global-risks-2013/

World Health Organization. (2006). Quality of care: A process for making strategic choices in health systems. *The Journal of the American Medical Association*, *267*, 1–50. http://doi.org/10.1542/peds.2010-1791

World Health Organization. Global action plan on antimicrobial resistance. (2015). Retrieved from http://www.who.int/drugresistance/global_action_plan/en/

World Health Organization. (2016). Global guidelines for the prevention of surgical site infection. Geneva: World Health Organization. Retrieved from http://www.who.int/gpsc/global-guidelines-web.pdf

Yankholmes, A. K. B., & Acheampong, O. A. (2010). Tourists‘ Perceptions of Heritage. *Tourism*, *616*(April), 603–616. http://doi.org/10.1002/jtr

Zaller, N., Jeronimo, A., Bratberg, J., Case, P., & Rich, J. D. (2010). Pharmacist and pharmacy staff experiences with non-prescription (NP) sale of syringes and attitudes toward providing HIV prevention services for injection drug users (IDUs) in Providence, RI. *Journal of Urban Health*, *87*(6), 942–953. http://doi.org/10.1007/s11524-010-9503-z

APPENDICES

UNIVERSITY OF GHANA

SCHOOL OF PUBLIC HEALTH

Appendix A

Participant Consent Form – Clients of Pharmacies
School of Public Health
College of Health Science
University of Ghana

Project Topic

Factors influencing access to non-prescribed antibiotics from community pharmacies in Osu

Background

Dear Client,

I wish to invite you to participate in an academic research involving clients of community pharmacies in Osu. My name is Naadu Joan Pessey, a student of the School of Public Health, University of Ghana. I am undertaking a study on the topic: Factors influencing access to non-prescribed antibiotics from community pharmacies in Osu. The objective of this study is to determine how and why clients of the pharmacies in Osu use antibiotics without a doctor's prescription. This is to help direct policies and educational campaigns that would help the general public to use antibiotics appropriately and improve healthcare. This research would form part of my work for the award of a Masters' degree in Public Health.

Procedures

The study seeks to interview both pharmacy staff and clients and to examine the ways in which both parties contribute to the use of antibiotics without a doctor's prescription. Questionnaires would be administered which you would be assisted to fill by myself or a research assistant.

Risks and Benefits

The information you provide will help me understand the reasons for self-medication with antibiotics. The information, I believe, would benefit you in the long run as it would kindle the interest of policy makers to pay more attention to long-term effects of self-medication with antibiotics from community pharmacies. Your participation in this study would only take 10 minutes of your time. Be assured that the information you will provide would be treated with the uttermost confidentiality and anonymity.

Right to refuse

Participation in this study is voluntary and you can choose not to partake. You are at liberty to withdraw from the study at any time. However, I will encourage your full participation since your participation is important.

Client's Consent

I, ……..declare that the purpose, procedures as well as risks and benefits of the study have been thoroughly explained to me and I have understood them. I hereby agree to take part in this study.

Signature of participant / thumbprint……

Date……. / …… / ……..

Interviewer's Statement

I, the undersigned, have explained this consent form to the subject in simple language that she/he understands, clarified the purpose of the study, procedures to be followed as well as the risks and benefits involved. The subject has freely agreed to participate in the study.

Signature of interviewer……

Date …… / …….. / ……

Address

Naadu Joan Pessey
P O Box KT118
Kotobabi-Accra

In case of any concern you can contact the Ethics Administrator, Ms Hannah Frimpong, GHS/ERC on: 0243235225 / 0507041223.

Appendix B

Participant Consent Form – Pharmacy Staff

School of Public Health

College of Health Science

University of Ghana

Project Topic

Factors influencing access to non-prescribed antibiotics from community pharmacies in Osu

Background

Dear Pharmacy Staff,

I wish to invite you to participate in an academic research involving staff of community pharmacies in Osu. My name is Naadu Joan Pessey, a student of the School of Public Health, University of Ghana. I am undertaking a study on the topic: Factors influencing access to non-prescribed antibiotics from community pharmacies in Osu. The objective of this study is to determine how and why clients of the pharmacies in Osu use antibiotics without a doctor's prescription. This is to help direct policies and educational campaigns that would help the general public to use antibiotics appropriately and improve healthcare. This research would form part of my work for the award of a Masters' degree in Public Health.

Procedures

The study seeks to interview both pharmacy staff and clients and to examine the ways in which both parties contribute to the use of antibiotics without a doctor's prescription. Questionnaires would be administered which you would be assisted to fill by myself or a research assistant.

Risks and Benefits

The information you provide will help me understand the reasons why pharmacy staff dispense antibiotics without a doctor's prescription. The information, I believe, would benefit you in the long run as it would kindle the interest of policy makers to design educational campaigns to educate pharmacy staff on ways to appropriately use antibiotics to improve healthcare. Your participation in this study would only take 10 minutes of your time. Be assured that any information you will provide would be treated with the uttermost confidentiality and anonymity.

Right to refuse

Participation in this study is voluntary and you can choose not to partake. You are at liberty to withdraw from the study at any time. However, I will encourage your full participation since your participation is important.

Pharmacy staff's Consent

I, ……..declare that the purpose, procedures as well as risks and benefits of the study have been thoroughly explained to me and I have understood them. I hereby agree to take part in this study.

Signature of participant / thumbprint……

Date……. / …… / ……..

Interviewer's Statement

I, the undersigned, have explained this consent form to the subject in simple language that she/he understands, clarified the purpose of the study, procedures to be followed as well as the risks and benefits involved. The subject has freely agreed to participate in the study.

Signature of interviewer ……

Date ……. / …….. / …….

Address

Naadu Joan Pessey
P O Box KT118
Kotobabi-Accra

In case of any concern you can contact the Ethics Administrator, Ms Hannah Frimpong, GHS/ERC on: 0243235225 / 0507041223.

Appendix C

QUESTIONNAIRE FOR COMMUNITY PHARMACY CLIENT SURVEY

DEMOGRAPHIC CHARACTERISTICS

Tick one response only for each item in this section

1. **Sex of respondent**: a. Male [ ]
   b. Female [ ]

2. **Age of respondent:** a. 18-22 [ ]
   b. 23-27 [ ]
   c. 28-32 [ ]
   d. 33-37 [ ]
   e. 38-42 [ ]
   f. 43-47 [ ]
   g. 48-52 [ ]
   h. 53-57 [ ]
   i. 58 and above [ ]

3. **Area of residence:** Osu [ ]
   Other (Specify Other) [ ]

4. **Religion:** Christianity [ ]
   Islam [ ]
   African Traditional Religion [ ]
   Other (Specify Other) [ ]

5. **Marital status:** a. Single [ ]
   b. Married [ ]
   c. Divorced [ ]
   d. Cohabiting [ ]

6. **Educational Status:** a. Tertiary Education [ ]
   b. Secondary Education [ ]
   c. Primary education and below [ ]

7. **Access to Antibiotics**
   I. Have you used antibiotics without a doctor‘s prescription in the past 6 months?
   Yes [ ] b. No [ ]

II. Where did you obtain these antibiotics from?

Friend/Relation	[ ]
Pharmacy	[ ]
Chemical Seller	[ ]
Other (Specify other)	[ ]

III. If your answer to III was b. (Pharmacy), where was the pharmacy located?

Osu	[ ]
Other	[ ]

PREDISPOSING FACTORS

The following are statements about the use of antibiotics.

Show how much you agree or disagree with each statement on a scale of 1 to 5 where **1= Strongly agree, 2= Disagree, 3=Neither agree nor disagree, 4=Agree, 5=Strongly agree**

8. Attitudes towards appropriateness of self-medication with antibiotics for diarrhoea

Just imagine you have diarrhoea. How appropriate is it in your view to get antibiotics without a prescription?

I.	…Over the weekend in a normal situation	[ ]
II.	…On holiday abroad	[ ]
III.	…You have no time to go to the doctor	[ ]
IV.	…When it is difficult to contact the doctor	[ ]
V.	…When the doctor has no time to see you immediately	[ ]
VI.	…When a consultation with a doctor is too expensive	[ ]
VII.	…When you have a good experience with taking this antibiotic	[ ]
VIII.	…When your doctor always prescribes you this antibiotic	[ ]
IX.	…When the pharmacist advises you which antibiotic to take	[ ]

9. Beliefs about antibiotics for minor ailments

I. When one has a sore throat, one should take antibiotics to prevent getting a more serious illness. [ ]

II. When one gets a cold antibiotics help to get better more quickly. [ ]

III. By the time you yourself are sick enough to visit a doctor with a bad cold, you usually expect a prescription for antibiotics [ ]

IV. You usually know if you yourself need an antibiotic for a sore throat before seeing a doctor [ ]

V. Most of your friends/relatives think people should take an antibiotic for a cold [ ]

10. Attitudes towards situational use of antibiotics

I. The use of antibiotics when you are sick in order to remain active (work, family, study) is appropriate [ ]

II. The use of antibiotics when you are sick for helping to get through an important event (e.g. exam, funeral or wedding) is appropriate [ ]

11. Knowledge about the effectiveness of antibiotics on bacteria and viruses

I. Antibiotics can kill bacteria [ ]

II. Antibiotics can kill viruses [ ]

ENABLING FACTORS

To answer the following, choose one response only

12. Accessibility and affordability of healthcare facilities

I. Do you have any chronic disease?
Yes [ ] b. No [ ]

II. Do you subscribe to the National Health Insurance Scheme?
Yes [ ] b. No [ ]

III. Do you subscribe to a private insurance scheme for the payment of your healthcare services
Yes [ ] b. No [ ]

IV. Are the health care facilities in your district easily accessible to you?
Yes [ ] b. No [ ]

V. Do you find that the healthcare facilities in your district are affordable?
Yes [ ] b. No [ ]

VI. How far is the nearest clinic or hospital from your residence?
Within the same neighbourhood [ ]

In a nearby community [ ]

Far from neighbourhood [ ]

VII. Is the doctor easily accessible
Yes [ ] b. No [ ]

VIII. Is it possible to get an antibiotic directly from a pharmacy in Osu without a prescription?
Yes [ ] b. No [ ]

Appendix D

QUESTIONNAIRE FOR COMMUNITY PHARMACY STAFF SURVEY

DEMOGRAPHIC CHARACTERISTICS

Tick one response only for each item in this section

1. **Sex of respondent:** a. Male [ ]
   b. Female [ ]

2. **Age of respondent:** a. 18-22 [ ]
   b. 23-27 [ ]
   c. 28-32 [ ]
   d. 33-37 [ ]
   e. 38-42 [ ]
   f. 43-47 [ ]
   g. 48-52 [ ]
   h. 53-57 [ ]
   i. 58 and above [ ]

3. **Area of residence:** Osu [ ]
   Other (Specify Other) [ ]

4. **Religion:** Christianity [ ]
   Islam [ ]
   African Traditional Religion [ ]
   Other (Specify Other) [ ]

5. **Marital status:** a. Single [ ]
   b. Married [ ]
   c. Divorced [ ]
   d. Cohabiting [ ]

6. **Qualification** a. Pharmacist [ ]
   b. Technician/technologist [ ]
   c. Medicine counter assistant [ ]

7. **Access to Antibiotics**
   Can you recall situation(s) where a patient(s) obtained antibiotics for self-medication from you in the past 6 months?
   Yes [ ] b. No [ ]

REINFORCING FACTORS

The following are statements about the use of antibiotics and antibiotic resistance

Show how much you agree or disagree with each statement on a scale of 1 to 5 where **1= Strongly disagree, 2= Disagree, 3=Neither agree nor disagree, 4=Agree, 5=Strongly agree**.

Please tick one of the boxes below each question to indicate this.

8. Knowledge of antibiotic resistance

I. Antibiotic resistance is an important public health problem of ours.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

II. The fact that a patient is taking an antibiotic increases the risk of developing resistance.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

III. In all cases in which antibiotics are dispensed, it is essential that patients be advised about complying with the treatment.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

IV. An important cause of the appearance of antibiotic resistance is long-term prescription of newer antibiotics.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

9. Attitudes towards the dispensing of antibiotics

I. When dispensing, possible interactions between the antibiotic and other drugs that the patient is taking should be assessed.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

II. Antibiotics are sometimes dispensed without a medical prescription because the patient is known to have difficulty in obtaining a medical consultation.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

III. Two of the main causes of the appearance of antibiotic resistance are patient self-medication and antibiotic misuse.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

IV. Antibiotics are sometimes dispensed, even when it is known that they are not indicated, because there is no time to explain the reason why they are not called for.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

V. If a patient feels that he or she needs antibiotics and these are not dispensed, the patient will easily obtain the prescription and could accuse us of having delayed treatment.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

VI. I am convinced that new antibiotics will be developed to solve the problem of antibiotic resistance.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

10. Dispensing behaviour of pharmacy staff

Situations where I have a tendency to dispense antibiotics without prescription

I. Diarrhoeal symptoms (e.g., traveller's diarrhoea, dysentery, cholera)

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

II. Upper respiratory tract infections (e.g., otitis media, pharyngitis)

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

III. Urinary tract infections (cystitis)

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

IV. Any infection in which the patient undertakes to bring the prescription

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

Appendix E

Ethical Clearance