

**SCHOOL OF PUBLIC HEALTH  
COLLEGE OF HEALTH SCIENCES  
UNIVERSITY OF GHANA**



**FACTORS ASSOCIATED WITH DISPENSING PRACTICES FOR  
ANTIMALARIALS IN THE LA-NKWANTANANG MADINA MUNICIPALITY**

**BY**

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**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA,  
LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE  
AWARD OF THE MASTER OF PUBLIC HEALTH DEGREE.**

**JULY, 2017**

## DECLARATION

I, Amankwa Enyaah Charles, declare that except for other people's investigations which have been duly acknowledged, this thesis is the result of my own original research undertaken under supervision and that it has neither in whole nor in part been presented for another degree in this university or elsewhere.

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## **DEDICATION**

I humbly dedicate this work to my parents, Mr. Charles Osei Amankwa and Mrs. Comfort Amankwa



## **ACKNOWLEDGEMENT**

Not that we are sufficient of ourselves to think anything as of ourselves; but our sufficiency is of God.

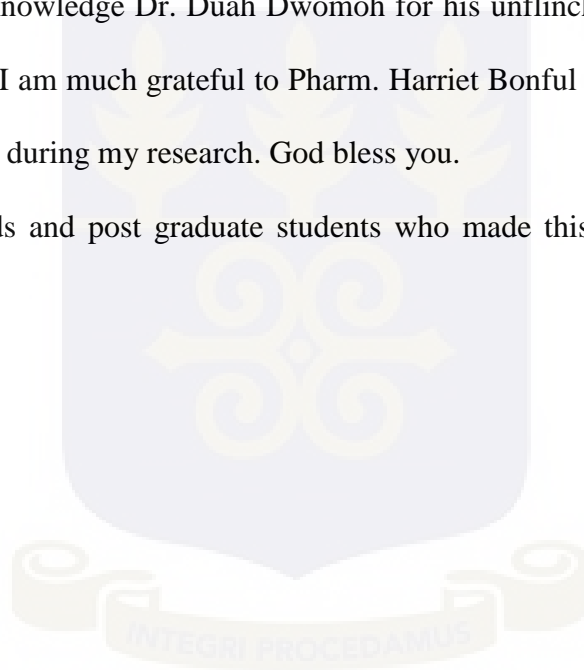
I am grateful to the Almighty God, my Creator for the continuous gift of life and strength.

Thanks to my entire family, who have remained steadfast in prayer and support throughout the course of this programme.

I also wish to acknowledge the immense guidance and contribution of my supervisor and my mother Dr. Priscillia Nortey. I appreciate you so much.

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Lastly, to all my friends and post graduate students who made this course bearable, I say thanks to all of them.



## ABSTRACT

**Introduction:** Malaria, though a preventable and treatable disease, remains a major public health problem worldwide. It is mesoendemic in Africa, with increased rate of morbidity and mortality among children under five and pregnant women. Efficient case management includes accurate diagnosis, the use of Artemisinin based combination therapy (ACT) and appropriate dispensing practices. These form the basis for optimal therapeutic outcomes. Despite the strategies adopted in Ghana to roll back malaria, the prevalence of malaria remains unacceptably high in most districts in Ghana. A surging problem correlated with this prevalence of malaria is the poor dispensing practice exhibited by dispensers.

**Objective:** This study examines factors associated with dispensing practices for antimalarials in community pharmacies in the La Nkwantanang-Madina municipal.

**Method:** A cross sectional study using a quantitative approach was employed in this study. It was conducted by administering close-ended questionnaires to patients and dispensers at community pharmacy retail level. Factors predictive of appropriate dispensing practices were determined. Analytical techniques employed include: Univariate analysis of categorical variables expressed as frequencies and proportions. Bivariate analysis used to compare associations between selected independent variables and appropriate dispensing practices.

**Results:** Marital status, NHIS status, Access to MCM wall chart, years of experience, type of recommender, awareness of guidelines and supervisory visits were found to be significantly associated with dispensing practices. Proportion of clients who tested before purchase of antimalarial is 53% and 52.4% were provided with appropriate dispensing practice.

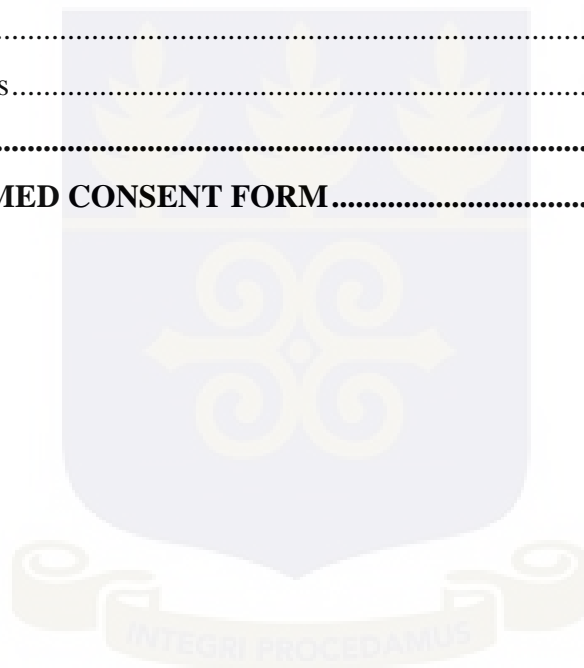
**Conclusion:** More than half of dispensers who participated in the study, provided appropriate dispensing practices to their respective clients. However, MCA's had six times more interaction with participants than pharmacists. Despite the higher MCA – clients interaction, nearly 51% yielded inappropriate instructions being issued.

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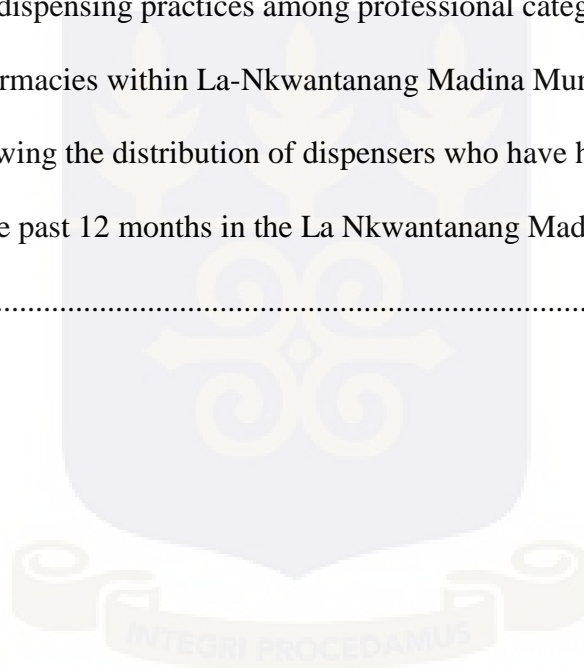
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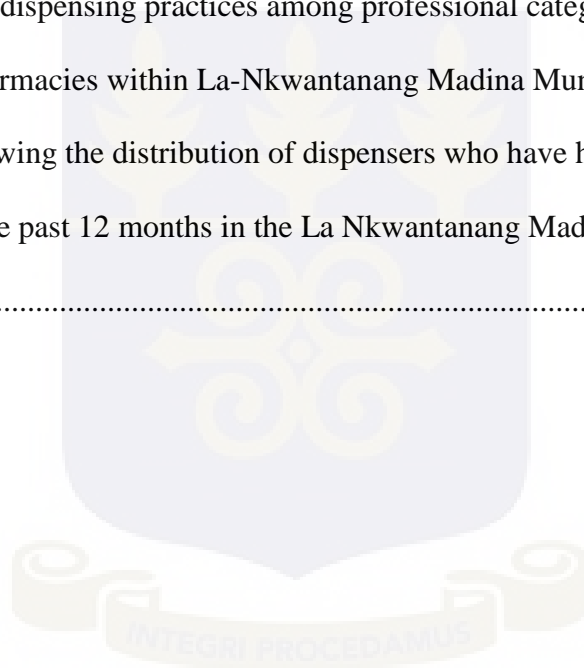
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## **LIST OF DEFINITIONS**

### **1. Dispensing practices:**

Dispensing practices ensure that an effective form of the correct medicine is delivered to the right patient, in the correct dosage and quantity, with clear instructions, and in a package that maintains the potency of the medicine. Dispensing includes all the activities that occur between the time the prescription is presented and the time the medicine or other prescribed items are issued to the patient.

### **2. Dispenser:**

Health related professionals with adequate knowledge aims to ensure the safe and effective use of pharmaceutical drugs.

### **3. Community pharmacists:**

Health professionals most accessible to the public. They supply medicines in accordance with a prescription or, when legally permitted, sell them without a prescription. They maintain links with other health professionals in primary health care.

### **4. Client:**

A person in the health care system who is a recipient of any health related services under the care of a physician.

### **5. Antimalarial:**

Medicines recognized by the WHO for the treatment of malaria. Medicines used solely for the prevention of malaria were excluded from analysis in this report.

### **6. Artemisinin-based Combination Therapy (ACT):**

An antimalarial that combines artemisinin or one of its derivatives with an antimalarial or antimalarials of a different class.

## **7. Pharmaceutical care:**

Pharmaceutical care is the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life. These outcomes are cure of a disease; elimination or reduction of a patient's symptomatology, slowing of a disease process; or preventing a disease or symptomatology.



## **LIST OF ABBREVIATIONS**

<b>AA</b>	Artesunate-Amodiaquine
<b>ACT</b>	Artemisinin-based Combination Therapy
<b>AL</b>	Artemether-Lumefantrine
<b>AM</b>	Amodiaquine
<b>AT</b>	Artesunate
<b>CPD</b>	Continuous Professional Development
<b>CQ</b>	Chloroquine
<b>DHA</b>	Dihydroartemisinin
<b>DHAP/DP</b>	Dihydroartemisinin- Piperazine
<b>FDA</b>	Food and Drugs Authority
<b>MCM</b>	Malaria Case Management
<b>NHIS</b>	National Health Insurance Scheme
<b>GHS</b>	Ghana Health Service
<b>ITNs</b>	Insecticide Treated Nets
<b>PC</b>	Pharmacy Council
<b>RDT</b>	Rapid Diagnostic Test
<b>SP</b>	Sulphadoxine-Pyrimethamine
<b>W.H.O.</b>	World Health Organization
<b>MCA</b>	Medicine Counter Assistants

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background**

Malaria is a life-threatening disease caused by Plasmodium parasites that are transmitted to people through the bites of infected female Anopheles mosquitoes. It is endemic in tropical areas. Globally, 198 million malaria cases were reported in 2013 with 584,000 deaths (Antony & Parija, 2016). An estimated one million people in Africa die from malaria each year. Nine out of ten malaria cases, occur in children under 5 years (UNICEF Ghana Fact sheet, 2007).

Over the years, significant strides have been put in place at country and international level to help reduce the burden of malaria globally (Buabeng, 2010). Consequently, several initiatives have been undertaken over the decades to address its menace. In 2000, following the development of the first strategic plan in Ghana, there have been numerous clinical and public health interventions to address the ravaging impact of the disease. These have included, treatment of uncomplicated malaria with artemisinin based combination therapy (ACT), indoor residual spraying (IRS), mass chemoprophylaxis with Sulphadoxine-pyrimethamine and improvement of drainage system (National Malaria Control Programme, 2013). Malaria continues to be the leading cause of morbidity in Ghana (Buabeng, 2010).

##### **1.1.1 Malaria control and the role of medicine outlet practitioners**

The control of malaria has been steadily improving. The emergence of community pharmacy and its access to the general public is of great benefit to the health community. In recent studies on health seeking behavior among Ghanaians, majority of the citizenry moved to community pharmacies and licensed chemical shops for treatment of diseases of common

occurrence and advice too (Salisu & Prinz, 2009). Pharmacy practice serves to provide pharmaceutical care to all patients through counselling and drug-based therapy.

Community pharmacies and licensed chemical shops, have been noted as the first port of call for many individuals seeking primary care services for common complaints and symptoms like fever, bodily pains, and coughs (Buabeng, 2010). Dispensers are involved in a wide variety of professional activities which may be considered as either product or patient-oriented (Al-Arifi, 2012). The role of professionally competent community pharmacists with specialized training in dispensing is pivotal to improve, promote and restore health. They can intercept potentially harmful prescribing errors and serve as an indispensable source of information for prescribing physicians (Al-Arifi, 2014).

A challenge to efficient patient centered pharmaceutical care is poor dispensing practice. The private pharmaceutical outlets largely depend on the assistance of pharmaceutical staff. It comprises a team of health workers with varied categories. They include: medicine counter assistants (MCA's), dispensing technicians and licensed chemical sellers (Buabeng, 2010). Dispensing staff in private pharmacies play a significant role in the management of proper pharmaceutical care and provision of relevant information to clinicians and patients. However, the private pharmaceutical sector has been filled with irrational dispensing and provision of poor quality medicines (Haule, 2008).

Inappropriate dispensing of antimalarials, leads to treatment failures, which may prolong the duration of illness. It could further lead to increased chances of developing severe and complicated malaria and can increase the development of drug resistant malaria strains.

## 1.2 Problem statement

In Ghana, malaria ranks the number one cause of OPD attendance with a general OPD attendance rate of thirty nine percent in 2012. Malaria contributes to ill health as well as infant and maternal deaths in Ghana. Children under five and pregnant women are most at risk (USAID, 2013).

Appropriate diagnosis and provision of appropriate medication is required for adequate case management. The way drugs are taken by patients is often influenced by the way drugs are dispensed, and the type of information given during the dispensing.(Abuzeid, 2015). The process of dispensing forms an integral part of the quality use of medicines. Adequate labelling and patient counselling sessions also constitute the core responsibilities of a pharmacist. These activities allow the safe and efficient provision of pharmaceutical care to the general public.(Fshp, Wu, & Mba, 1999). It is often the last step in the healthcare delivery system and is assumed to be a simple, routine process that cannot go wrong (Amoah, 2012).

However, considerable evidence of poor dispensing practices, inadequate package labelling and poor instruction given to clients on usage of medicines in low and middle-income countries (LMICs) has been on the rise (Athuraliya, Walkom, Dharmaratne, & Robertson, 2016). Poor dispensing practice has been associated with errors in drug provision and generally considered to have a negative impact on the health of individuals (A. Hussain & Ibrahim, 2011; Azhar Hussain & Ibrahim, 2011). All resources involved in patient care prior to dispensing may be wasted if dispensing does not result in the patient receiving an effective form of the correct drug, in appropriate packaging, and with the correct dose and advice.

A study carried out in Pakistan reported dispensing practices as unsatisfactory. Findings propounded events, including emergence of drug resistance, fatalities caused by toxicity,



unforeseen drug's adverse effects, treatment failures and increased treatment costs on the community as effects of poor dispensing practices (A. Hussain, Ibrahim, & Malik, 2013).

On a larger scale, it may result in overburdening of the National Health Insurance Scheme as well as the health system as a whole (Kamuhabwa A.R. and A. M.Ignace, 2015).

This study therefore sought to examine dispensing practices for antimalarials and determine the factors that influence these practices.

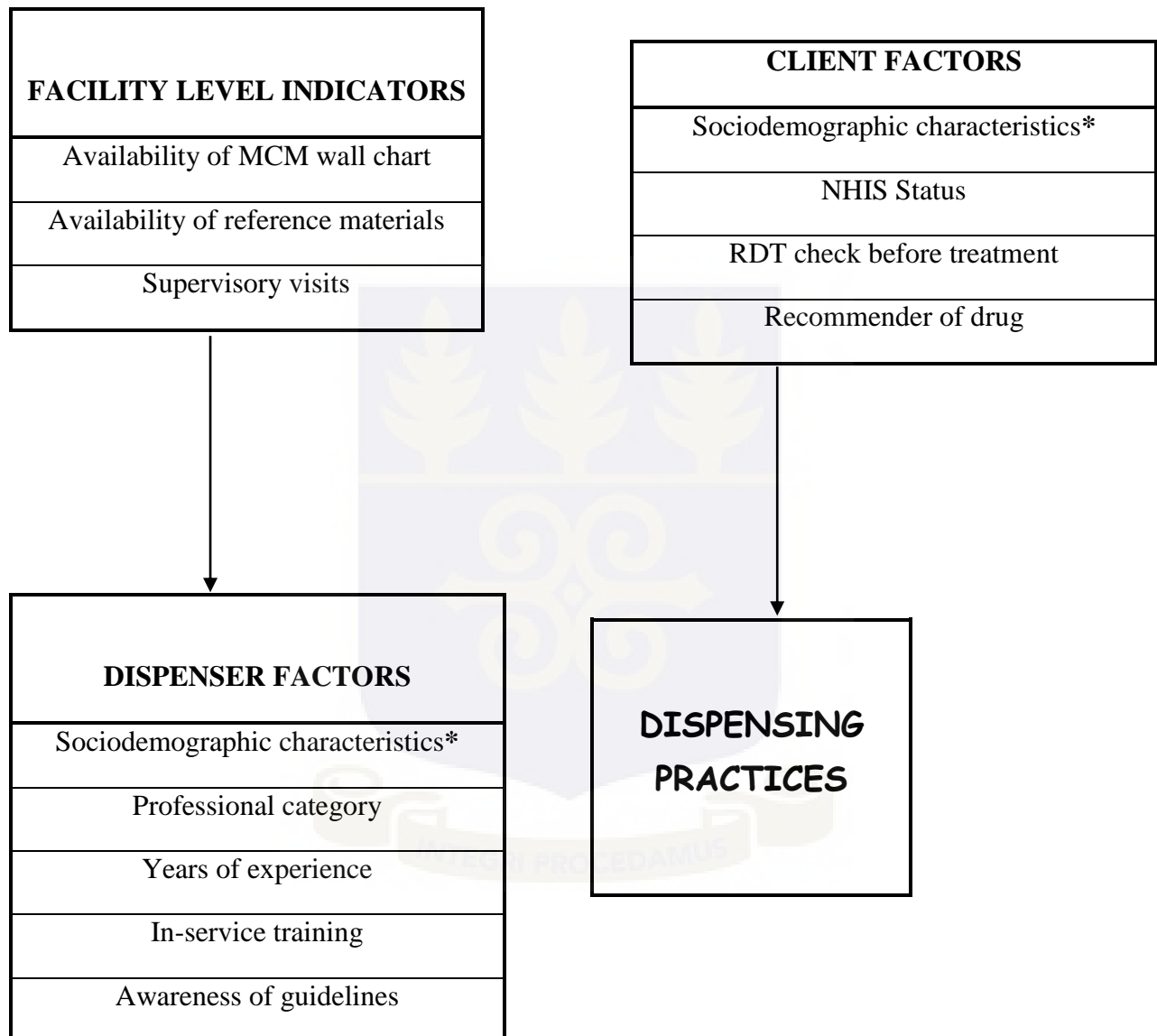
### **1.3 Conceptual framework**

Dispensing practice is influenced by several contextual and broad health related factor (Nigatu Hirko, 2017). However, the factors for this study have been compressed in a conceptual framework as seen in figure 1.

The proposed framework for dispensing practices highlights the contributing factors that may affect dispensing practices. From literature, these factors have been categorized into dispenser factors, client factors and facility level indicators. The study conjectures that, dispenser's factors such as age, work experience, training sessions may directly influence dispensing factors as well as some key facility level indicators.(Morisky, Ang, Krousel-wood, & Ward, 2008; Nigatu Hirko, 2017)

A study conducted by (State & West, 2016) showed that, educational level of the dispenser's, profession of the dispensers and working experience plays a role in dispensing practices. Client factors, such as level of education may also affect dispensing practices which could lead to poor adherence to medication.(Rusk et al., 2012) This may lead to inappropriate dispensing outcomes. Facility Level Indicators such as supervision, have a subtle way of

influencing dispenser behavior and knowledge. (Ameyaw, 1996) They have been linked with better dispensing outcomes if present within the community pharmacy.



**Fig 1.1: A conceptual framework: Dispensing practices for antimalarials**

*Sociodemographic characteristics\** refer to the following: age, sex, marital status, highest level of education, religion and ethnicity.

#### **1.4 Justification**

The private sector's involvement in pharmaceuticals, contributes immensely by making drugs readily available and promoting treatment outcomes (Arhinful K, et al., 2009). Poor dispensing practices may influence proper patient care and have negative outcomes on health. Delivering a comprehensive standard operating procedure for dispensing in retail outlets at the community level is key in reducing the burden of malaria in Ghana.

The results generated will also inform policy makers and health educators to put in strategies that further improve dispensing practice. This will further prevent development of antimalarial resistance and ultimately reduce the financial burden on malaria.

#### **1.5 General objective**

To determine factors associated with dispensing practices for antimalarials in community pharmacies in the La Nkwantanang-Madina municipality.

#### **1.6 Specific objectives**

1. To determine the dispenser factors associated with antimalarial dispensing practice.
2. To identify the proportion of patients dispensed with antimalarials with appropriate dispensing practice exhibited by dispenser.
3. To determine the proportion of clients who test for malaria before purchase of antimalarials.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Overview**

Malaria remains a major public health problem worldwide. About 3.2 million people globally representing almost half of the world's population, are at risk of malaria infection (Bremner, Alilio, & White, 2007). Sub-Saharan Africa records a disproportionately high share of the global malaria burden of 88%. Malaria is a major cause of morbidity and mortality, accounting for 90% of deaths in Sub-Saharan Africa, where an estimated one million deaths occur each year (W.H.O, 2015).

In Ghana, malaria is hyper endemic and is considered the leading cause of death with a crude parasite rate spanning from 10 – 70% (W.H.O, 2015). The disease ranks the number one cause of morbidity accounting for over 40 % of out- patient attendance in public health facilities with about 2.2 million cases reported annually between 1995 and 2001 (Ankomah., Asante., & Asenso-okyere., 2003) though preventable and curable, the cases seen in health facility outpatient departments in Ghana, have increased from approximately 250 per 1,000 population in 2000, to about 437 per 1,000 population in 2012. Over the same period, there was an increase in total outpatient department cases from 4.9 million to 11.3 million, resulting from better access to health due to the expanding coverage of the National Health Insurance Scheme (USAID, 2013).

Malaria has devastating economic effects on developing countries. Very often, malaria infected persons are usually the poor and less educated in the society. The vulnerable groups therefore are often forced to live on marginal lands where they are prone to getting infected. Malaria endemic communities are therefore kept in a vicious cycle of disease and poverty (Ankomah., Asante., & Asenso-Okyere., 2003).

## 2.2 Epidemiology of Malaria in Ghana

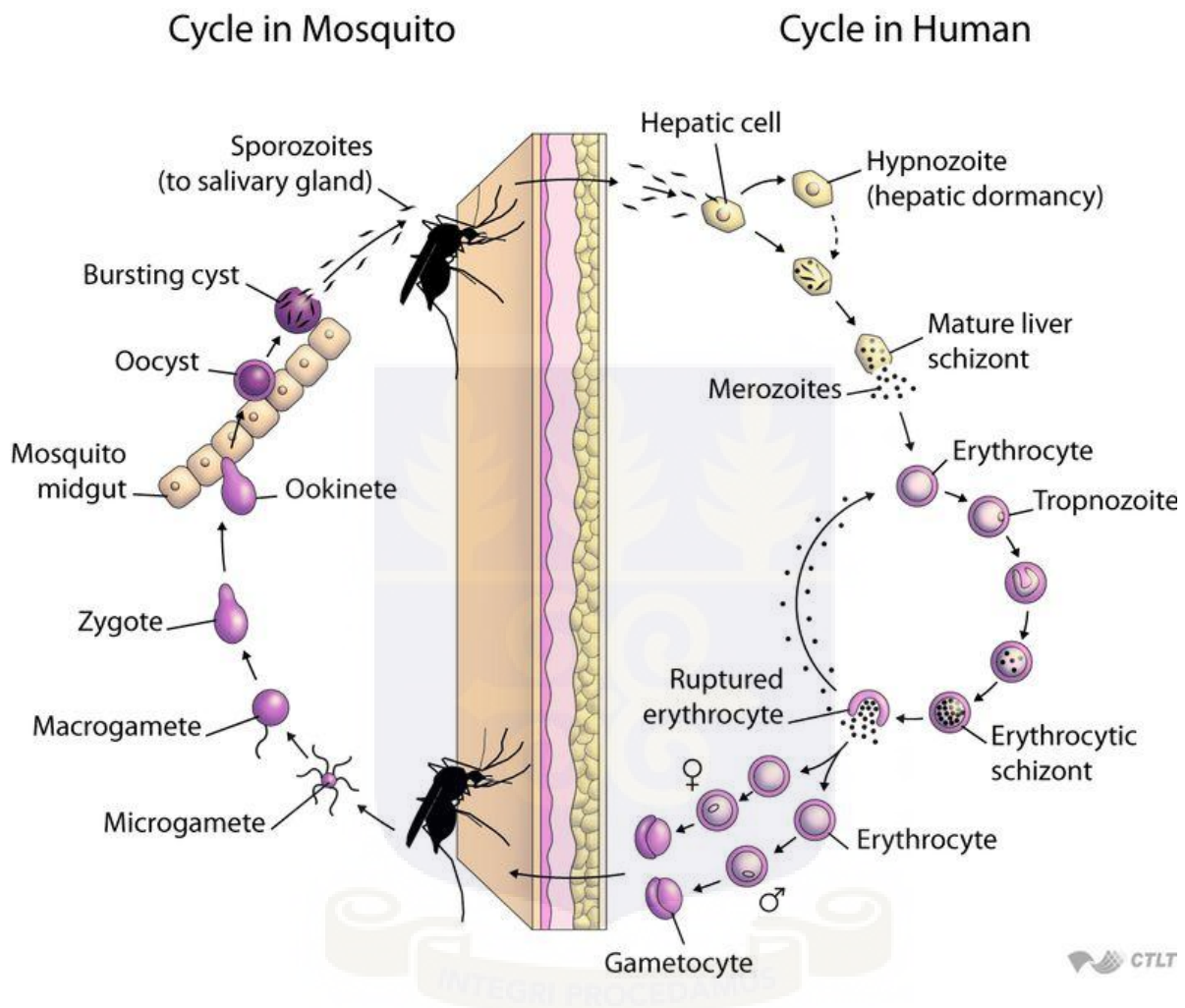
Malaria is a complex disease that varies widely in epidemiology and clinical manifestation in different parts of the world. It is a public health problem which is found in more than 90 countries worldwide (Drutu, 2003). For that matter, variations in the strains of parasite in a given area is predominant. Their susceptibility to commonly used antimalarial drugs, may vary depending on the geographical location and the distribution of mosquito vectors. Environmental predictors such as climate and other behavioral practices tends to influence the type of parasite found in that region (State & West, 2016).

Presently in Ghana, Seventy five percent of the country is considered to be malaria endemic with a chunk of this data emanating from the three northern regions. Recent studies however, have revealed that, malaria is generally stable in Ghana. Endemicity in Ghana, ranges from hypoendemicity in the Greater Accra region, to hyperendemicity in the Upper West regions and mesoendemicity in the rest of the country (National Malaria Control Programme, 2013). Epidemiological analysis in Ghana has revealed that only three species of the Plasmodium are present; Plasmodium falciparum (80%-90%), Plasmodium malariae (20%-36%) and Plasmodium ovale (0.15%). Plasmodium falciparum is thus the predominant parasite species carried by a combination of vectors. The principal vectors are the Anopheles gambiae complex, which is most widespread and difficult to control.

## 2.3 Life cycle of the parasite

The natural ecology of the life cycle of the malaria parasites, occurs mainly in two different types of hosts; humans and the female anopheles mosquito. During a blood meal, a malaria infected female anopheles mosquito, injects sporozoites into the blood stream of hosts. Sporozoites attack the liver cells and multiply to produce schizonts. They further rupture to produce merozoites (Kamuhabwa & Mnyusiwalla, 2011).

Merozoites infect red blood cells and causes rapid haemolysis of the erythrocytes as well. Blood stage parasites are responsible for the clinical manifestations seen as symptoms of malaria (Rehman, Lötsch, Kremsner, & Ramharther, 2014).



**Fig 2.1: A diagram showing the lifecycle of malaria parasite**

## 2.4 Symptoms of malaria

The symptoms of malaria can be classified as uncomplicated and complicated. Uncomplicated manifestation of malaria may vary from no apparent illness (asymptomatic) to mild symptoms such as: headache, fever, chills, nausea, restlessness, fatigue, muscle pains and sometimes diarrhea; to severe illness, anaemia and other complications (Buabeng, 2010). Malaria can attack individuals several times within a short period. It is a curable disease if

promptly diagnosed and treated appropriately. Complicated malaria on the other hand, presents with extremely febrile conditions, convulsions, acute kidney failure, cerebral malaria etc.

A delayed response to malaria symptoms leads to rapid progression of disease to complications and possibly death (Takala-Harrison & Laufer, 2015). Vulnerable groups such as children under five years, HIV patients, pregnant women, cancer patients, and non-immune travelers from malaria free countries need accurate and prompt cost effective approaches to combating maternal mortality. Identification of the symptoms therefore, plays a crucial role in diagnosis. Effective diagnosis however, is key in case management of malaria.

## **2.5 Management of Uncomplicated Malaria**

Malaria is not a difficult disease to be managed if diagnosed early and treated promptly. However, delay in treatment will lead to grave outcomes. Prompt and effective treatment of malaria is a critical element of malaria control. In 2009, the African Leaders Malaria Alliance (ALMA) comprising 49 African Heads of States set to achieve a malaria-free Africa by 2030. Strategies employed to achieve the set target included, promotion of locally manufactured ACTs, removal of oral artemisinin monotherapies from the general public, and enforcement in the use of ITNs particularly amongst pregnant women and children under five (Akinbo, Omoregie, Mordi, & Okaka, 2009).

However, in most malaria endemic areas, drugs are purchased from private, informal sector where diagnosis may or may not be done. Moreover, diagnosis may not be clear as there is a lack of specific clinical presentation and sometimes a possibility of another disease mimicking the symptoms of malaria.

Fixed dose artemisinin-based combinations have been recommended for use in Ghana to encourage compliance. The recommended ACTs are; Dihydroartemisinin-Piperaquine, Artesunate Amodiaquine and Artemether-Lumefantrine to provide a wider range of options for the management of uncomplicated malaria in Ghana. (National Malaria Control Programme, 2013).

## **2.6 Irrational Use of Antimalarials**

Although the national protocol for the management of malaria has been published, and health professionals have been trained, the prescribing and dispensing behaviors of these professionals however, have not changed as expected (National Malaria Control Programme, 2013). Moreover, a large proportion of patients in malaria endemic areas, receive antimalarial treatments without visiting as hospitals and clinics (Buabeng, 2010).

In a study conducted by Buabeng et al (2007), on self- reported use of antimalarials and health facilities in Ghana, 43% of the patients had undertaken self-medication for malaria therapy two weeks before visiting the health centers. From this population, about 50% obtained their medicines from licensed chemical shops with 21% obtaining theirs from community pharmacies.

Altogether, an alarming 77% of the patients took their antimalarials inappropriately with clear issues of incorrect dosage or did not complete the course of purchased antimalarials (Buabeng, 2010). Role of professionally competent dispenser, is therefore pivotal in intercepting some of these discrepancies (Nigatu Hirko, 2017).



## 2.7 Dispensing practices

The process of dispensing forms an integral part of the healthcare delivery system. The core professional activities of dispensers includes the provision of adequate counselling on the use of drugs, likely side effects, accurate dosage regimen and other related drug-health issues. A multi-disciplinary approach is therefore needed to develop, implement and evaluate interventions aimed at improving dispensing standards (Nigatu Hirko, 2017).

Studies have shown that, a significantly high proportion of patients could not recall the name of their dispensed medicines (53.6%), side-effects (66.4%), what to do in case of a missed dose. (65.4%). Patients poorly understood the how to take their dispensed medicines and had little knowledge concerning the use of their drugs (Nigatu Hirko, 2017; Sturm-ramirez, Mamun, Iuliano, & Azziz-, 2017). This phenomenon is a life-threatening one, since it could lead to overuse and abuse of medicines. It is a dangerous sign for development of anti-malarial drug resistance (Takala-Harrison & Laufer, 2015).

Among recommendations reviewed, improving dispensing practices, pharmaceutical roles and implementing effective professional development programs. Good dispensing practices are necessary in ensuring that patients receive appropriate medicines in an orderly manner and in a clean, safe and organized working environment.

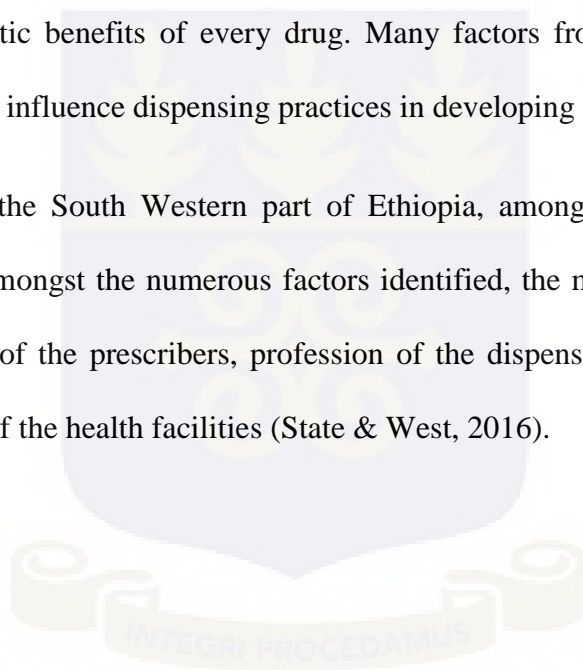
*“Good dispensing practices ensure that an effective form of the correct medicine is delivered to the right patient, in the correct dosage and quantity, with clear instructions, and in a package that maintains the potency of the medicine. Dispensing includes all the activities that occur between the time the prescription is presented and the time the medicine or other prescribed items are issued to the patient”*(WHO, 2012).

Dispensing is one of the vital components in the rational use of medications. Good dispensing practices, promotes the achievements of desired therapeutic outcome. These processes may

take place in a public or private health centre, a chemical shop, hospital or a community pharmacy setting. It is carried out by a wide variety of people with various levels of training. The scope of pharmacy practice has extended beyond the supply of medicines to include a growing range of professional health services including effective counselling, medicine reviews, chronic disease management and offering preventive health services (Australia, 2013).

The practice of dispensing is very important in drug use and compliance. Dosage regimen, reporting possible side effects, counselling on how to take medications etcetera can hugely impact on the therapeutic benefits of every drug. Many factors from literature have been identified as factors that influence dispensing practices in developing countries.

A study conducted in the South Western part of Ethiopia, amongst six malaria endemic districts showed that, amongst the numerous factors identified, the most significant markers were educational level of the prescribers, profession of the dispensers, dispensers working experiences and status of the health facilities (State & West, 2016).



## **CHAPTER THREE**

### **METHODOLOGY**

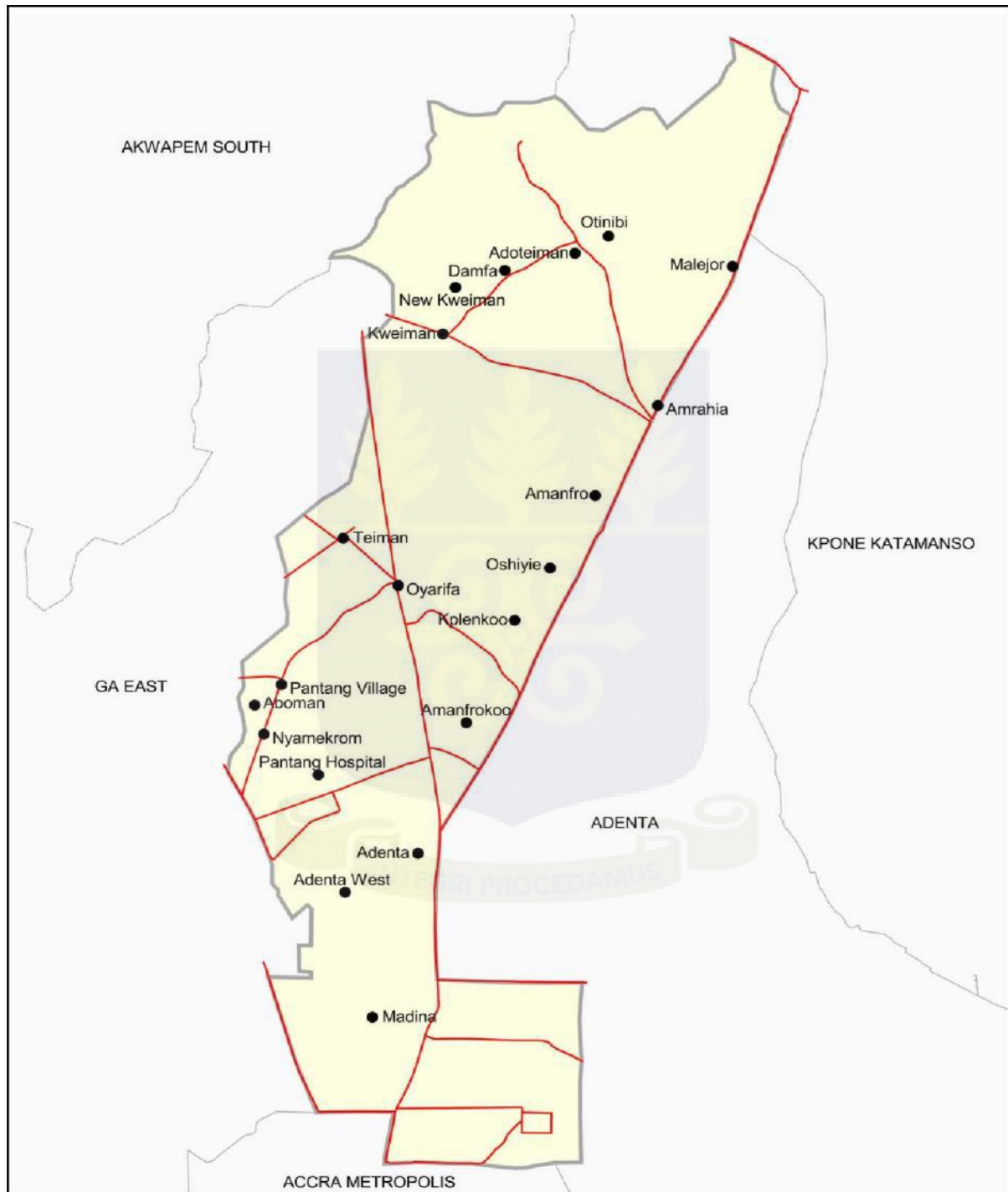
#### **3.1 Study design**

This study was cross-sectional in design and employed a quantitative approach. It was conducted in May and June 2017. A survey was conducted to interview dispensers and clients who purchased anti malarians in retail pharmacies within La Madina Nkwantanang. This was done by the use of a WHO modified questionnaire.

#### **3.2 Study location**

The La Nkwantanang-Madina Municipality is located at the northern part of the Greater Accra Region. It covers a total land surface area of 70.887 square kilometers. It is bordered on the West by the Ga East Municipal, on the East by the Adentan Municipal, the South by Accra Metropolitan Area and the North by the Akwapim South District La Nkwantanang Madina Municipality is generally urban (84percent) (Osman Suleman, 2014).

The population of La-Nkwantanang-Madina Municipal according to the 2010 population and Housing Census, is 111,926 representing 2.8 percent of the region's total population (PHC, 2012). Malaria is the leading cause of OPD attendance in the Municipality, accounting for approximately 80 % (26,349 cases) (Osman Suleman, 2014).



**Fig 3.1: Map of La-Nkwantanang Madina Municipality**

### **3.3 Study variables**

The main dependent variable for this study is dispensing practices. The independent variables of interest are stratified into three main categories.

#### **1. Dispenser variables:**

Sociodemographic characteristics

Years of experience

Exposure to in-service training

Professional category

Awareness of guidelines

#### **2. Client variables:**

Sociodemographic characteristics

National Health Insurance (NHI) Status

Rapid Diagnostic Test (RDT) check before treatment

Recommender of drugs

#### **3. Facility Level Indicators**

Availability of reference materials on Malaria Case Management (MCM)

Availability of MCM wall chart

Supervision

**Table 3.1: Variables of interest and their corresponding type of variable**

<b>VARIABLE</b>	<b>TYPE OF VARIABLE</b>
<b>Dispensing practices</b>	Categorical variable
<b>Age (at last birthday)</b>	Discrete variable
<b>Level of education</b>	Ordinal Categorical variable
<b>Training</b>	Discrete variable
<b>Supervision</b>	Ordinal Categorical variable
<b>Dispenser's working experience</b>	Discrete variables

### 3.4 Dependent Variable

The main variable in this study was dispensing practices. It was measured as a binary outcome (*Appropriate/Inappropriate dispensing practices*) from a composite score of some key dispensing variables. According to the World Health Organization (WHO) dispensing practices is a measure of the following indicators:

1. The right drug
2. Given to the right patient
3. At the right dose and frequency
4. Adequate counselling
5. Clear instruction on a label

From my study, thirteen questions from Client Data Extraction tool (Questions 18 to 28) were used as composite scores to measure dispensing practices. This was based on a scoring system ranging from 0 to 13. A positive response was scored one and a negative score was tagged zero. Therefore, a perfect score of 13 out of 13 was ideal for appropriate dispensing practice. However, a respondent with a score 9 and above was considered to have had appropriate dispensing practice and those below 9 were considered inappropriate.

### 3.5 Independent Variables

The independent variables for this study was broadly defined under the following: background characteristics of respondents, facility level indicators and Supervision.

#### 3.5.1 Background Characteristics

Age of respondents, both dispensers and clients were measured as completed years. It was further categorized into 16 to 25 years, 26 to 35 years, 36 to 45 years, 46 to 55 years and above 55 years; sex of respondents was either male or female. Ethnic background was grouped into Ewe, Akan, Ga/Adangme, Northerner and other. Highest level of education, Religious status and occupation were all grouped as in *table 4.2*

Facility level indicators assessed the availability of reference materials in pharmacies and the access to an ACT wall chart in the facility. Supervision also covered the number of times of visits ever and over the past 12 months.

### 3.6 Study population

The study population covers dispensers in retail pharmacies within La Nkwantanang Madina Municipality as well as clients exiting these facilities with an antimalarial. A sample of the study population was randomly selected for the study.

Adopting Cochran sample size calculation,

$$N = (z^2 pq) / d^2$$

$$N = \text{sample size}$$

$$p = \text{estimated proportion of clients (0.50)}$$

$$d = \text{margin of error (0.05 with a confidence interval of 95\%)}$$

$$q = (1-p)$$

$$z = 1.96$$

$$N = (z^2 pq)/d^2$$

$$N = (1.96^2 0.40 \times 0.60)/0.05^2$$

$$= 384.16$$

Total Sample size = 384.16

With a 5% non-responsive group in addition. (5%)  $384.16 = 19.21$

A total population of 403 will be used for the study. However, there have been some studies in this area but the parameters of interest differ. A study by (Rusk et al., 2012) looked at a prevalence of adequate knowledge of antimalarial guidelines. As the prevalence of the parameters of this study are unknown, a proportion of 50% was used. From the sample size of 403, sixty-three percent was used for clients (n=250) and a corresponding thirty-seven percent was factored as the finite population for the dispensers. (n=150).

Retail facilities selected for this study were done by obtaining a list of 122 retail pharmacies in La Nkwantanang-Madina from Pharmacy Council. Out of the list of pharmacies, fifty percent (50%) were randomly selected, representing sixty-six (66) retail facilities. This randomized selection was done by using a statistical tool (STATA 14). Dispensers were selected based on the retail facilities visited. Any dispenser who falls within the inclusion criteria was selected for the study. Selection of clients for exit interviews were done based on the individual's appreciation of the research topic. Sampling and recruitment of respondents was done at the various community pharmacy outlets between 4pm and 9pm each day.



### **3.6.1 Inclusion criteria**

Individuals who are permanent or locum dispensers in retail pharmacies and clients exiting pharmacies with antimalarials (ACTs)

### **3.6.2 Exclusion criteria**

Those excluded comprise dispensers who for some medical reasons cannot participate in the study, pregnant women and people with cognitive disabilities cannot participate in the study.

### **3.7 Data collection tools**

A well-structured WHO modified document on proper dispensing practices, as well as Training Manual for Licensed Chemical Sellers were adopted in designing the questionnaire. This served as the main instrument for collection of primary data. The main themes to be covered by the questionnaire will include:

- Awareness and knowledge of appropriate dispensing standards for drugs.
- Socio demographic factors with possible influence on dispensing practices
- Provision of adequate counselling for anti-malarial use.
- Regulations that apply to dispensing practices in retail community pharmacies.
- Training modules attended.

### **3.8 Data collection technique**

Questionnaires were administered to dispensers for data collection first before client exit interviews were conducted. This was done using a client based developed questionnaire. However, data collected on labelling were obtained through observation and by using a checklist. Exit interviews lasted for about ten minutes each and after collection, data received were reviewed for completeness.

### **3.9 Pre-data Collection Activities**

The following activities were carried out before collection of data on the field to ensure reliability and reproducibility of the data.

#### **3.9.1 Training of field Research Assistants**

A two day training session was organized for the field research assistants. All assistants recruited for the study were university graduates from the University Of Ghana. The training captured a comprehensive exposition on the key concepts of the study as well as the detailed methodology. Three research assistants including one supervisor, were trained on the subject area. The key concepts discussed included:

1. The objectives of the study
2. Definition of key terms
3. Description of dispensing factors and general scope of study
4. Selection of study participants
5. Interviewing skills with emphasis on courtesy for participants
6. Receiving informed consents from study participants
7. Review of all questionnaires and checklists
8. Appropriate translation of questionnaire into Twi and Ga
9. Mock interviews

#### **3.9.2 Pre-testing**

Questionnaires for the study were pretested in seven (7) community pharmacies outside the selected study area. (Accra-Central) Dispenser questionnaires were administered to individuals who attended to clients. Client data extraction tools were tested on clients exiting

with anti-malarials. The pre-testing exercise further refined both questionnaires. Based on responses received, a few questions were clarified and modified to ensure reliability of responses.

### **3.10 Actual data collection**

Data were collected from dispensers and clients over a 12 day working period, from June 26<sup>th</sup> to July 10<sup>th</sup> 2017. All 66 selected retail outlets were visited within the period. One hundred and six dispensers (n=106) were interviewed in their respective pharmacies as well as (n=231) clients. A few clients (n=17) who were still interested but were not available for in-person interviews opted to answer questions on phone. Thus, no complete data were obtained for labels of drug, as such completed data from a total of 231 participants were obtained after the study. A modified World Health Organization (WHO) developed drug use indicators as well as Licensed Chemical Sellers Training Manual were used to design the questionnaire for the study.

To assess the practice of dispensing professionals and to securely evaluate crucial aspects of pharmaceutical practice, close ended questions were asked and coded as Yes = 1, No = 0. Other variables with more than two levels were coded from 0 to 5. Data obtained from respondents were collected and entered on a customized screen using EpiData (Version 3.1). Double data entry was ensured to minimize errors and assure reliability of data collected.

### **3.11 Data sets**

The study used two main data, collected from random community pharmacies in La Nkwantanang Madina Municipality. The first dataset were obtained from dispensers found in

the retail facilities visited. Data were gathered on their professional conduct and practices along with other supervisory information.

The second data were from clients who exited the retail facilities with oral antimalarials. Data on dispensing information was collected to help assess the dispenser's performance. Both data were merged into a single data set.

### **3.12 Data Analysis**

Stata I/C version 14.0 was used for analysis. Preliminary tests were carried out on data to check for normality (z- scores for outliers, Komogorov Smirnov test) and also the reliability of the various scales used to measure various independent variables (Cronbach's alpha test statistic) The data was "svyset" to account for clustering in facilities and all analyses were conducted using the "svy:" command in STATA version 14 I/C (Stata Corporation, College Station, Texas). The data extracted was checked for internal consistency and completeness using simple summary statistics of the selected variables. A measure of dispenser-patient interaction was key in this study. However, each dispenser was linked to the patient with whom he/she had encountered. By merging client and dispenser data and adjusting for clustering, further tests were carried out.

Descriptive statistics was used to describe baseline characteristics. Frequency distribution were summarized in tables and charts as well. Measures of central tendencies (mean, median and mode) were determined for continuous variables. Standard deviation was used to establish the extent of spread of certain selected key continuous variables at a 95% confidence level.

Inferential statistics were carried out to determine the relationship between the outcome variable (dispensing practices) and other independent variables using the chi square test of association. A fisher's exact test was used when sample sizes were too small.

The outcome variable (dispensing practices) however, was considered a categorical variable. Therefore, logistic regression was carried out to examine the strength of associations between the outcome variable and possible predictors.

### **3.13 Quality control**

After the questionnaires were pre-tested and filled, they were kept safely in a cabinet under lock and key. All analyzed data were transferred to a laptop and password protected. Another copy will be kept on an external hard drive which would be securely kept in a cabinet, with access limited to the principal investigator. After a year, the data would be deleted.

### **3.14 Ethical issues**

Ethical approval was sought from the Ghana Health Service Ethics Review Committee. Approval was also sought from the proprietors of retail facilities as well. Before the exit interview was conducted, the participants were duly informed about all relevant details and their consent was sought. Dispensers were informed about the nature of the work and their consent sought before the questionnaires are administered. The names of all those involved in the interviews were kept confidential. The data collected were strictly used for academic and research purposes only.

### **3.15 Funding**

This research was solely funded by the principal investigator.

### **3.16 Dissemination of findings**

The findings will be written for publication in a reputable journal and presented at conferences.



## **CHAPTER FOUR**

### **RESULTS**

#### **4.0 Introduction**

This chapter provides details on the results of the study. It covers background characteristics of dispensers and clients, sociodemographic characteristics and table of results.

#### **4.1 Background characteristics of study population.**

##### **4.1.1 Enrolment details of study participants**

###### **Clients**

Two hundred and sixty-eight (268) clients were approached for the study 248 indicated their willingness to participate in the study and hence were recruited. Seventeen (17) clients expressed consent to participate in the study yet did not have time for the interview. These clients communicated on phone, however, complete data were not collected as researcher could not have access to their drugs to assess labelling. Thus a completed data of 231 were collected representing a 93% response rate.

###### **Dispensers**

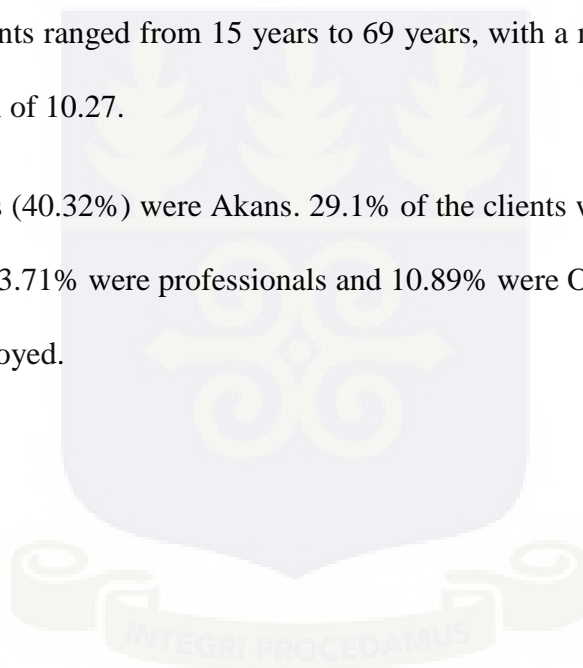
An expected population of a hundred and fifty dispensers were to be recruited. However, only one hundred and twenty four (124) dispensers consented to partake in the study, with only one hundred and six providing completed forms. In all, a response rate of 85% was obtained for dispensers.

#### 4.1.2 Socio-demographic characteristics of clients

Table 4.1 shows the socio-demographic characteristics of 248 clients interviewed for the study. There were 38.7% males and 60.9% females. Majority of clients interviewed (53.6%) were married and a corresponding 41.1% were single. Their religious background was mainly Christians as a higher proportion of the clients (85.6%) were Christians with 14.1% and 0.81% being Muslims and Traditional believers respectively.

Most of the clients had secondary level of education (38.7%). Clients who had tertiary level of education were 63 representing 25% of the entire population. Only 3.2% had no formal education. Ages of clients ranged from 15 years to 69 years, with a mean age of 33.70 years and a standard deviation of 10.27.

About 2/5 of the clients (40.32%) were Akans. 29.1% of the clients were engaged in trading. 26.61% were artisans. 13.71% were professionals and 10.89% were Office workers. 4.44% of the clients were unemployed.





**Table 4.1: Socio-demographic characteristics of clients who patronize retail pharmacy services in the La-Nkwantanang Madina – 2017**

Characteristics	Frequency (n=248)	Percentage (%)
<b>Sex</b>		
Male	96	38.7
Female	151	60.9
<b>Age</b> (mean, sd)	(33.70, 10.27)	-
<b>Marital Status</b>		
Single	102	41.1
Married	133	53.6
Separated/Divorced	5	2.0
Widow/ widower	8	3.2
<b>Highest level of Education</b>		
None	8	3.2
Primary/Elementary	62	25.0
Secondary	96	38.7
Tertiary	63	25.4
Vocational/Technical	19	7.7
<b>Religion</b>		
Muslim	35	14.1
Christian	211	85.1
Traditional	2	0.8
<b>Ethnicity</b>		
Ewe	64	25.8
Akan	100	40.3
Ga/Adangme	43	17.3
Northerner	36	14.5
Other	5	2.0
<b>Occupation</b>		
Trader	72	29.0
Artisan <sup>1</sup>	66	26.6
Professional <sup>2</sup>	34	13.7
Office worker <sup>3</sup>	27	10.9
Unemployed	11	4.4
Student	35	14.1
Other	3	12.0

1=refers to a worker in a skilled trade especially one that involves making things by hand. Eg hair dressers, painters, etc.

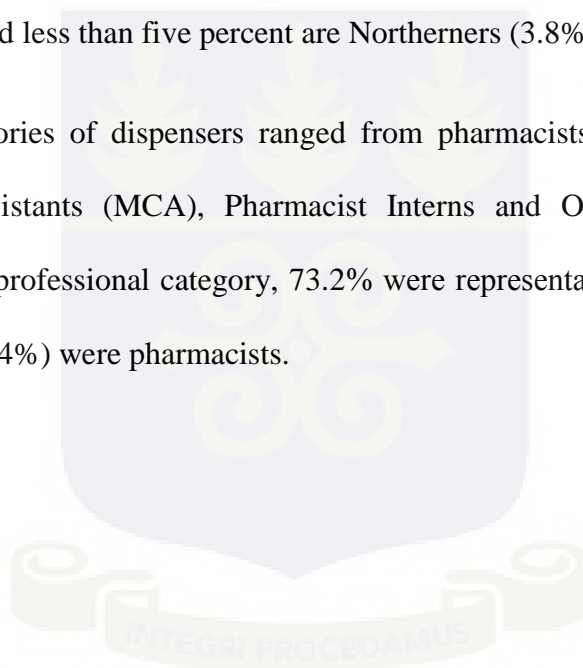
2= Includes skilled professionals such as nurses, teachers etc. 3= mainly people who work in offices eg. Banker

#### **4.1.3 Socio-demographic characteristics of dispensers**

A total of 106 dispensers were interviewed. Females were 67.9% (n=72) and males represented 32.1% of the population. 65.1% of the dispensers were single, and 97.2% were Christians.

Most dispensers had tertiary level of education (68.9%) and a corresponding 28.3% represented patients with secondary level of education. Dispenser's ages ranged from 18 years to 70 years with mean of 30.4 and standard deviation of 8.8. 51.9% of dispensers belonged to 25-34 years age category. For ethnic groups, results showed that 50.9% of dispensers are Akans and less than five percent are Northerners (3.8%).

The professional categories of dispensers ranged from pharmacists, pharmacy technician, Medicine Counter Assistants (MCA), Pharmacist Interns and Other (Manager, owner, auxiliary staff). Of the professional category, 73.2% were representative of MCA's and less than fifteen percent (14.4%) were pharmacists.



**Table 4.2: Socio-demographic characteristics of dispensers in community retail pharmacies in La Nkwantanang Madina-2017**

Characteristics	Frequency (n=106)	Percentage (%)
<b>Sex</b>		
Male	34	32.1
Female	72	67.9
<b>Age (mean, sd)</b>	(30.43, 8.79)	
<b>Age group (years)</b>		
15 - 24	21	19.8
25-34	55	51.9
35-44	22	20.8
>45	8	7.6
<b>Marital Status</b>		
Single	69	65.1
Married	37	34.9
<b>Highest level of Education</b>		
None	-	-
Primary/Elementary	1	0.9
Secondary	30	28.3
Tertiary	73	68.9
Vocational/Technical	2	1.9
<b>Religion</b>		
Muslim	3	2.8
Christian	103	97.2
<b>Ethnicity</b>		
Ewe	19	17.9
Akan	54	50.9
Ga/Adangme	29	27.4
Northerner	4	3.8
<b>Professional Category</b>	(n=97)	
Pharmacist	14	14.4
M.C. A	71	73.2
Pharmacy Technician	3	3.1
Pharmacist Intern	8	8.3
Other (Manager/owner)	1	1.0

#### **4.2. Distribution of variables used in assessment of dispensing practice**

As shown in table 4.3 below, dispensing practice was assessed using a composite score of some key variables as presented. From table 4.3, more than forty percent (41.5%) of clients were provided with inaccurate direction on the use of their medications. (Antimalarials)

About fifty-eight percent of clients on the other hand were provided with accurate direction on the use of their medications and a large proportion (95.5%) being advised to take medications after meals. Only 11.3% of the clients (n=248) were not advised to complete the full course of their anti-malarial. Advice on side-effect by dispensers showed that, 21.8% of clients were not advised on the risk of side-effects of their antimalarials.

Again, majority of the clients (91.1%) had dispenser's informing them on the quantity of drug (number of tablets/volume) to take and less than one third (11.7%) of the clients being provided with the exact times to take the medication.

Eighty-eight percent (88.3%) were not advised on the appropriate time to take the drug. With regards to labelling, most clients had their respective dispenser's writing in ink on a label (92.74%) In addition, 87.1% found the writings clearly spelt out with instructions which made meaning and approximately 10% found the writing illegible.

Majority (88.3%) of the clients were advised on the frequency with which drug should be taken but approximately 23% were not advised on the duration of use.

**Table 4.3: Distribution of areas of assessment during dispensing and post dispensing advice**

<b>Areas of assessment (Advise)</b>	<b>Frequency (n=248)</b>	<b>Percentage (100%)</b>
<b>How to take antimalarials</b>		
Accurate direction	103	58.5
Inaccurate direction	145	41.5
<b>Taking after meals</b>		
After meals	237	95.6
Before meals	11	4.4
<b>Completion of full course</b>		
Advised	220	88.7
Not advised	28	11.3
<b>Risk of side effects</b>		
Advised	53	21.4
Not advised	195	78.6
<b>Labelling</b>		
<b>Writing in ink</b>		
Yes	230	92.7
No	18	7.3
<b>Clear instruction</b>		
Clear	216	87.1
Not clear	32	12.9
<b>Legibility to client</b>		
Legible	223	89.9
Illegible	25	10.1
<b>Label captured</b>		
<b>Quantity of drug</b>		
Yes	226	91.1
No	22	8.9
<b>Frequency</b>		
Yes	219	88.3
No	29	11.7
<b>Exact time to take drug</b>		
Yes	29	11.7
No	219	88.3
<b>How long to take drug</b>		
Yes	191	77.0
No	57	23.0

Assessment was from clients exit interviews

### 4.3 Measurement of dispensing practice

In order to quantify dispensing practice, a composite variable was created. It consisted of the scores of the various areas mentioned earlier (table 4.3) and assessed. Performance of a particular area of assessment was scored as one while nonperformance was scored as zero.

In the end, scores of respondents ranged from zero to thirteen. Those who scored less than nine out of thirteen were considered to be offering inappropriate dispensing practice whereas those who scored nine or more were classified as providing appropriate dispensing practice.

**Table 4.4: Dispensing practice classification**

Score (n=13)	Dispensing practice
Less than 9	Inappropriate
At least 9	Appropriate

### 4.4 Relationship between exposure factors and dispensing practices.

The assessment of association between the independent variables and the outcome variable was done by using the chi square test of association. The exposure factors used included: age group, sex, educational status, NHIS status, professional category, years of experience, marital status, access to reference materials, number of supervisory visits, recommender, awareness of guidelines and In-service training. Whilst the outcome variable was dispensing practice at a 95% confidence interval.

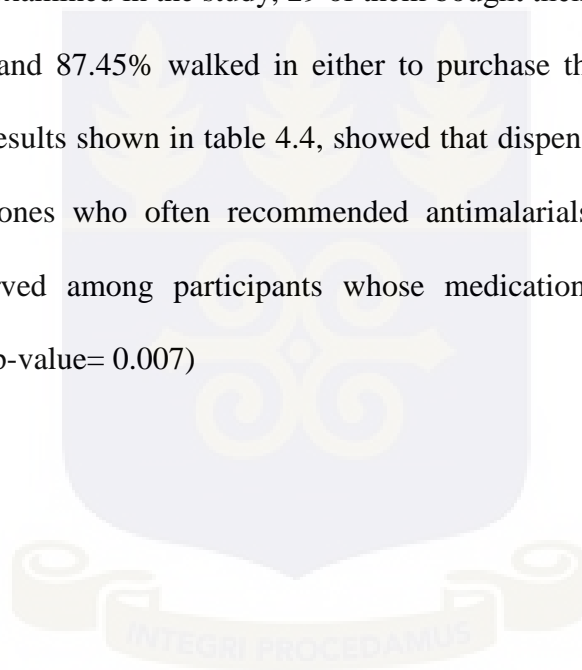
Among the factors examined, clients NHIS status were found to be significantly associated with dispensing practice. (Chi = 5.03, p-value= 0.02) Clients without a valid NHIS had a higher proportion of dispenser's providing them with inappropriate dispensing practices.

Marital Status was also found to be significantly related to dispensing practices. Majority of the clients (n=83) who were single, had dispensers providing appropriate dispensing practices. (Chi = 6.79, p-value= 0.009).

For dispensers who had access to reference materials, 54 of them representing 25.11% actually provided appropriate dispensing practices to their clients. Whereas, 64 of them (29.77%) provided inappropriate dispensing practices to their clients. This association was significant. (Chi =6.27, p-value=0.012).

Dispensers who offered inappropriate dispensing practices were those who had one supervisory visit within 12 months (n=58). Number of supervisory visit was found to be significant. (Chi=10.61, p-value=0.031)

Among the 231 clients examined in the study, 29 of them bought their ACT's with a prescription representing (12.55%) and 87.45% walked in either to purchase the medicine by self, or on recommendation. The results shown in table 4.4, showed that dispensers (n=136) in community pharmacies, were the ones who often recommended antimalarials to clients. A significant relationship was observed among participants whose medications were recommended by dispenser. (Chi= 16.52 p-value= 0.007)



**Table 4.5: Chi square test of association of socio-demographic characteristics of dispensers and dispensing practices**

Dispensing Practices						-
Variables	Appropriate		Inappropriate		$\chi^2$	p – value
	Frequency	%	Frequency	%		
Age group	N=121		N=110			
15 – 24	14	11.6	11	10.0	7.76	0.10
25 – 34	59	48.8	58	52.7		
35 – 44	30	24.8	36	32.7		
45+	18	14.9	5	4.6		
Total	121	100.0	110	100.0		
Sex	N=121		N=110			
Male	35	28.9	33	30.0	0.032	0.89
Female	86	71.1	77	70.0		
Educational Level	N=121		N=110			
None	-	-	-	-	1.442	0.696
Primary	1	0.8	-	-		
Secondary	42	34.7	36	32.7		
Tertiary	77	63.6	72	65.5		
Vocational/Tech	1	0.8	2	1.8		
NHIS Status	N=121		N=110			
Have NHIS	59	48.8	37	33.6	5.43	0.02*
Not Have NHIS	62	51.2	73	66.4		
Professional Category	N=120		N=110			
Pharmacist	14	11.7	15	13.6	6.90	0.09*
Medicine Counter Assistant	85	70.8	88	80.0		
Pharmacy Technician	6	5.0	2	1.8		
Pharmacy Intern	11	9.17	3	2.7		
Other	4	3.3	2	1.8		
Years of Experience	N=113		N=96			
< 2years	28	24.8	14	14.6	3.66	0.30
3 – 5 years	41	36.3	39	40.6		
6 – 9 years	32	28.3	29	30.2		
>10years	12	10.6	14	14.6		
Marital Status	N=121		N= 110			
Single	83	68.6	57	51.8	6.79	0.009*
Married	38	31.4	53	48.9		

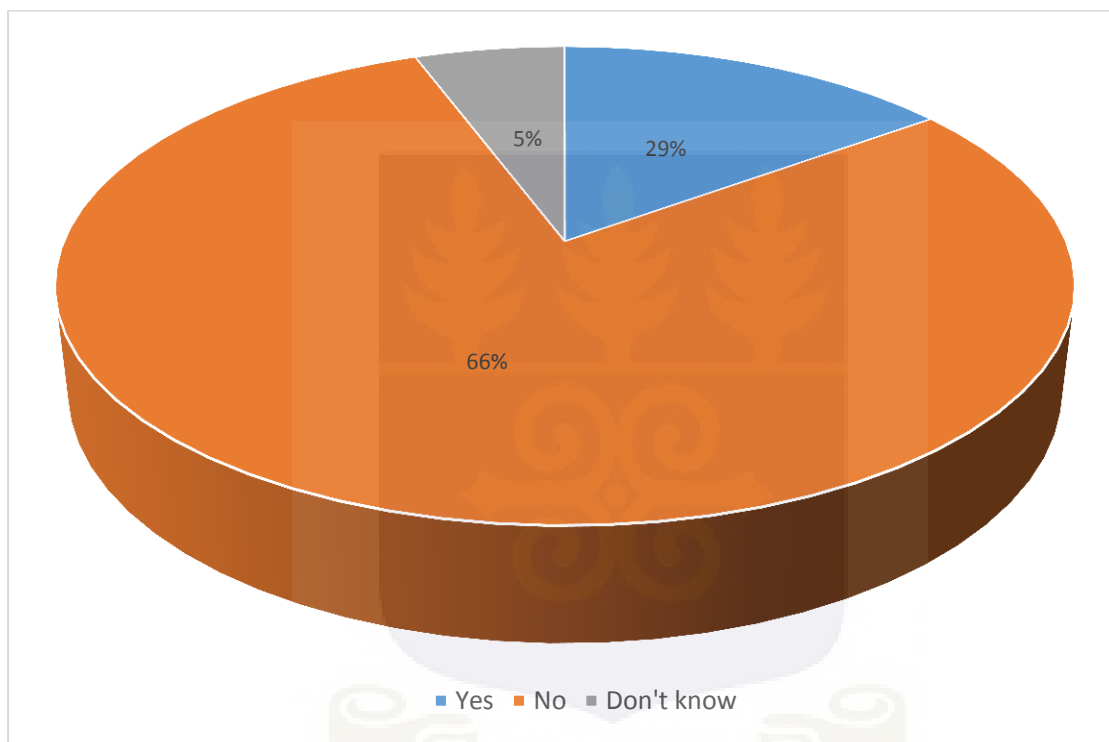


Dispensing Practices						
Variables	Appropriate		Inappropriate		$\chi^2$	p – value
	Frequency	%	Frequency	%		
Access to wall chart	N=121		N=110			
Yes	13	10.7	24	21.8	5.25	0.068
No	108	89.3	86	78.2		
Access to reference material	N=115		N=100			
Yes	54	47.0	64	64.0	6.27	0.012*
No	61	53.0	36	36.0		
Supervisory visits	N=121		N=110			
Once	48	39.7	58	52.7	10.61	0.031*
Twice	40	33.1	20	18.2		
Three times	3	2.5	5	4.6		
More than 3	3	2.5	-	-		
Can't remember	27	22.3	27	24.6		
Recommender	N=121		N=110			
Dispenser	68	56.2	63	57.2	16.52	0.007*
Relative	16	13.2	5	4.6		
Friend	2	1.7	-	-		
Self	16	13.2	30	27.3		
Media	-	-	2	1.8		
Unspecified	19	15.7	10	9.1		
Awareness of Guidelines	N=53		N=69			
Yes	14	14.6	28	24.8	3.66	0.09*
No	39	40.6	41	36.2		
In-Service Training ( last 12mnts)	N=231		N= 110			
Yes	60	26.0	36	32.7	4.98	0.065
No	123	53.3	53	48.2		
Can't remember	48	20.8	21	19.1		

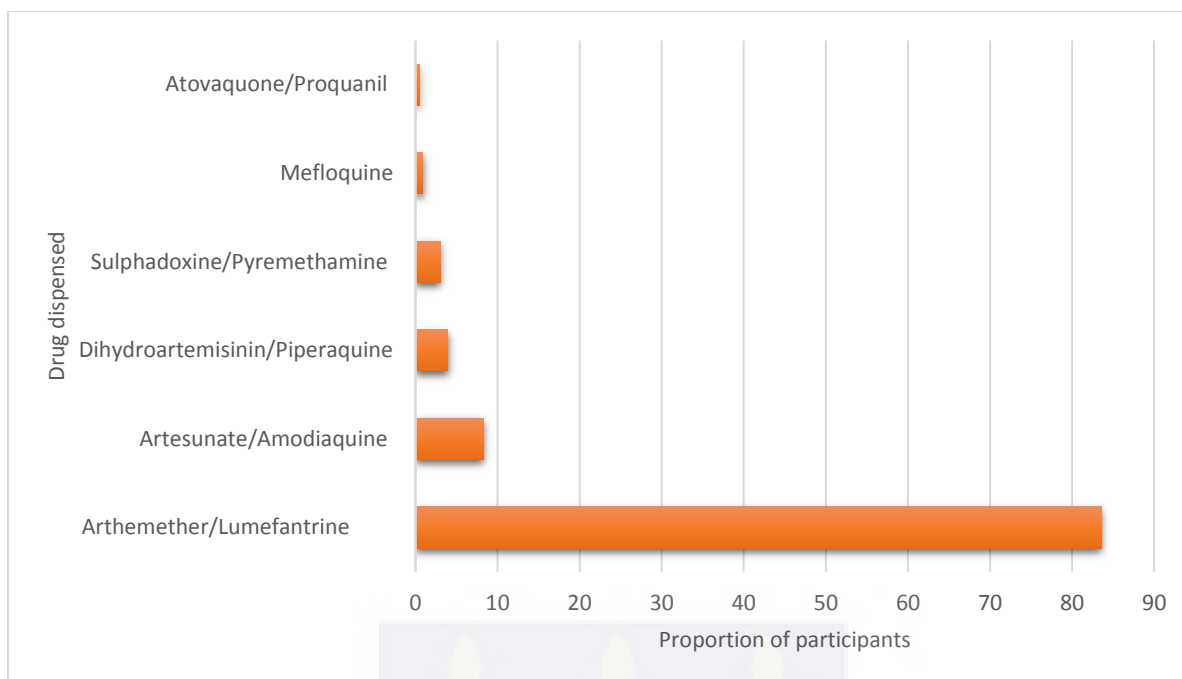
*Statistically significant associations are marked with \**

#### 4.4.1 Distribution of clients who tested before taking antimalarials

From the chart below, 66% of clients who visited community pharmacies within La Nkwantanang Madina did not test using the RDT before purchase of the medicine (antimalarials). On the other hand, out of the 231 clients, only 67 (29% )of them did test before treatment. The remaining 5% did not know whether the owner of the drugs being purchased had tested for malaria or not.

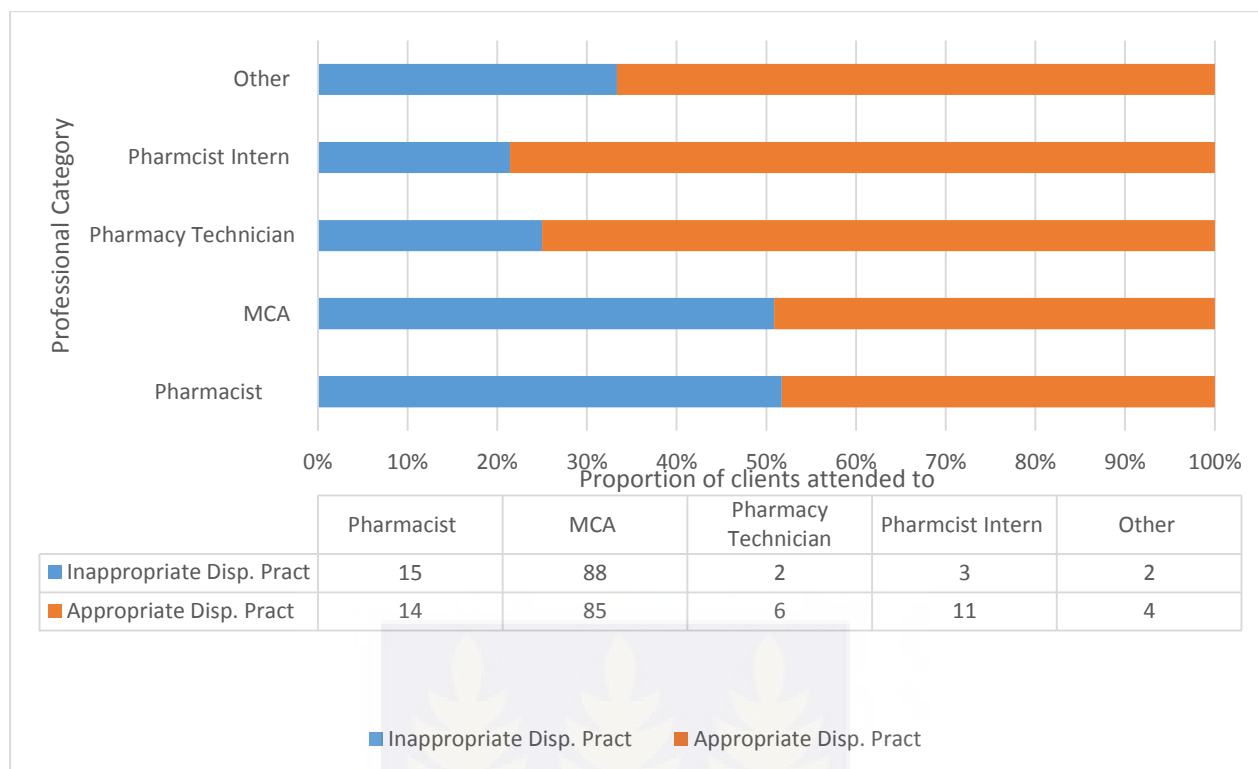


**Fig 4.1: Pie chart showing proportion of clients who performed an RDT before taking an antimalarial**



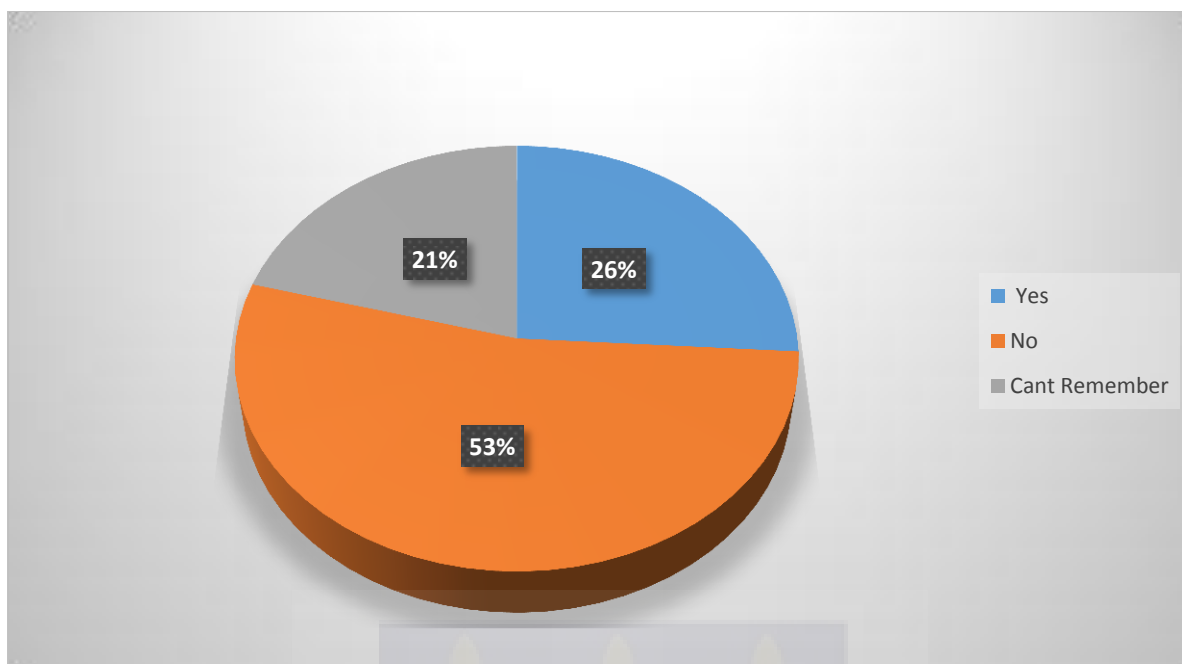
**Fig 4.2: Distribution of antimalarials dispensed in community pharmacies within La Nkwantanang Madina municipality, July 2017**

The distribution of antimalarials dispensed showed that, a large population (83.6%) were dispensed with Artemether/Lumefantrine as the treatment option for uncomplicated malaria encounters in retail outlets. 8.2% of other clients were dispensed with Artesunate/Amodiaquine. 3.9% exited pharmacies with Dihydroartemisinin/Piperaquine 3.03% bought Sulphadoxine/pyrimethamine 0.87% had Mefloquine and 0.43% were recorded to have purchased Atovaquone/proguanil.



**Fig 4.3: Distribution of dispensing practices among professional categories observed in community pharmacies within La-Nkwantanang Madina Municipality, July 2017**

Results from the chart above depicts that, 173 of the clients recruited for the study were attended to by MCA's and from these encounter, 88 of them had inappropriate dispensing practices. Pharmacists on the other hand, encountered 29 clients with a 48.3% (n= 14) of them administering inappropriate dispensing practices. Pharmacy Technicians attended only to 8 clients and appropriately dispensed to only 6 of them. Pharmacist Interns were also found to have interacted with 14 clients, and impressively providing appropriate dispensing practice to their clients. (n=11) whereas others (managers, owners and other supporting staff) provided appropriate dispensing practices to 4 out of the 6 clients they encountered.



**Fig 4.4: A pie chart showing the distribution of dispensers who have had an in-service training over the past 12 months in the La Nkwantanang Madina Municipality, July 2017**

Close-ended questions on dispensers in – service training within last 12 months were collected and the results indicated that, 53% of dispensers had no training over the past 12 months. Only 26% had in- service training within the last 12 months and 21% couldn't remember whether they had had in-service training over the past 12 months.

#### **4.5 Multivariate Logistic Regression**

A multivariate logistic regression model was then run between the significantly associated independent variables and the outcome variable (dispensing practice) to determine the predictor variables associated with the outcome of interest. Crude as well as the Adjusted Odds Ratios were found and are shown in *table 4.6 below*;

**Table 4.6: Univariate and multivariate logistic regression analysis for the association between dispensing practices and socio-demographic characteristics of dispensers**

Characteristics	Crude OR (95% CI)	p – value	Adjusted OR (95% CI)	p- value
<b>Age Group</b>				
15 - 24 (reference)	1			
25 – 34	1.08 (0.43-2.69)	0.874		
35 – 44	0.94 (0.35-2.98)	0.897	-	-
>45	3.6 (0.98-13.16)	0.053		
Age	0.99 (0.96-1.02)	0.560		
<b>Sex</b>				
Male (reference)	1			
Female	1.05 (0.60-1.86)	0.860	-	-
<b>Educational Level</b>				
None (reference)	1			
Primary	1	-		
Secondary	2.33 (0.20-26.81)	0.496	-	-
Tertiary	2.14 (0.19-24.10)	0.538		
Vocational/Technical	1	-		
<b>Professional Category</b>				
Pharmacist (reference)	1			
MCA	1.03 (0.47-2.27)	0.930		
Pharm. Technician	3.21 (0.55-18.65)	0.190	-	-
Pharm. Intern	3.93 (0.90-17.08)	0.068		
Other	2.14 (0.34-13.89)	0.419		
<b>Marital Status</b>				
Single	1	-	1	-
Married	0.49 (0.29-0.84)	<b>0.010*</b>	0.26 (0.13-0.51)	<b>0.001*</b>
<b>NHIS Status</b>				
Have NHIS (reference)	1		1	
Don't have NHIS	0.53 (0.31-0.91)	<b>0.020*</b>	0.53 (0.28-1.00)	<b>0.05*</b>
<b>Access to wall chart</b>				
No	1	-		
Yes	2.32 (1.11-4.82)	<b>0.024*</b>	2.56 (0.98-5.41)	<b>0.05*</b>
<b>Experience</b>				
< 2 years (reference)	1	-		
3- 5 years	0.52 (0.24-1.14)	0.105	-	-
6 – 9 years	0.55 (0.24-1.24)	0.153		

>10 years	0.42 (0.16-1.17)	0.098		
<b>Awareness of guidelines</b>				
Aware (reference)	1			
Unaware	0.36 (0.15-0.87)	<b>0.023*</b>	0.37 (0.13-0.99)	<b>0.049*</b>
<b>Access to reference material</b>				
No	1	-		
Yes	0.44 (0.26-0.75)	<b>0.003*</b>	2.29 (1.13-4.63)	<b>0.022*</b>
<b>Supervisory visits</b>				
Once	1	-		
Twice	2.42 (1.25-4.67)	<b>0.009*</b>	-	-
Three times	0.73 (0.16-3.19)	0.67		
>Three	1	-		
Can't remember	1.21 (0.63-2.33)	0.57		
<b>Recommender</b>				
Dispenser	1	-	1	-
Relative	2.96 (1.02-8.57)	<b>0.045*</b>	2.69 (0.80-9.03)	0.11
Friend	1	-	1	-
Self	0.49 (0.25-0.99)	<b>0.047*</b>	0.38 (0.17-0.84)	<b>0.018*</b>
Media	1	-	1	
Unspecified	1.76 (0.76-4.07)	0.186	1.33 (0.49-3.56)	0.058

*Statistically significant associations are marked with \* OR=Odds Ratio*

Crude analysis of the association between the outcome variable (dispensing practices) and predictor variables showed that marital status, clients NHIS status, access to wall chart, access to reference materials, number of supervisory visits, type of recommender and awareness of guidelines were associated with dispensing practices.

Married dispensers were 51% less likely to provide appropriate dispensing practice to their clients. (COR = 0.49 95%CI= 0.29-0.84, p-value= 0.01) Non-NHIS registrants were 47% less likely to receive appropriate dispensing practice from their dispensers. (COR = 0.53, 95%CI= 0.31-0.91, p-value= 0.02)

From the table, the odds of providing appropriate dispensing practice was 2.32 times amongst dispensers who did not have the wall chart than in those who had an anti-malarial wall chart in their facilities. . (COR = 2.23 95%CI= 1.11- 4.82, p-value= 0.024) However, dispensers who had access to reference materials were 56% less likely to provide appropriate dispensing

practices compared to dispensers without reference materials. (COR = 0.44 95%CI= 0.26 - 0.75, p-value= 0.003)

Supervisory visits was found to be associated with dispensing practices. The odds of providing appropriate dispensing practices amongst dispensers who were visited twice was 2.42 times higher the odds of providing appropriate dispensing practices amongst dispensers visited once. (COR = 2.42 95%CI= 1.25-4.67, p-value= 0.009)

Compared to dispensers, the odds of receiving appropriate dispensing practice was 2.96 times among clients who had recommendation from relatives. (COR = 2.96, 95%CI= 1.02-8.57, p-value= 0.045) In furtherance, clients who self-recommended the purchase of antimalarials had a 51% decreased odds of receiving appropriate dispensing practice compared to recommendation from a dispenser. (COR = 0.49, 95%CI= 0.25-0.99, p-value= 0.047)

Dispensers who were unaware about guidelines, had a 64% decreased odds of providing appropriate dispensing practice compared to dispensers who were aware. (COR = 0.36, 95%CI= 0.15-0.87, p-value= 0.023)

After adjusting for all other variables, marital status, NHIS status, experience and type of recommender were significant predictors of dispensing practices as shown in table 3.

Married dispensers were 74% less likely to provide appropriate dispensing practice to their clients. (AOR = 0.26 95% CI=0.13-0.51, p-value< 0.001) adjusting for all other variables.

Non-NHIS registrants were 47% less likely to receive appropriate dispensing practice from their dispensers. (AOR = 0.53, 95%CI= 0.28-1.00, p-value= 0.05) adjusting for all other variables.



Again, participants who self-recommend were found to have a 62% decreased odds of receiving appropriate dispensing practice compared to dispensers. (AOR = 0.38, 95%CI= 0.17 - 0.84, p-value = 0.018). The full model was statistically significant,  $\chi^2 (26) = 81.30$ ,  $p < 0.001$  indicating that the model was a good model.



## CHAPTER FIVE

### DISCUSSION

This chapter presents a detailed discussion of the study findings which is organized along the objectives of this study. Key findings are captioned under the following thematic areas

1. Proportion of clients exit with appropriate dispensing practice
2. Factors associated with dispensing practices
3. Proportion of clients who test before treatment

#### **5.1 Proportion of clients exit with appropriate dispensing practice**

In general, many patients do not take prescribed drugs correctly, or they may not take them at all. The most common attributable reasons are: symptoms have ceased, side effects have occurred, the drug is not perceived as effective, or the dosage schedule is complicated for patients (Abuzeid, 2015). There is evidence that the risk of dispensing errors is increasing and poor dispensing factors is a contributory cause (Fshp et al., 1999). Dispensers must be adequately trained and have the cognitive abilities to identify both requested and prescribed drugs. In Ghana, pharmacists go through intensive academic and practical sessions with rigorous clinical training targeted at providing adequate pharmaceutical care to their patients. Pharmacists are therefore, expected to be found in retail/wholesale facilities involved in the sale of medicines, given that a community pharmacy is open for business (Pharmacy Council, 1994). However, this assumption, is often not met as pharmacists are either out of post or not actively engaged in dispensing practices (Al-Mohamadi, Badr, Bin Mahfouz, Samargandi, & Al Ahdal, 2013).

This study shows a similar phenomenon. Comparatively, pharmacists had 29 client-dispenser interaction whilst Medicine Counter Assistants produced nearly six times that of pharmacist-

client interaction (n=173). In other words, per every pharmacist who dispenses drugs to a client, an MCA will dispense to six clients. (Ratio 1:6) This shows that, dispenser-client interaction is higher amongst MCA's than amongst pharmacists. Unfortunately, nearly 51% of MCA-client interaction yielded inappropriate dispensing practices being issued.

Results from the study again indicated that, the proportion of clients who exited community pharmacies within La Nkwantanang Madina with appropriate dispensing practice was 52.4%. This proportion had adequate labelling of their medications coupled with adequate counselling and clear instructions on the use of their anti-malarials. This was consistent with to a similar study done in Sri Lanka, where appropriateness of labelling was a key measure. A score of 52.2% was obtained for private medicine sources compared to public sources. (OR 2.90, 95% CI 2.57, 3.26)(Athuraliya et al., 2016).

However, an alarming proportion of dispensers (47.6%) dispensed inappropriately. A study which looked at consumer's perception on the contribution of community Pharmacists in Dawadmi (Saudi Arabia) showed that, 48% of the dispensers did not provide accurate dispensing information to their clients (Alotaibi & Abdelkarim, 2015).

This rather high prevalence can be attributed to insufficient time either from the service provider or the recipient. The issue of poor contact time between clients and dispenser and a likely client rush exit as well reduces the chances of receiving appropriate dispensing information (A. Hussain et al., 2013).

Furthermore, interruptions during dispensing, low staff strength, inadequate knowledge, lack of training and dispenser fatigue are likely causes of inappropriate dispensing practices (Fshp et al., 1999).

## 5.2 Factors associated with dispensing practices

This study emphasized on dispensing practices exhibited by dispensers found in community pharmacies. Much focus was given to factors that influence dispensing practices and measures that can be implemented to improve the process. Findings from this study showed that, dispenser's sociodemographic status (marital status) Health Insurance Status of Client, access to wall chart, and awareness of guidelines were associated with the outcome variable.

### 5.2.1 Marital Status

Findings from this study suggests that married dispensers were 74% less likely to provide appropriate dispensing practice to their clients. (AOR = 0.26 95% CI=0.13-0.51, p-value< 0.001) adjusting for all other variables. In agreement with this finding, closely related studies reported that, marital status of dispensers is strongly correlated to his/her knowledge in dispensing (Nigatu Hirko, 2017). This suggests that, dispensers who were single actually had a better chance of providing appropriate dispensing practices to their client.

Another hypothesis was that, the independent living of a single dispenser, requires self-responsibility and autonomy thus a higher odds ratio (AOR: 1.0) with regards to dispensing practices is expected. However, in contrast to this finding, other studies have reported the role of family support and marital status in the adherence to dispensed medicines in general (Morisky et al., 2008). It is possible that, the higher proportion of single dispensers who participated in this study (n=69%), introduced some bias into the study findings: however, the direct relationship between marital status of dispensers and their dispensing practice, lacks clear explanation.

### 5.2.2 Health Insurance Status of Client

The National Health Insurance Scheme (NHIS) has been implemented in the country for over ten years now. The purpose was to reduce financial barriers in order to enable the citizenry to access quality health care. Community pharmacies are key partners in the health care delivery system. However since the implementation of the NHIS not much has been known about its impact on the community pharmacies with respect to their business operations (NHIS, 2013).

Evidence from this study showed that, Health Insurance Status was significantly associated with the outcome of dispensing practices. (AOR = 0.53, 95% CI= 0.28-1.00, p-value= 0.05) Clients who were non registered NHIS holders had decreased odds of receiving appropriate dispensing practice from dispensers.

This is consistent with the assertion that, the few community pharmacies accredited by NHIA, actually appreciate non registered NHIS clients since they pay out rightly for their medications. Participants with NHIS on the other hand, do not readily appreciate services rendered by community pharmacy attendants. Common reasons are: most of the medicines needed are not covered by the NHIA, delay in reimbursement, tedious claim filling and delays in adjusting NHIS drug prices (Amoah, 2012).

### 5.2.3 Access to wall chart

One key facility level indicator employed in the study was access to an ACT- protocol in a poster form within the dispensaries. Results from the study identified access to wall chart significantly associated with the outcome of dispensing practices. (AOR=2.56 95% CI = 0.98-5.41 p-value =0.05)

The findings of this study supports the hypothesis that, posters and wall charts are cost effective interventions to improving dispensing practices and knowledge of dispensed drugs at primary health care units. Facilities who had an ACT-wall chart had 2.56 increased odds of providing appropriate dispensing practices to their clients compared to facilities without wall charts.

Nearly 47% of the dispensers interviewed had an ACT-protocol poster affixed in their respective facilities. However, a study done in Sudan reported only 20% of dispensaries having the new protocol for malaria case management (Abbas, 2006).

In agreement with this finding, another study addressed the impact of interventions on dispensing practices. His finding proved that, access to posters in health care facilities leads to a marked improvement in dispensing practices. The poster group had a significant increase in dispensing time from 36.4 to 50.7 seconds ( $p < 0.05$ ) compared to the control group. With respect to percentage of adequately labelled drugs the poster group had a significant increase from 0.2% to 32.3% ( $p < 0.05$ ). Patient knowledge significantly increased from 4.7% to 13.4% in the poster group ( $p < 0.01$ ) (Ameyaw, 1996).

#### **5.2.4 Type of Recommender**

Results from the study revealed that, clients who walked in pharmacies to purchase anti-malarial on self- recommendation were found to have a 62% decreased odds of receiving appropriate dispensing practice compared to dispensers. (AOR = 0.38, 95% CI= 0.17 – 0.84,  $p$ -value = 0.018). This significantly was associated with dispensing practices. In line with a qualitative study, dispensers were more prone to giving adequate dispensing information to clients whose drugs were recommended by them than those who request by themselves (A. Hussain & Ibrahim, 2011).

Clients appear to know what they come for, in view of this, dispensers give it to them expecting them to know how to take it. This is consistent with a study, whose finding revealed that incorrect usage of the antimalarials was highest among those who used left-over medicines at home or those who obtained their antimalarials from retail outlets, particularly the licensed chemical shops on their recommendation (Buabeng, 2010).

#### **5.2.5 Awareness of guidelines and training**

Awareness of dispenser of guidelines for treatment of uncomplicated malaria was found to be significant after the study. Dispensers who were unaware about guidelines, had a 64% decreased odds of providing appropriate dispensing practice compared to dispensers who were aware of the guidelines. Many dispensers are not readily abreast with the current trends of treatment in their countries. They mostly rely on information by the representatives of pharmaceutical companies thus sale of medicines is under the influence of promotion rather than pharmaceutical care (Butt, Gilani, Nanan, Sheikh, & White, 2005).

This study could not clearly establish an association between training and the outcome of dispensing practices. In contrast, several studies have associated a positive relationship between training and dispensing practices. In a study where dispensing practice was measured as the ability to identify the recommended anti-malarial, the odds of knowing the recommended treatment were significantly higher amongst participants with health training. (OR =3.26 95% CI = 1.23-8.63; p value=0.017) (Rusk et al., 2012).

#### **5.3 Proportion of clients who test before treatment**

Misdiagnosis of malaria results in significant morbidity and mortality. In certain cases, it may lead to antimicrobial resistance and render drugs ineffective. (Mathew, Gadde, Nutakki, & Doddayya, 2013). Resistance to artemisinin's has been recorded in South Eastern Asia

manifesting itself as delayed clearance of parasitaemia following treatment with artemisinin derivatives (Takala-Harrison & Laufer, 2015). Rapid diagnostic test kit are rapidly being used in laboratories and even health facilities and retail pharmacies for definitive diagnosis of malaria. The rationale is to make the RDT readily accessible to enhance proper diagnosis and adequate treatment outcome for patients (WHO, 2010).

In Ghana, diagnosis is progressively being shifted from clinical to parasitological confirmation as the basis for treatment. This is in compliance with global initiatives and recommendations such as the Test, Treat and Track (T3) which is an initiative to scale up parasite-based diagnosis to all age groups (NMCP, 2014).

Results showed that, proportion of clients who did an RDT before treatment was 53% while only 29% tested before taking the medications. This low turnout is inconsistent with the National Policy. It is therefore a call for action to pre-empt the likelihood of resistance.

#### **5.4 Strength of the study**

This study is probably the first to have been done in Ghana and perhaps in West Africa. In most of the similar studies reviewed, there were traces of recall bias but this study ensured double data entry to minimize levels of bias in the study.

#### **5.5 Limitations of the study**

This study had limitations that need to be considered when interpreting findings. These are:

1. This study was cross-sectional and the findings therefore are associations and not causative.
2. The lack of complete dispenser data in this study prevented the use of all client data available. This may have affected the strengths of the relationship between dispensing practice and possible determinants.



3. The time allotted for the entire research work was limited. This was a major setback in carrying out this study.
4. Lastly, participants were reluctant during data collection making this an arduous task.



## **CHAPTER SIX**

### **CONCLUSION AND RECOMMENDATIONS**

#### **6.1 Conclusion**

More than half of dispensers who participated in the study, provided appropriate dispensing practices to their respective clients. MCA's had six times more interaction with participants than pharmacists. Despite the higher MCA – clients interaction, nearly 51% yielded inappropriate instructions being issued. In addition, major factors significantly associated with the outcome of dispensing practices were notably, marital status, NHIS status, access to an ACT-wall chart, recommender type, awareness of guidelines and number of supervisory visits. Lastly, very few clients tested before taking antimalarials. In contrast to recommendations from WHO.

#### **6.2 Recommendations**

The findings of this study have important implications for the Pharmaceutical Society of Ghana and Pharmacy Council:

- There is an urgent need for regulatory authorities to adopt approaches such as educational campaigns, to educate both pharmacists and create public awareness to improve standards for the profession.
- There should be regulatory policies, dispensing manuals, guidelines and SOP's put in place to specifically address poor dispensing practices.
- Training and supervisory visits should be intensified to ensure promotion of appropriate dispensing practices.

## REFERENCES

- A. Hussain, & Ibrahim, M. I. M. (2011). Perceptions of Dispensers Regarding Dispensing Practices in Pakistan : A Qualitative Study, *10*(April), 117–123.
- Abbas, H. B. (2006). Prescribing and Dispensing Practices for Malaria at Dispensary Level , White Nile State , Sudan 2005, *1*(April), 117–121.
- Abuzeid, A. (2015). Antimalarial Prescribing and Dispensing Practices among Health Care Providers in Health Centers of Khartoum State, (July). Retrieved from <http://dspace.uofk.edu:8080/handle/123456789/8283>
- Akinbo, F. O., Omoregie, R., Mordi, R., & Okaka, C. E. (2009). Prevalence of Malaria and Anemia Among Young Children in a Tertiary Hospital in Benin City, Edo State, Nigeria. *Fooyin Journal of Health Sciences*, *1*(2), 81–84. [http://doi.org/10.1016/S1877-8607\(10\)60004-5](http://doi.org/10.1016/S1877-8607(10)60004-5)
- Al-Arifi, M. N. (2012). Patients' perception, views and satisfaction with pharmacists' role as health care provider in community pharmacy setting at Riyadh, Saudi Arabia. *Saudi Pharmaceutical Journal*, *20*(4), 323–330. <http://doi.org/10.1016/j.jsps.2012.05.007>
- Al-Arifi, M. N. (2014). Community pharmacist perception and attitude toward ethical issues at community pharmacy setting in central Saudi Arabia. *Saudi Pharmaceutical Journal*, *22*(4), 315–325. <http://doi.org/10.1016/j.jsps.2013.08.003>
- Al-Mohamadi, A., Badr, A., Bin Mahfouz, L., Samargandi, D., & Al Ahdal, A. (2013). Dispensing medications without prescription at Saudi community pharmacy: Extent and perception. *Saudi Pharmaceutical Journal*, *21*(1), 13–18. <http://doi.org/10.1016/j.jsps.2011.11.003>
- Alotaibi, H. S., & Abdelkarim, M. A. (2015). Consumers' perceptions on the contribution of community pharmacists in the dispensing process at Dawadmi. *Saudi Pharmaceutical Journal*, *23*(3), 230–234. <http://doi.org/10.1016/j.jsps.2014.11.002>
- Ameyaw, M.-M. (1996). The impact of three forms of educational interventions on dispensing practices.
- Amoah, M. (2012). The Impact of National Health Insurance on community Pharmacies: A case study in the Western Region of Ghana, (June).

- Ankomah., F., Asante., & Asenso-okyer., K. (2003). Economic Burden of Malaria in Ghana. *WHO African Region Office*, (November), 1–81.
- Arhinful K, et al. (2009). Assessment of malaria pharmaceutical management systems in ghana, (December).
- Athuraliya, N., Walkom, E. J., Dharmaratne, S., & Robertson, J. (2016). Assessing medication packaging and labelling appropriateness in Sri Lanka. *Journal of Pharmaceutical Policy and Practice*, 5–10. <http://doi.org/10.1186/s40545-016-0091-5>
- Australia, P. G. of. (2013). Dispensing your prescription medicine : more than sticking a label on a bottle, (May), 2.
- Breman, J. G., Alilio, M. S., & White, N. J. (2007). Defining and defeating the intolerable burden of malaria III. Progress and perspectives. *American Journal of Tropical Medicine and Hygiene*, 77(SUPPL. 6).
- Buabeng, K. O. (2010). *The Role of the Pharmaceutical Sector in Malaria Control in Ghana*.
- Butt, Z. A., Gilani, A. H., Nanan, D., Sheikh, A. L., & White, F. (2005). Quality of pharmacies in Pakistan : a cross-sectional survey, 17(4), 307–313.
- Cordina, M., Safta, V., Ciobanu, A., & Sautenkova, N. (2008). An assessment of community pharmacists ' attitudes towards professional practice in the Republic of Moldova, 6(1), 1–8.
- Drutu, I. (2003). Epidemiology of Malaria. *MacMillan Group*, 2, 1–10.
- Fshp, G. M. P., Wu, M. S. H., & Mba, J. K. B. B. (1999). Pharmacists ' attitudes towards dispensing errors : their causes and prevention, 57–71.
- Haule, A. . (2008). Poor Knowledge on New Malaria Treatment Guidelines Among Drug Dispensers in Private, 5(2), 117–121.
- Hussain, A., & Ibrahim, M. I. M. (2011). Qualification , knowledge and experience of dispensers working at community pharmacies in Pakistan, 9(2), 93–100.
- Hussain, A., Ibrahim, M. I., & Malik, M. (2013). PHS137 – Dispensing Practices At Community Pharmacies: A Cross Sectional Study From Pakistan. *Value in Health*,

16(3). <http://doi.org/10.1016/j.jval.2013.03.1062>

Jeremy, A. (2014). Staff Experience And Patient Outcomes : What Do We Know ? A report commissioned by NHS Employers on behalf of NHS England, (July).

Kamuhabwa, A. R., & Mnyusiwalla, F. (2011). Rational dispensing and use of artemether-lumefantrine during pregnancy in Dar es Salaam, Tanzania. *Tanzania Journal of Health Research*, 13(2). <http://doi.org/10.4314/thrb.v13i2.63122>

Kamuhabwa A.R. and A. M.Ignace. (2015). Dispensing Practice of Prescribed Medicines in the Private Pharmacies in Urban Areas of Tanzania, 77(August 2014), 542–549.

Mathew, B., Gadde, R., Nutakki, P., & Doddappa, H. (2013). Assessment of drug dispensing practices using who patient care and health facility indicators in a private tertiary care teaching hospital. *International Journal of Pharmacy and Pharmaceutical Sciences*, 5(SUPPL.4), 368–371.

Morisky, D. E., Ang, A., Krousel-wood, M., & Ward, H. J. (2008). Predictive Validity of a Medication Adherence Measure in an Outpatient Setting, 10(5).

NHIS. (2013). National Health Insurance Scheme 10 th Anniversary International Conference Report.

Nigatu Hirko, D. E. (2017). Factors influencing the exit knowledge of patients for dispensed drugs at outpatient pharmacy of Hiwot Fana Specialized University Hospital , Eastern Ethiopia, 205–212.

NMCP. (2014). Management of MALARIA in Ghana, (July).

Osman Suleman, E. A. A. (2014). La nkwantanang-madina municipality.

Pharmacy Council, B. O. directors. (1994). Pharmacy Act, 1994. *Pharmacy Council*,.

Rehman, K., Lötsch, F., Kremsner, P. G., & Ramharter, M. (2014). Haemolysis associated with the treatment of malaria with artemisinin derivatives: a systematic review of current evidence. *International Journal of Infectious Diseases*, 29, 268–273.  
<http://doi.org/10.1016/j.ijid.2014.09.007>

Rusk, A., Smith, N., Menya, D., Obala, A., Simiyu, C., Khwa-Otsyula, B., & O'Meara, W. (2012). Does anti-malarial drug knowledge predict anti-malarial dispensing practice in

- drug outlets? A survey of medicine retailers in western Kenya. *Malar J*, 11(1), 263.  
<http://doi.org/10.1186/1475-2875-11-263>
- Salisu, A., & Prinz, V. 2009. (2009). Health care in Ghana. *Austrian Centre for Country of Origin & Asylum Research and Documentation (ACCORD)*, (March), 36.
- State, O. R., & West, S. (2016). Journal of Drug Research and Development Malarious Areas of Ilu Aba Bora Zone Health.
- Sturm-ramirez, K., Mamun, A. Al, Iuliano, A. D., & Azziz-, E. (2017). Factors driving customers to seek health care from pharmacies for acute respiratory illness and treatment recommendations from drug sellers in Dhaka city , Bangladesh, 479–486.
- Takala-Harrison, S., & Laufer, M. K. (2015). Antimalarial drug resistance in Africa: Key lessons for the future. *Annals of the New York Academy of Sciences*, 1342(1), 62–67.  
<http://doi.org/10.1111/nyas.12766>
- USAID. (2013). President ' S Malaria Initiative Zambia Malaria Operational Plan FY 2015, 1–45. Retrieved from [http://www.pmi.gov/countries/mops/fy13/liberia\\_mop\\_fy13.pdf](http://www.pmi.gov/countries/mops/fy13/liberia_mop_fy13.pdf)
- W.H.O. (2015). World Malaria Report 2015, 1–280. <http://doi.org/ISBN 978 92 4 1564403>
- WHO. (2010). WHO Manual on use of RDT.
- WHO. (2012). Ensuring good dispensing practices, 17. Retrieved from <http://apps.who.int/medicinedocs/documents/s19607en/s19607en.pdf>

**APPENDIX: INFORMED CONSENT FORM**

**School of Public Health  
College of Health Sciences  
University of Ghana**

<b>Title of study</b>	<b>Factors associated with dispensing practices for antimalarials in the La-Nkwantanang Madina Municipality</b>	
<b>Researcher</b>	<b>Department</b>	<b>Phone</b>
<b>Amankwa Enyaah Charles</b>	<b>Epidemiology and disease control</b>	<b>0246812571</b>

**Background**

Dear participant, Amankwa Enyaah Charles is my name, a student of School of Public Health, University of Ghana, Legon. I am undertaking a study about the factors associated with dispensing practices for antimalarials. The purpose study is to assess the various factors that influence dispensing of antimalarials within the La- Nkwantanang Madina Municipality. The objective of the study includes identifying the proportion of patients dispensed with antimalarials with adequate labelling and appropriate dispensing information. Determine patients understanding of dispensing information.

**Procedure**

The study will involve the use of a questionnaire as an extraction tool. Data will be taken from dispensers and clients who visit community pharmacies. The consent of dispensers and our clients will be sought before taking any data. This is purely an academic research which forms part of my work for the award of Master of Public Health Degree. I would be very grateful to have you as part of this study

### **Risks and Benefits**

The study will not cause any risk to the participants as data on the use of drugs will be collected and duly explained to participants before taking them. It is hoped that the results obtained for this study will be used by policy makers and the community in particular to either improve upon existing safety measures or to ensure existing ones with the objective of better protecting children under five years from pesticides exposure.

### **Right to refuse**

Participation in this study is voluntary and participants can choose not to answer any particular question or all questions. You are at liberty to withdraw from the study at any time. However, it is encouraged that you participate since your opinion is important in determining the outcome of the study.

### **Anonymity and Confidentiality**

I would like to assure you that whatever information provided will be handled with strict confidentiality and will be used purely for research purposes. Your data will not be shared with anybody who is not part of the research team. Data analysis will be done at the aggregate level to ensure anonymity. Urine samples will be discarded a week after the analysis. Your identity will not be disclosed in the material that is published.



### Dissemination of results

The result of this study will be mailed to you if you provide your address below. Before taking the consent, do you have any question you wish to ask about the study?

Yes ☐ (if yes, questions to be noted below)

No ☐

.....  
.....  
.....

### Consent

I....., declare that the purpose of the study has been thoroughly explained to me in English language and Twi and I have understood. I hereby agree to answer the questions

Signature..... Date.....

Thumb print



### Interviewer's Statement

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

Interviewer's signature.....

Date.....

Address.....

If you have questions later, you may contact me on 0246812571

Administrator, Ghana Health Service Ethical Review Committee,

Miss Hannah Frimpong (0507041223/0243235225) OR Miss Nana Abena Kwaa Addai-  
Donkor (0244712919)



**FORM 1D**

**DISPENSER DATA EXTRACTION TOOL**

**FACILITY CODE:**     **FW code**

**DISPENSER'S NAME** .....

**INSTRUCTION:** Fill the facility code      Date: \_\_/\_\_/\_\_

Dispenser's code:    (Do not ask client for code, codes will be provided)

*Instruction; Circle the relevant option and write in the space provided when necessary.*

**SECTION A: SOCIO-DEMOGRAPHIC DATA**

1. Sex:      (1) Male                      (2) Female
2. How old are you?: [.....] (At last birthday)
3. What is your marital status?  
(1) Single    (2) Married    (3) Separated/Divorced    (4) Widow/Widower
4. What is your highest level of education?  
(1) None    (2) Primary/Elementary    (3) Secondary    (4) Tertiary    (5) Vocational/Technical  
(96) Others

***If other please specify*** .....

5. What is your religion?  
(1) No religion    (2) Muslim    (3) Christian    (4) Traditional    (96) Other

6. What is your ethnicity?  
(1) Ewe      (2) Akan    (3) Ga/Adangme    (4) Northerner    (96) Other

***If other please specify*** .....

## SECTION B: PROFESSIONAL PRACTICE AND SUPERVISION

7. What is your professional category (*Circle **only one** that applies*)

- Pharmacist (1)
- Medicine Counter Assistant (MCA) (2)
- Pharmacy Technician (3)
- Nurse (4)
- Physician Assistant (5)
- Pharmacist Intern (6)
- Other (96)

*If other please specify* .....

8. How long have you been dispensing medicines to clients? (completed years)

- Completed years
- Completed months

9. Have you **EVER** participated in an In-service training program on Malaria Case Management (MCM)?

- (1) Yes (2) No If no skip to 12

10. Within the last **12 months** have you participated in any In-Service training program on Malaria Case Management (MCM)?

- (1) Yes (2) No (99) N/A

11. If yes, how many MCM training programs have you participated in within the past 12 months?

- (1) Once (2) Twice (3) Three times (4) Three or more (99) N/A

12. Which agency/organization is responsible for supervision of your pharmaceutical activities?

- Pharmacy Council (1)
- FDA (Food and Drugs Authority)(2)
- Medical & Dental Council (3)
- Don't know (88)
- Other (96)

*If other please specify* .....

13. Have you had supervisory visits within the last six months?

- (1) Yes (2) No If no skip to 15

14. If **yes**, how many supervisory visits have you received within the last six months?

- (1) Once (2) twice (3) three times (4) three or more (99) N/A

15. Do you have access to a hard/soft copy of the National Malaria Control Program (NMCP) Case Management Guidelines or other reference materials on malaria treatment?

- (1) Yes (2) No If **No** skip to 17

16. If **yes**, (please ask to see copy)

- (1) Copy seen (2) Copy **NOT** seen (99) N/A

17. Do you have an Artemisinin-Based Combination Therapy (ACT) wall chart in this pharmacy?

- (1) Yes (2) No

18. If **yes**, (please ask to see copy)

- (1) Copy seen (2) Copy **NOT** seen (99) N/A

19. Are you aware of any guideline(s) aimed at ensuring safe antimalarial medicines use in Ghana?

- (1) Yes (2) No

20. Which of the following policies and/or practices ensure appropriate anti-malarial medicines use.

*(Circle all that apply)*

- Anti-malarial Drug policy (1)  
Good Dispensing Practices (2)  
Good Wholesale Practices (3)  
Others (96)

***If other please specify:*** .....

21. Do you receive complaints from patients on the use of anti-malarials for the past one year?

(1) Yes (2) No (99) Don't know If **No** skip to 23

22. If **"Yes"** what was the nature of the complaint? (*Circle all that apply*)

Product defect (1)  
Product effectiveness (2)  
ADR (3)  
Product expiry (4)  
Adulteration (5)  
Other (96)

***Others specify*** .....

23. Do you have any structure for reporting patient complaints about anti-malarial medication?

(1) Yes (2) No (88) Don't know

24. If **yes**, describe the structure

Verbal communication (1)  
Documentation (2)  
Other (96)  
N/A (99)

***If Others specify*** .....

25. Do you recommend ACT as first line for the treatment of uncomplicated malaria?

(1) Yes (2) No (3) Sometimes

26. When do you advise patients to take Artemether/Lumefantrine?

(1) Before meals (2) After meals (4) none (96) other

***If other specify*** .....

27. Do you advise patients in the event of a missed dose?

(1) Yes (2) No

If **No** skip to 29

28. If **“Yes”** how is this done?

- (1)
- (2)
- (3) Start all over again
- (4) Continue
- (99) N/A

29. Do you advise patients to repeat dose after vomiting?

- (1) Yes                      (2) No    If **Yes** skip to 31

30. If **“No”** why?

- (1) There is usually no time to explain to them.
- (2) I forget to inform them.
- (3) Clients do not need such information.
- (99) N/A

31. When do you refer a suspected malaria case? When: *(Circle all that apply)*

- Patient is under 5 years (1)
- Patient is a pregnant woman (2)
- Case of recurrent episodes of uncomplicated malaria (3)
- Patient has taken a complete course of ACT's and is not getting better (4)

32. Do you advise patients on the risk of possible side-effects?

- Yes (1)                      No (2)                      Sometimes (3)

**THANK YOU FOR PARTICIPATING!**

**SCHOOL OF PUBLIC HEALTH**

**UNIVERSITY OF GHANA**

**A STUDY TO DETERMINE FACTORS ASSOCIATED WITH DISPENSING  
PRACTICES FOR ANTIMALARIALS IN THE LA-NKWANTANANG-MADINA**

**MUNICIPAL – GHANA**

**FORM 1C**

**CLIENT DATA EXTRACTION TOOL**

**FACILITY NAME**

**FACILITY CODE:**

**DISPENSER'S CODE:**

**FW CODE**

**CLIENT CODE:**    (Do not ask client for code, codes will be provided)

*Instruction; Circle the relevant option and write in the space provided on the right.*

*This research is purely for academic purposes. Your identity would not be revealed in any way. Be assured that the information you provide will be treated with the utmost confidentiality and anonymity.*

**Dear Participant,**

I wish to invite you participate in an academic study involving the use of antimalarials among Ghanaians. The objective of this study is to determine factors associated with dispensing practices for antimalarials.

Date of interview (dd/mm/yy): **DATE** \_\_ \_\_/\_\_ \_\_/\_\_ \_\_



**SECTION A: SOCIO-DEMOGRAPHIC DATA**

1. Sex: (1) Male (2) Female

2. How old are you?: [.....] (*At last birthday*)

3. What is your marital status?

(1) Single (2) Married (3) Separated/Divorced (4) Widow/Widower

4. What is your highest level of education?

(1) None (2) Primary/Elementary (3) Secondary (4) Tertiary (5)

Vocational/Technical

(96) Others

***If other please specify*** .....

5. What is your religion?

(1) No religion (2) Muslim (3) Christian (4) Traditional (96) Other

***If other specify*** .....

6. What is your ethnicity?

(1) Ewe (2) Akan (3) Ga/Adangme (4) Northerner (96) Other

***If other specify*** .....

7. What is your current occupation?

(1) Trader (2) Artisan (carpenter, hairdresser, seamstress)

(3) Professional (teacher/lawyer) (4) Office worker (5) Unemployed (6) Student

(96) Other

***If other please specify*** .....

### SECTION B: MEDICATION USE

8. Type of Antimalarial (*Tick one that applies*)

1. Artemether/Lumefantrine
2. Artesunate/Amodiaquine
3. Dihydroartemisinin/Piperaquine
4. Quinine
5. Sulphadoxine/Pyremethamine
6. Mefloquine
7. Atovaquone/Proguanil
96. Others

☐  
☐  
☐  
☐  
☐  
☐  
☐  
☐

*If other please specify*.....

9. Did you buy this medicine with a prescription?

- (1) Yes                      (2) No                      (99) N/A

10. If “No” who recommended this medicine?

- (1) Dispenser    (2) Relative              (3) friend              (4) Self    (5) Media

11. If “No” who is this for?

- (1) 18 year and above    (2) Child 5 years and above    (3) Child below 5years

(99) N/A

12. Did you/the person taking the drug complain of fever over the past two weeks?

- (1) Yes              (2) No

13. Why did you buy this medicine?

- For prevention of malaria    (1)  
 For treatment of malaria    (2)  
 Don't know                      (88)  
 Other                                  (96)

*If other please specify* .....

14. Did you/the person taking the drug perform the rapid malaria test before buying this medicine?

- (1) Yes                      (2) No                      (88) Don't know

15. How much did you buy this medicine?

.....

16. Do you have a valid National Health Insurance Scheme-Card?

- (1) Yes (2) No

### SECTION C: DISPENSING INFORMATION

17. How did he/she tell you to take it?

- Twice daily for 3 days (1)  
 Three times daily for 3 days (2)  
 Once daily for 3 days (3)  
 8 hours interval for first and second dose. Subsequent dose is 12 hourly for 3 days (4)  
 Other (96)

*If other*, how were you advised to take it?

.....

18. Did the dispenser tell you to take this medication after food?

- (1) Yes (2) No (77) Not sure/ can't remember

19. If *yes* why?

- (1) To prevent headaches and other side effects  
 (2) Food improves absorption of the drug  
 (3) Taking it without food makes you weaker  
 (88) Don't know  
 (96) Other

*If other please specify* .....

(99) N/A

20. Did the dispenser advice you to complete the 3-day full course?

- (1) Yes (2) No (77) Not sure/ can't remember

21. Were you/ the person taking the drug, advised to repeat dose after vomiting?

- (1) Yes (2) No (77) Not sure/ can't remember

22. Were you advised on the risk of possible side-effects?

- (1) Yes (2) No (77) Not sure/ can't remember

23. What other information did the dispenser give you?

- (1) None
- (2) Come back if symptoms persists
- (3) Keep in a cool dry place away from moisture
- (96) Other

*If other please specify* .....

**Researcher**

24 Is there any writing in ink fixed on the antimalarial drug?

- (1) Yes
- (2) No

25. Was the drug given clear instruction for use on a label?

- (1) Yes
- (2) No
- (99) N/A

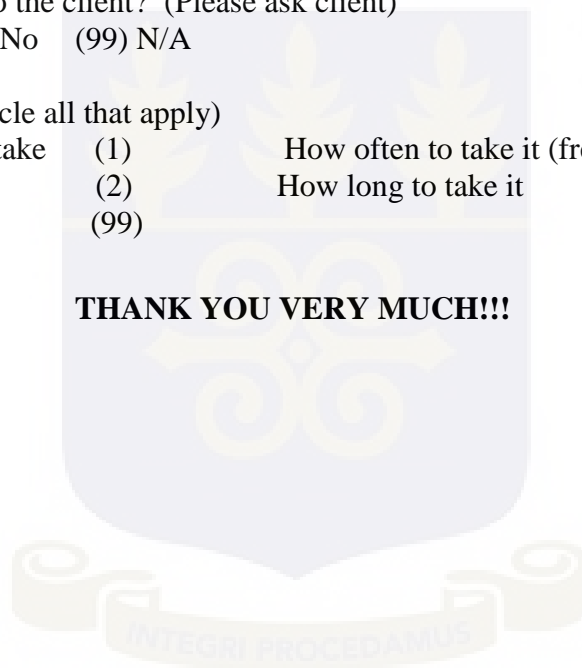
26. Is the label legible to the client? (Please ask client)

- (1) Yes
- (2) No
- (99) N/A

27. Label captured: (Circle all that apply)

- |                          |      |                                  |     |
|--------------------------|------|----------------------------------|-----|
| Quantity of drug to take | (1)  | How often to take it (frequency) | (3) |
| Time to take drug        | (2)  | How long to take it              | (4) |
| N/A                      | (99) |                                  |     |

**THANK YOU VERY MUCH!!!**



**FACILITIES AND THEIR CODES**

Name	Code
RANDY PHARMACY	0001
HEALEX PHARMACY	0002
MAGPAT PHARMACY	0003
AMANFRO PHARMACY	0004
KOREENY PHARMACY LTD.	0005
VALLEY VIEW PHARMACY	0006
PRIJOPHARMA COMPANY LTD.	0007
VALLEY VIEW PHARMACY	0008
VOB PHARMACY	0009
MEDLIFE PHARMACY LTD.	0010
FAMILYCARE PHARMACY	0011
IVAKITO PHARMACY	0012
LAWMERC PHARMACY LTD.	0013
MEDAX PHARMA LTD.	0014
LEXBETA PHARMACY LTD.	0015
ZIZIS PHARMACY	0016
TELAD PHARMACY LTD.	0017
THE NYARKOS PHARMACY	0018
VINA PHARMACY LTD.	0019
MAAPA HEALTHCARE LTD.	0020
A & F PHARMACY LTD	0021
HOLY CROSS PHARMACY	0022
APPOLLONIA PHARMA LTD.	0023
HEALTHY VITA PHARMACY	0024
BETVIN PHARMACY	0025
OLD ROAD CHEMISTS	0026

PEBS PHARMACY LTD.	0027
MEGAPHARM LTD.	0028
BEKKEN PHARMACY LTD	0029
KAFEESA PHARMACY	0030
FIVE TWO PHARMA	0031
ADNAID PHARMACY	0032
THE PILL BOX PHARMACY	0033
EMERALD CHEMIST	0034
MATHS PHARMACY	0035
PEBS PHARMACY LTD.	0036
THIRD GATE PHARMACY	0037
RANDY PHARMACY	0038
PHARMHAUS CHEMIST	0039
VANORA PHARMACY	0040
VANIAH PHARMACARE(VINA PHARMACY)	0041
HEALEX PHARMACY	0042
OPEN HEAVENS PHARMACY	0043
LIFECARE PHARMACY	0044
ADENTA PHARMACY LTD.	0045
BOSTI CHEMISTS LTD.	0046
KADOLF PHARMACY	0047
HERALDS CHEMISTS LTD.	0048
MEGAN CHEMISTS LTD.	0049
WELLIFE PHARMACY LTD.	0050
ERIPHARMA LTD.	0051
N-GEO PHARMACY	0052
AMANI CHEMISTS LTD	0053
DISCOUNT PHARMACY	0054

ST. KEM PHARMA CO. LTD.	0055
PHARM-IN LTD	0056
DOUBLE PLUS TWO PHARMACY	0057
FULANI PHARMACY LTD.	0058
GINAD PHARMACY LTD.	0059
S & V PHARMACY	0060
IDEAL HEALTH PHARMACY	0061
ERNSAB PHARMACY(ASHIEYE BRANCH)	0062
OLIVES CHEMIST& H'CARE SERV.	0063
M & M HEALTH	0064
MAL-TITI CHEMISTS	0065
STIPPS PHARMACY	0066

