QUALITY OF CARE OF PATIENTS PRESENTING PRESCRIPTIONS AT COMMUNITY PHARMACIES IN A REGION OF GHANA

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KEYWORDS

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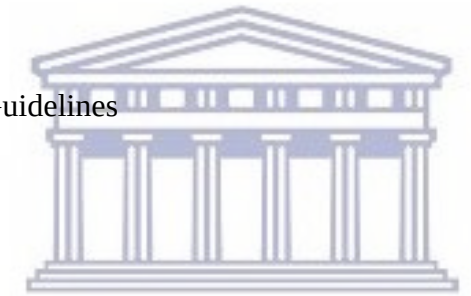

ABSTRACT

Background: Quality of patient care may be assessed through rational use of medicine indicators initially developed in collaboration with WHO. These assessments have been carried out in primary level government clinics and hospital settings across the world, however, very little information is available on the assessment of the quality of patient care in community pharmacies, particularly in LMIC countries like Ghana, despite the fact that community pharmacies are an integral part of the health system.

Aim: This study investigated the quality of care of patients or caregivers who presented prescriptions at community pharmacies in the Volta region of Ghana.

Methods: A prospective cross-sectional study of dispensing practices at community pharmacies was carried out and included: analysing prescriptions presented, interviewing patients and observing pharmacies for availability of key medicines and the essential medicines list. Eighteen out of 34 registered community pharmacies in the region were selected using proportionate multistage random sampling. Data was collected from all patients presenting prescriptions during a 6-hour period at each selected pharmacy using adapted versions of WHO validated tools. After data checking and cleaning, frequencies and means were calculated and presented for the indicators. A composite quality of care measure was calculated for each community pharmacy based on optimal indices of indicators. Measures of associations were measured with Chi-square and p-values set at 0.05% significance. Ethical clearance (BM/16/5/29) was obtained from UWC BMREC and permission obtained from community pharmacy owners, while consent was obtained from all pharmacy staff and respondents prior to involvement in study.

Results: A total of 318 patients or caregivers were included. The average number of medicines per prescription was 1.6 (range 1-6), 75% of medicines prescribed were

written in generic names (range 62%-100%), 65% were from the EML, and 20% and 10% of patients were prescribed antibiotics and injections respectively. The average dispensing time was 184 seconds (range 20-699), 75% of medicines prescribed were dispensed, and 85% (range 64%-100%) of patients recalled the correct dosage of all medicines received while no dispensed medicine was adequately labelled. Sixty-seven percent of community pharmacies had copies of EML/local formulary. The mean availability of key medicines was 97% (range 80%-100%) with 12 community pharmacies having all key medicines. The mean composite quality of care score for the community pharmacies was 8.58/11.

Conclusions: Prescribing indicators were generally good whilst most patient care indicators were not within WHO reference values. Availability of key medicines was good but EML/local formulary were not consistently available. Quality of care across all community pharmacies was average.

Recommendations: Pharmacy Council should ensure pharmacists at community pharmacies take up their legal responsibilities; training and monitoring should be introduced to improve dispensing practices of pharmacists and other support workers, including labelling and information provision to patients; and the government should encourage community pharmacies to enrol as health insurance service providers.

DECLARATION

I declare that QUALITY OF CARE OF PATIENTS PRESENTING PRESCRIPTIONS AT COMMUNITY PHARMACIES IN A REGION OF GHANA is my own work, that it has not been submitted before any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references.

Essilfie-Essel, Gabriel K. N November 2017

Signed……  ……

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ABBREVIATIONS

CP	Community Pharmacies
DA	Dispensing Assistant
EML	Essential Medicines List
INN	International Nonproprietary Name
INRUD	International Network for the Rational Use of drugs
LMIC	Lower and Middle Income Country
MCA	Medicine Counter Assistant
MOH	Ministry of Health
OPD	Outpatient Department
OTC	Over-the-Counter
PA	Physician Assistant
PHCC	Primary Health Care Centres
PT	Pharmacy Technician
RUM	Rational Use of Medicines
SHS	Senior High School
WHO	World Health Organisation

GLOSSARY

TERM	DEFINITION/MEANING
Adverse Drug Reactions	An unintended and sometimes harmful or uncomfortable reaction to a medicine taken at normal or usual doses.
Brand Name or Trade Name	Name given by manufacturer of a medicine and used to market the product. Example Tylenol is a brand name and Paracetamol/acetaminophen is the generic name or the INN
Compounding Medicines	Preparation or manufacture of medicines.
Essential Medicines List	A list of essential or important medicines, normally for a country.
Extemporaneous Preparation	Medicines prepared specifically for a patient upon prescription by a pharmacist when a pre-manufactured product is not available.
Inefficacious Medicines	Ineffective Medicines
INN (International Non-proprietary name) or Generic name	An internationally accepted name given to an active pharmaceutical ingredient. For example Paracetamol or Acetaminophen
Polypharmacy	A situation where medicines in excess of an acceptable number are prescribed for a patient

CHAPTER 1: INTRODUCTION

1.0 Background

Community pharmacies are institutions owned privately that may either be a chain of corporate pharmacies, or pharmacies in supermarkets or standalone/independent pharmacies that provide pharmaceutical services to the community (Saini & Rai, 2012).

Community pharmacies have been identified as "easily accessible" to society (Aslam, Bushra & Khan, 2012: 298). Activities carried out by community pharmacies are led by a community pharmacist, and these include supply of medicines to patients based on prescriptions, extemporaneous preparation of pharmaceutical products, treatment of simple ailments, provision of information to the general public as well as other health professionals and monitoring of patient medicine use (WHO, 1994). They also provide other public health services such as counselling (on lifestyle modification, on medicine and non-medicine treatments) and management of simple ailments (Porteous, Ryan, Bond, Watson & Watson, 2016).

In the United Kingdom, community pharmacy services have expanded to include "diagnostic testing and smoke-cessation programmes" (Schafheutle, Samuels & Hassel, 2008: 57). The expanded role of community pharmacies or community pharmacists includes a concept called pharmaceutical care. Pharmaceutical care is simply defined as "the responsible provision of medicine therapy for the purpose of achieving definite outcomes which improve a patient's quality of life" (Hepler & Strand, 1990: 539). Examples of pharmaceutical care include actions aimed at identifying, solving or reducing medicines-related problems of patients (Hepler & Strand, 1990).

Community pharmacies have been said to be at the very heart of health care delivery in a population by virtue of accessibility. In Scotland, it has been estimated that

people use the services of community pharmacies on a daily basis and that about 94% of the population utilize the services of community pharmacies at least once in a year (Eades, Ferguson & O' Carroll, 2011). The importance of community pharmacies to the health system globally, and in developing countries such as Ghana, thus cannot be over emphasized although detailed information from these settings is scanty.

In addition to the community pharmacist, various categories of personnel, known as support staff work, in community pharmacies and utilize various levels of skills to perform different activities within the community pharmacy (Mullen, 2004). These staff work under the supervision of the pharmacist to support the delivery of pharmaceutical services from community pharmacies (Latif, Boardman & Pollock, 2013). In community pharmacies in the UK setting, three categories of support staff, pharmacy technicians (PT), dispensing assistants (DA) and medicine counter assistants were identified in studies by Schafheutle et al. (2008) and Latif et al. (2013). In Ghana, support staff are largely pharmacy technicians, medicine counter assistants and people trained on the job.

The use of medicines in developing countries, including Ghana, have largely been described as "irrational" with the intake or consumption of substandard, inefficacious, unwholesome medicines being a major issue (Smith, 2004: 234). A wide range of reasons have been attributed to the irrational use of medicines in these countries including inadequate numbers of qualified personnel, the prevalence of counterfeit products, challenges in regulatory enforcements, high cost of medicines, as well as cultural beliefs about medicines and their use (Smith, 2004).

To investigate the use of medicines, or patterns of medicines use, the World Health Organisation (WHO) and the International Network for Rational Use of Drugs (INRUD) developed a set of indicators (WHO, 1993). These indicators cover three main areas; prescribing indicators (pharmaceutical prescribing practices by health providers), patient care indicators (from clinical consultation to medicine dispensing)

and facility indicators (indicators which show elements of the facility which support rational use of medicine) (WHO, 1993). Numerous studies have employed the use of these indicators to describe and assess medicine pattern use in health facilities. One recent study by Bilal, Osman & Mulugeta (2016) in health centre settings in Ethiopia assessed these indicators and found prescribing and dispensing practices in surveyed health centres to be fairly close to the WHO standards although improvements were needed. Another healthcare facility setting study in Brazil by Santos & Nitrini (2004) found that care to patients was below standard and recommended further research into reasons why indicator measures were below standards. Few studies on the use of patient care indicators to assess quality of care or rational use of medicines have been conducted in community pharmacies in Ghana making it worthy of investigation. This study builds on other studies conducted in Africa. Previous studies as already mentioned have largely been conducted in health facility settings. This study, in the Ghanaian setting, adds to the scanty data on practices in community pharmacies.

1.1 Study Setting

The study setting was the Volta Region in the eastern part of Ghana. The region has unique features such as being geographically the longest of all regions and possessing all the ecological zones of Ghana (Ghana Statisical Service (GSS), 2013). According to 2010 Population and Housing Census Report, the region had a population of 2,118,252 persons (GSS, 2013) and is divided into 25 districts. At the end of 2014 the region had 446 health institutions comprising of hospitals, clinics, health centres and maternity homes; ownership of these facilities is largely by the government, with a few privately owned and mission (religious organisation) owned facilities (Ghana Health Service (GHS), 2014). Pharmacies and dispensaries are included in these facilities, with staffing levels and the type of medications available dependent on the category of the facility.

Community pharmacies exist in 13 out of 25 districts of the region. Data obtained from the regulator of pharmacies, the Pharmacy Council of Ghana, revealed that 38

community pharmacies exist in the region. In October 2016, out of the 38, 6 had suspended operation leaving 32 community pharmacies currently operating in the region. These pharmacies are owned by corporate bodies of which shareholders may be pharmacists or non-pharmacists, however, according to Part 4 (Pharmacy Council) of Health Professions Regulatory Bodies Act, "the business of mixing, compounding, preparing or supplying restricted medicines by retail must be carried out under the supervision of a superintendent pharmacist" or else the licence to operate may be revoked (Parliament of Ghana, 2013: 43).

Patients who present prescriptions at community pharmacies fall into three categories: insurance accredited patients who opt to fill prescriptions at accredited community pharmacies from choice; insurance accredited patients who opt to fill prescriptions at community pharmacies due to stock outs in hospitals; and un-insured patients who buy medicines out of pocket from community pharmacies. In practice, most prescriptions are filled by hospital pharmacies (where the prescriptions are issued) resulting in relatively small numbers being presented at community pharmacies.

1.2 Problem Statement

Assessments of the quality of care with regards to pharmacies are skewed towards public sector (government) institutions. These include studies in Ethiopia by Bilal et al. (2016) and by Santos & Nitrini (2004) in Brazil which focussed on quality of care of patients presenting prescriptions at health facilities. In Indonesia, a study conducted by Abdulah, Barliana, Pradipta, Halimah, Diantini & Lestari (2014) focusing on community pharmacies investigated the quality of patient care in community pharmacy settings and found indicators to be close to recognised standards. In 2009, the Ministry of Health Ghana (2009) published the report of a survey of health facilities; the survey looked at aspects of WHO patient care indicators (adequate labelling and knowledge of dosage) in public and private dispensaries. Private dispensaries were not limited to community pharmacies but included over-the-counter medicine sellers. The survey, thus, did not provide a clear

picture of the quality of patient care pertaining to community pharmacies in Ghana, important providers within the health system.

1.3 Purpose

The purpose of this study is to assess the quality of care received by patients presenting prescriptions at community pharmacies. It is hoped that this information will provide a good picture of the current situation and that it could be used to motivate for improved quality of pharmaceutical care in these settings.

1.4 Aim

To describe the quality of care of patients presenting prescriptions at community pharmacies in the Volta Region of Ghana.

1.5 Objectives

The objectives of the study are:

1) To describe patterns of antibiotic, injections and generic medicines prescribing of prescriptions presented at community pharmacies
2) To describe dispensing encounters of patients presenting prescriptions at community pharmacies
3) To describe compliance of community pharmacies to the essential medicines concept.
4) To measure associations between elements of quality of care and exposures in community pharmacies.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

The study focused on quality of care of patients presenting prescriptions at community pharmacies and this review includes the concept of quality of care, rational medicine use, rational medicine use indicators and how they have been applied in various pharmaceutical settings.

2.1 Quality of Care

Quality of care has been defined as the "degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge"(Mitchell, 2008: 1-1). By this definition, quality of care can be assessed by use of quality indicators (Mitchell, 2008). Medications, which are one of the major beneficial interventions used in a health system, are also associated with causing harm (Winslade, Taylor, Shi, Schuwirth, Van de Vleuten & Tamblyn, 2011). It is therefore imperative that the quality of care patients receive when medicines are supplied is assessed regularly to improve patient safety. Quality of patient care when receiving medicines can be assessed by means of rational use of medicine indicators. These quality indicators, developed by WHO, measure medicine pattern use in health facilities (WHO, 1993). These indicators are used to describe medicine usage in any health facility irrespective of location and are also considered to be objective ways of measuring (Ofori-Asenso, Brhlikova & Pollock, 2016). Several different categories of indicators to measure quality of care have been developed. These include: Patient care indicators, prescribing indicators and facility specific indicators (WHO, 1993).

2.2 The Concept of Rational Use of Medicines

For rational use of medicines to prevail, it requires that "patients receive medicines appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and the

community" (WHO, 1985: 299). This definition was promulgated at the WHO conference of experts on the rational use of medicines in Nairobi, Kenya in the year 1985. For rational use of medicine to work, the conference of WHO (1985) also iterated some responsibilities for governments, health training institutions, manufacturing companies, regulators, prescribers, dispensers and consumers.

2.2.1 Governments

Governments have the responsibility to develop and implement national drug policies. The drug policy should address, essential medicines, an appropriate medicine supply system, quality control measures, monitoring of adverse drug reactions, human resource requirements, and inter-sectoral collaboration and monitoring and evaluation of procedures.

2.2.2 Prescribers

Prescribers should use available objective information to choose medicines. Prescribers should be aware of medicine prices, adverse effects of medicines, handing of medicine adverse effects, when medicines are not needed and skills to advice patients to understand when they need no medicines.

2.2.3 Health Training Institutions

Health training institutions should train health workers in the concepts of rational use of medicines. It is also recommended that training should include in-service for health workers already in practice.

2.2.4 Manufacturing Companies and Regulators

Regulators should ensure that manufacturers provide complete information about licensed medicines. This is important so that prescribers will have detailed, reliable information on pharmaceutical products they prescribe.

2.2.5 Dispensers and Consumers

It is the responsibility of pharmacists to dispense the correct medicines as well as provide the patients information on how to use the medicines correctly. They should also be able to identify and report adverse drug reactions that patients experience; this extends to other health professionals as well. Patients have the responsibility to know about the medicines they are taking; they should know why they are taking the medicines, their effects, and also follow guidelines given them by dispensers on ways to identify and report any adverse drug reactions that may occur.

2.3 Irrational Use of Medicines

Irrational use of medicines occur when there is non-compliance to the WHO definition of rational use of medicines (World Health Organisation, 2002). Irrational medicine use occurs in all countries, hospitals, pharmacies and homes (MSH (Management Sciences for Health), 2012). Various forms in which irrational use of medicines occur includes, polypharmacy, incorrect use of medicines, use of medicines when they are not needed, use of unsafe medicines and prescribing without conforming to recommendations of clinical guidelines (MSH (Management Sciences for Health), 2012; World Health Organisation, 2002).

2.4 Measuring Rational Use of Medicines

Irrational medicine use is particularly a problem in developing countries, this is as a result of challenges faced, and results in loss of life, morbidity, poor quality of medication therapy and "wastage of resources" (Afriyie & Tetteh, 2014: 142). Reducing irrational medicine use would have obvious benefits to patients and to the population as a whole. Several countries have made efforts to improve rational medicine use by the implementation of drug policies; these actions that aim ultimately at improving quality of care must also be evaluated (Walker, Hogerzeil, Sallami, Alwan, Fernando & Kassem, 1990).

The WHO and the International network for the rational use of drugs (INRUD) have developed indicators for measuring rational use of medicines in health care facilities (World Health Organisation, 2002). These indicators, as mentioned earlier include prescribing indicators, patient care indicators and facility specific indicators. Various studies have worked on the use of these indicators in health facilities, and these will be discussed in the next sections.

2.5 Prescribing Indicators

Inappropriate prescribing of medicines is a problem globally (Hogerzeil, 1995). Inappropriate prescribing practices of prescribers often time leads to patients engaging in practices such as self-medication (Chandelkar & Rataboli, 2014). Prescribing indicators measure quality of care at health care facilities in areas of rational medicine use and these indicators are, the average number of medicines per encounter/prescription (polypharmacy), percentage of medicines prescribed by generic name, percentage of encounters with antibiotics and injections prescribed and the percentage of medicines prescribed from an essential medicines list (EML) or formulary (WHO, 1993). Prescribing encounters can be measured retrospectively (using historical patient records) and also prospectively by observing patients who visit a health care facility (WHO, 1993). Prescribing indicators provide a general description of prescribing habits of prescribers and do not collect nor require data on patient signs and symptoms (Ofori-Asenso et al., 2016).

Various researchers have measured prescribing indicators in health care facilities. A retrospective study of the prescribing patterns at Primary Healthcare Centres (PHCCs) in Egypt found all prescribing indicators with the exception of average medicines per encounter and prescriptions with injections to be below optimal levels (Akl, Mahalli, Elkahky & Salem, 2014). The study also found that results for prescriptions with antibiotics were generally above the reference values (Akl et al., 2014). A second study of prescribing indicators in Ghana, which was also done using retrospective data focused on prescribing patterns in public and privately owned

PHCCs; the study found that antibiotic prescribing was generally higher than previous national averages (Ahiabu, Tersbol, Biritwum, Bygbjerg & Magnussen, 2016). A third study by Afriyie & Tetteh (2014) described the pattern of rational drug use in a hospital in Ghana and used retrospective data to measure prescribing indicators. The study found that generally rational medicine use in the hospital was not at a satisfactory level.

It must be noted that none of these studies involved community pharmacies. Another study conducted in Ethiopia by Srikanth, Tesfaye, Degife, Ergetie, Muhammed & Atinafu (2013) involved the use of prescriptions from community pharmacists as well as from public health facilities in Ethiopia. The study concluded that prescribers adhered to the use of medicines recommended by the Ethiopian national medicines list (Srikanth et al., 2013).

Other studies have also described prescribing patterns based on prescriptions available at health care facilities such as hospitals, clinics, however it appears few have studied the pattern at community pharmacies, the thrust of this research.

One of such few is a study at rural community pharmacies in India where it was found that medicines were largely not prescribed by their generic names and also the need for improvement in the availability of essential medicines and essential medicine guidelines (Aravamuthan, Arputhavanan, Subramaniam & Udaya Chander J, 2017). Another study in private community pharmacies in Nepal found prescribing practices to be below standards (Chapagain, Pokharel & Paranjape, 2016).

2.6 Patient Care Indicators

Patient care indicators also assess important components of the service patients receive when they visit health institutions (WHO, 1993). The indicators are: average consultation time (patient with prescriber), average dispensing time, percentage of medicines actually dispensed and percentage of medicines actually labelled (El Mahalli et al., 2012 ; Akl et al., 2014). Shorter dispensing times may indicate poor

services. In a study of health centres in Ethiopia, the average consultation time was 5.7 minutes, dispensing time was 2.7 minutes, 64.0% of medicines received were adequately labelled and 69% of patients had adequate knowledge about medicines (Bilal et al., 2016). This showed that with the exception of dispensing time all other indicators fell short of the optimal. In Namibia, a study conducted in public hospitals in all 14 regions of the country, found the mean percentage of medicines dispensed to be 77.7%, 59.3% of medicines dispensed were adequately labelled and more than 80% of patients not knowing how to take medicines prescribed for them (Kibuule, Lates, Kagoya, Bayobuya, Niaz & Rennie, 2017).

Another African based study conducted in primary and tertiary hospitals in Ethiopia by Gidebo, Summoro, Kanche & Woticha (2016) found patient care indicators; dispensing time, the number of medicines prescribed, percentage of medicines labelled and dispensed, to be below reference standards. In Saudi Arabia, a study of primary health care centres (PHCC), found the average consultation time was 7.3 minutes, dispensing time was 99.6 seconds, 10 % of medicines adequately labelled and 79.3% of patients had adequate knowledge about medicines dosage (El Mahalli et al., 2012). It must be noted that patient care indicators are measured using prospective data (WHO, 1993). Another study of prescribing and dispensing practices in a hospital in Ethiopia , found that the percentage of medicines adequately labelled was 11% and this was described as being poor (Sisay, Abdela, Kano, Araya, Chemdi & Fiseha, 2017).

Very few studies have been carried out in community pharmacy settings, but a recent study in Indonesia found the average dispensing time to be 62 seconds, 99% of medications were adequately labelled, 96% of prescribed medicines were dispensed and 88% of patients knew the correct dosage of medicines received (Abdulah et al., 2014). The findings fairly indicated a relatively high quality of all indicators. Another study at community pharmacies in India measured the average consultation times, dispensing times and percentage of medicines prescribed (Aravamuthan et al., 2017).

In Serbia a study compared medicine use (patient care) indicators between private and state owned community pharmacies and found no significant differences between the two settings (Prokic, Davidovic & Gunjic, 2014).

2.7 Facility Specific Indicators

Facility indicators devised by WHO measure two quality indicators which are the availability of essential medicines in facilities and the availability of an Essential Medicines List in the facility (WHO, 1993). These indicators are important because the availability of medicines and information about medicines can influence the quality of service patients receive in health facilities.

Various studies have also measured these indicators in health care institutions. A study of Primary Health Care Clinics in Saudi Arabia found 90% of facilities having EMLs and 59.2% of key medicines in stock (El Mahalli et al., 2012). Another study of PHCCs in Egypt also found that generally the percentage availability of key medicines and EML or local formularies was lower the optimum level required (Akl et al., 2014). Bilal et al. (2016) measured health facility indicators in health centres in Ethiopia and found that 6 out of 8 health centres surveyed had a copy of the Ethiopian EML. Gidebo et al. (2016) also conducted a health facility study in Ethiopia and found availability of EML to be 25% and availability of key medicines to be 65.7%. None of these studies were conducted in community pharmacy settings.

2.8 Reference/Standard Values for Indicators

Measuring indicators without comparison to standard values make it difficult to determine the performance of an indicator in a particular setting. The current group of indicators were “finalized” following various field testing in African countries, Nigeria and Tanzania (WHO, 1993: 5). This led to the compilation of the manual, “How to investigate drug use in health facilities”. However, the manual did not clearly define reference values for the indicators. In 2006, the WHO book on using indicators to measure country pharmaceutical situations reiterated this point, that

prescribing indicators such as the mean number of medicines per prescription, percentage of encounters with antibiotics and injections prescribed did not have specified reference values but did suggest minimum thresholds for them (Appendix 1). The WHO (2006), however, noted that reference values for indicators may vary from country as they are influenced by country specific treatment guidelines, patterns of disease and country specific medicine policies. Reference values for indicators such as availability of key medicines, percentage of medicines dispensed, adequacy of labelling and compliance with treatment guidelines are expected to have an optimal values of 100% (WHO, 2006).

Prior to the WHO (2006) a group of researchers, Isah et al. (2002), developed a set of optimal values for prescribing indicators (Appendix 1). The development was based on morbidity profiles and medicine treatment guidelines for prevalent diseases in Nigeria (Isah et al., 2002). The reference values for average number of medicines prescribed, antibiotic and injections prescriptions were not too different from the WHO (2006) manual. Subsequently, various studies including those by Bilal et al. (2016) and Desalegn (2013), compared prescribing indicators to the reference values developed by Isah et al. (2002). A recent study by Sisay et al. (2017) used a combination of WHO (2006) and Isah et al. (2002) reference values in their study. The reference value for the average dispensing time varied between publications, some publications used ≥60 seconds (Akl et al., 2014; El Mahalli et al., 2012), whilst others used >180 seconds (Bilal et al., 2016).

The concept of optimal index of RUM indicators has been used in quite a number of studies. This concept compares the optimal level of an indicator to 1. The closer to 1, the more rational the indicator (Dong, Yang & Wang, 2011). The optimal index was based the use of a mathematical model developed by Zhang and Zhi for appraisal of healthcare, a method that had been validated and used in various health research settings (Zhang & Zhi in Dong et al., 2011)

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 Study Design

The study employed was a cross-sectional analytical design and the WHO standardized methodology, tools and indicators were adapted for use in this study (WHO, 1993). A cross sectional design was deemed appropriate because the study investigated an area in which there was little information available, that was, patient care in community pharmacies in Volta region of Ghana. Participants were surveyed at one point in time removing the possibility of loss to follow up which could bias the study (Sedgwick, 2014). The analytical nature of this design also offered the opportunity to measure association between variables. In addition, a cross sectional design was also suitable for this study because of the relative ease to perform and cheap costs (Sedgwick, 2014).

3.2 Study Population

The study population was all 34 active community pharmacies in Volta Region. The study population increased from 32 to 34 because two community pharmacies who had suspended operations reopened during the protocol development period. Patient/caregiver encounters were drawn from patients/caregivers presenting prescriptions at community pharmacies. It was estimated that an average of 30 patients per-day present prescriptions at each community pharmacy (personal information). All patients/caregivers presenting prescriptions were eligible for the study.

3.3 Study Sampling

All 34 active community pharmacies in 13 districts served as the primary sampling unit. Distribution of pharmacies per district was as follows: Ho-11, Hohoe-5, Ketu South-4, North Tongu-3, Kpando-2, Nkwanta South-2 and seven other districts had one pharmacy in each. A multistage sampling process was used to select community pharmacies using both proportional and random sampling techniques. In all 18

community pharmacies were selected. A tabular description of sampling is shown in Appendix 2. For a period of 6 hours, all patients who presented prescriptions at selected community pharmacies and who provided informed consent were included in the study.

3.4 Data Collection

Data was collected using adapted versions of standardized tools developed by the WHO (1993). Prior to commencement of data collection, two pilot studies were conducted in two community pharmacies (not included in the study) in the Ho district prior and minor changes were made to the data collection tools. The tools and definitions used are attached in Appendix 3-5.

Tool 1: Prescribing Indicator Form collected data on the sex, age and gender of patients presenting prescriptions, the number of medicines, number of generic medicines prescribed, presence of antibiotic and injections on prescriptions and number of essential medicines list medicines prescribed (Objective 1). The gender of the patient was included following the pilot study to offer more demographic information on the patient.

Tool 2: Patient/Caregiver Form collected the following data from each patient/caregiver: the dispensing time, the number of medicines prescribed, the number of medicines adequately labelled, the presence of a pharmacist during dispensing, the patients' knowledge of correct dosage after dispensing and the category of person who actually dispensed. The latter was added after the pilot study to further describe what categories of personnel dispense to patients/caregivers. The tool also included a questionnaire component that collected data on demographics of respondents and reasons behind their visits to the community pharmacies. (Objective 2). Modifications were made to the questionnaire after the pilot study because, it will help describe and explore reasons patients/caregivers choose to use community pharmacy services.

Tool 3: Community Pharmacy Summary Form measured the availability of a current national medicines list and formulary in pharmacies and the availability of key medicines in pharmacies (Objective 3). Following the pilot study, the tool was modified to include the age of community pharmacy, Health insurance accreditation status of community pharmacy as well as other types of formularies available at the community pharmacy. These modifications were made to further describe the community pharmacies

Data collection was be carried out by the principal investigator (a licenced pharmacist) and one other trained data collector who was an intern pharmacist. Data collection commenced on 31st January 2017 and ended on 31st May 2017. On the day of data collection the data collectors visited the community pharmacy before 10 am and collected data using Tool 3. At 10am data collection using Tools 1 and 2 commenced and continued for a period of six hours. The second data collector (pharmacist intern) was stationed at the waiting area of the community pharmacy while the principal investigator who was a pharmacist, was stationed behind the counter but not in immediate contact with workers.

Patients/caregivers who visited the community pharmacy with prescriptions were initially approached by second data collector and informed about the study using the Participant Information Sheet (Appendix 6-9), and if they agreed to participate they were requested to sign the Consent Form (Appendix 10-12). Patients/caregivers then visited the counter and data on Tool 2 (dispensing time, number of medicines prescribed, category of dispenser and presence of pharmacist) were captured. After the patient/caregiver left the counter, the questionnaire component of the Tool 2 and the number of medicines dispensed and adequately labelled were captured. The principal investigator collector reviewed the prescription after the patient had been served to capture data on Tool 1.

3.5 Data Management and Analysis

All data forms were checked for accuracy and completeness before leaving the community pharmacy**.** Data collected were entered onto an excel spreadsheet twice to ensure accuracy of entries and after data cleaning the averages and percentages were calculated using excel. For the purposes of data analysis, patients were grouped into two age groups, adults and children. Adulthood starts at 18 years according to Ghanaian Law; persons below 18 years are considered to be children (Parliament of Ghana, 1998). Criteria for measuring and calculating dispensing time, defining patients' adequacy of knowledge of dosage, defining adequacy of medicine labelling, antibiotics, injections and determination of key medicines, are specified in Appendix 3-5. The name of a medicine on a prescription was determined to be a generic name when the International Nonproprietary Name (INN) was written on the prescription. Reference values for WHO standardised indicators as well as optimal indices were used to calculate total quality measures.

3.5.1 Reference Values for WHO Standardized Indicators & Optimal Levels

There are no real "internationally accepted empirically determined valid standards" for optimal levels of prescribing indicators such as mean number of medicines per prescription, percentage of patients prescribed antibiotics and injections; however, prescribing from EML and availability of key medicines are required to be a 100% (WHO, 2006 :4). The reference values from various studies and a WHO manual are available in Appendix 1 for comparison.

The reference values for determining the optimal levels for all indicators in the protocol of this research were based on two published articles Akl et al. (2014) and El Mahalli et al. (2012), studies conducted in PHCCs in Egypt and Saudi Arabia respectively. However, the WHO (2006), fact book on using indicators to measure country specific pharmaceutical situations proposed a range for prescribing indicators and these were also similar to derived values for prescribing indicators obtained in a study by Isah et al., (2002) and in a systematic review of prescribing indicators in

both public and private settings in Africa by Ofori-Asenso et al. (2016). Prescribing indicator levels were thus modified to what the WHO (2006) manual. The patient care indicators and facility specific indicators remained the same as in the protocol. The optimal level indicators are presented in Table 1 below. The only variations from original proposal are the average number of medicines per prescription (≤3 now <2) and the percentage of patients prescribed with injections (≤10 now <20).

Formulae for calculation of indicators are available in Appendix 3-5. Indicators were computed for each community pharmacy and also for the entire group of community pharmacies. Indicator results for the entire group was calculated based on pooling all individual patients results and the computing the indicator results. This was the method used in Dong et al. (2011) and Bilal et al. (2016).

3.5.2 Optimal Index and Quality of Care Measure

Calculation of the optimal indices were based on methods used in Akl et al., (2014) and Dong et al. (2011). The optimal index for the average number of medicines prescribed, percentage of prescriptions/encounters with antibiotics or injections were obtained by dividing the optimal indices in the case of percentage of prescriptions with antibiotics (<30) by the percentage of prescriptions with antibiotics obtained; the same applied to percentage of prescriptions with injections. Calculation of the index for the average dispensing time was obtained by dividing the average dispensing time obtained by the optimal level (≥60 seconds). For all other indicators whose optimal value was 100%, the optimal index was calculated by dividing the results obtained by the optimal level (100). Optimal index for all indicators is a maximum of 1 even when the calculated answer is greater than 1. An indicator with an optimal index of 1 implies a medicine is being used rationally (Akl et al., 2014).

A quality of care measure was developed to compare community pharmacies. A composite quality of care measure for each community pharmacy was calculated based on optimal indices of indicators. Out of a maximum cumulative optimal index

of 11: 0-4 = poor quality of care; 5-8 = average quality of care; 9-11= good quality of care (See Table 1).

Table 1: Optimal Level and Optimal Index of Indicators used as a Measure of Quality of Care

No	Indicator	Optimal Level	Optimal Index	
	Prescribing Indicators			
1	Average Number of medicines per encounter/prescription	<2	1	
2	Percentage of medicines prescribed by generic name	100%	1	
3	Percentage of encounters with antibiotics	<30%	1	
4	Percentage of encounters with injections prescribed	<20%	1	
5	Percentage of medicines prescribed from essential medicines list	100%	1	
	Cumulative Index for Prescribing Indicators			**5**
	Patient Care Indicators			
6	Average dispensing time	≥ 60seconds	1	
7	Percentage of medicines actually dispensed	100%	1	
8	Percentage of medicines actually labelled	100%	1	
9	Patients knowledge of correct dose	100%	1	
	Cumulative Index for Patient Care Indicators			**4**
	Facility Indicators			
10	Availability of essential medicines list or national formulary	100%	1	

11	Percentage Availability of key medicines	100%	1	
	Cumulative Index for Facility Indicators			**2**
	Total Quality of Care Measures			**11**

Epi-info7 was up-loaded with data entered from excel and bivariate analysis was used to measure associations between exposures such as the category of personnel dispensing and indicator measure such as patient's knowledge of correct dosage. Measures of associations were measured with Chi-square tests and significance levels set at 0.05.

3.6 Validity and Reliability

In research "validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are" (Joppe, 2000 in Golafshani, 2003 : 599). To improve validity through reduction of selection bias, participants were interviewed in three major languages in the region, English, Ewe or Twi (Akan). Data collectors ensured that dispensers did not know indicators being measured, in order for them not to decide to impress the researcher by deliberately putting up the best practice; the study attempted as much as possible to measure the real everyday situation. Recall bias was limited because participants were required to recall dispensing encounters immediately after they occurred.

Reliability refers to the repeatability of the a study finding or the consistency of the study measurements over a time period (Golafshani, 2003). To increase reliability experienced data collectors, who were also pharmacists, and WHO standardised tools which have been pretested in other settings was employed. Since timing of dispensing was measured, the same digital clock was used in all pharmacies and the periods for starting and stopping timing was specified; this was similar across all participants and settings. Prior to commencing the study the data collection tools were pre-tested for ambiguity and clarity in two community pharmacies in the Ho district which were not

part of selected pharmacies. Necessary modifications were made to tools as described under Data collection.

3.7 Limitations

This cross sectional study was liable to non-response bias as some of the selected participants declined to participate in the study. This study being a cross-sectional study was also be unable to infer causation between exposures and outcomes. The survey was also subject to response bias as some participants may have responded to questions inaccurately or may have chosen to answer the question in a way that sounds socially correct. An example was caregivers who answered the question of whether the person they were taking care of was a subscriber to a health insurance scheme.

Although participants were asked to recall their encounters immediately after being served in the pharmacy, there was still a possibility of recall bias; participants may have forgotten what they were told and rather recalled a past or wrong dosage which could lead to an information bias. The study being quantitative investigated what happened quantitatively but was unable to investigate in-depth the reasons behind the observations found. Participant bias was minimised because pharmacy staff were not aware of the exact indicators measured. Observer bias was reduced because data collectors were well trained on tools, definition of indicators and the use of standard data collection procedures at all facilities. The 6-hour data collection period (10am to 4pm) was determined from the pilot study as the period which most prescriptions were presented at community pharmacies, however, there could still be some groups of patients/caregivers who visit the pharmacies before 10am or after 4pm. The study missed such persons and could have suffered from selection bias.

3.8 Ethics Considerations

Ethical approval for the study with reference number BM/16/5/29, was given by the University of the Western Cape Biomedical Research Ethics Committee (BMREC) (Appendix 13). Prior to commencement of the study, permission (Appendix 14) was obtained from owners or managers of Community Pharmacies. After receiving permission, participant information sheets were given to key pharmacy staff and a signed consent was taken before data collection commenced. A participant information sheet was given to or read to patients/care givers in any of the 3 languages of participant's choice (English, Ewe and (Akan) Twi) (Appendix 6-9). An informed consent was taken before research was conducted (Appendix 10-12).

Participation was voluntary; participants were free to participate and free to leave at any time. The research ensured that participants' rights or respect for human dignity were held in high esteem. Confidentiality of the participant was also assured. The study was governed by the principle of non-maleficence ; researchers ensured that the respondents were not harmed in any way as a result of the study (Wassenaar, 2006). Questions were not asked in a manner that traumatized or intimidated participants. Although arrangements were made for the handling of traumatic experiences no participant reported a case of being traumatized during the survey. Participants were identified by codes and data collected was kept in a locked cupboard and password protected computer, accessible only to the principal investigator.

Findings of the study will be disseminated to stakeholders in pharmacy practice including managers of community pharmacies in the Volta region, the Pharmaceutical Society of Ghana, the Pharmacy Council and the Chief Pharmacist of the Ministry of Health.

CHAPTER 4: RESULTS

4.1 Introduction

The study described the quality of care of patients presenting prescriptions at community pharmacies in the Volta region of Ghana using tools which captured information on prescribing practices, patient care and the community pharmacy facility. A total of 318 (69%) out of 463 patients/caregivers consented and were observed and interviewed across 18 selected community pharmacies (CPs) during the one-day (6 hour) study period which took place between 31st January 2017 and 31st May 2017. The total number of patients/caregivers who sought services at the CPs during the same study time period without using prescriptions was 1349; they were not part of the study as the focus was on those presenting prescriptions.

4.2 Demographics of Patients and Caregivers

The demographics of patients and caregivers are shown in Table 2. Out of the 318 prescriptions presented at the CPs, 66% (209) were for female patients while 34% (109) were for male patients. With the exception of CPs 3, 4, 9, and 18, all other community pharmacies received more prescriptions for female patients than for male patients. Eighty-one percent (259) patients were adults, while the rest were children (<18years). The age range was one day to 94 years; the mean age was 39 years. Patients who were below 18 years were all represented by caregivers. Of the 318 patients, 88% (280) were insured. Forty-eight percent (154) had their prescriptions presented by caregiver who were mostly male, 84 (54.5%), and their age range was 18 to 65 years with the mean age being 37 years. Most patients, (86%), reported that the reason for presenting prescriptions at CPs was because hospitals were out of stock of medicines prescribed; the remainder, (14%), reported a combination of reasons including long queues at hospital pharmacies, preferring the services of CPs and medicines being out of the scope of health insurance hence not stocked by the hospital.

Table 2: Demographics of Patients and Caregivers presenting Prescriptions

CP	District	Patients (n=318)						Caregivers (n=154)		
		Gender		Age group (yrs.)			Insured	Gender		Age (yrs.)
		Male f (%)	Female f (%)	Adult > 18 f (%)	Child <18 f (%)	Mean Age (Range)	Patients f (%)	Male f (%)	Female f (%)	Mean Age (Range)
1	Jasikan	5 (38%)	8 (62%)	13 (100%)	0	41(19-83)	12 (92%)	5 (63)%	3(38%)	42 (27-59)
2	Ho	10 (33%)	20 (67%)	28 (93%)	2 (7%)	34 (2-64)	28 (93%)	8 (73%)	3 (23%)	35(23-58)
3	Ho	4 (67%)	2 (33%)	3 (50%)	3 (50%)	29 (4-55)	6 (100%)	0	3 (100%)	39 (32-45)
4	Ho	6 (50%)	6 (50%)	10 (83%)	2 (17%)	28 (0.02-68)	10 (83%)	5 (83%)	1 (17%)	35 (25-48)
5	Ho	7 (33%)	14 (67%)	17 (81%)	4 (19%)	42 (0.75-85)	20 (95%)	8 (62%)	5 (38%)	33 (18-43)
6	Ho	6 (37.5%)	10 (62.5%)	12 (75%)	4 (25%)	33 (0.6-70)	10 (62.5%)	7 (70%)	3 (30%)	33 (19-65)
7	Ho	10 (31%)	22 (69%)	24 (75%)	8 (25%)	37 (0.003-80)	26 (81%)	10 (53%)	9 (47%)	40 (18-63)
8	Ketu South	9 (29%)	22 (71%)	26 (84%)	5 (16%)	40 (1-80)	26 (84%)	6 (46%)	7 (54%)	38 (20-62)
9	North Tongu	4 (57%)	3 (43%)	6 (86%)	1 (14%)	48 (5-76)	5 (71%)	2 (40%)	3 (60%)	40 (22-55)
10	Hohoe	4 (36%)	7 (64%)	8 (73%)	3 (27%)	42 (0.9-75)	10 (91%)	2 (29%)	5 (71%)	30 (18-45)
11	Kpando	7 (21%)	27 (79%)	23 (68%)	11 (32%)	40 (0.01-83)	33 (97%)	6 (32%)	13 (68%)	35 (24-55)
12	South Tongu	11 (34%)	21 (66%)	25 (78%)	7 (22%)	37 (1-94)	29 (91%)	8 (62%)	5 (38%)	39 (18-56)
13	Hohoe	8 (32%)	17 (68%)	23 (92%)	2 (8%)	51 (6-86)	25 (100%)	5 (56%)	4 (44%)	42 (26-56)
14	Hohoe	7 (44%)	9 (56%)	14 (87.5%)	2 (12.5%)	46 (3-81)	14 (87.5%)	3 (43%)	4 (57%)	37 (27-47)
15	Ketu North	3 (33%)	6 (67%)	9 (100%)	0	41 (18-70)	7 (78%)	3 (60%)	2 (40%)	35 (24-49)
16	Nkwanta South	2 (40%)	3 (60%)	5 (100%)	0	37 (23-50)	4 (80%)	4 (100%)	0	30 (27-33)
17	Kadjebi	0	6 (100%)	5 (83%)	1 (17%)	41 (10-83)	6 (100%)	1 (100%)	0	18
18	Ketu South	6 (50%)	6 (50%)	8 (67%)	4 (33%)	36 (1-68)	9 (75%)	1 (100%)	0	45
Total		**109 (34%)**	**209 (66%)**	**259 (81%)**	**59 (19%)**	**39 (0.003-94)**	**280 (88%)**	**84 (54.5%)**	**70 (45.5%)**	**37 (18-65)**

4.3 Prescribing Patterns on Prescriptions Presented at Community Pharmacies

Prescribing indicator results as depicted in Table 3 show that overall the average number of medicines prescribed per prescription presented was 1.6 with a range of 1-6 medicines. CP 18 at Ketu South had the lowest average, 1.2 medicines per prescription whilst, two CPs 6 and 14, both recorded the highest, 2.1 medicines. Only one pharmacy, CP 16, recorded 100% of medicines prescribed by generic name. With the exception of CPs 2 and 9, all CPs recorded the percentage of patients/encounters prescribed antibiotics below 30%. Prescriptions with injections were 60% in CP 16 and 22% in CP 15, these were the highest (beyond optimal of 20); CPs 9, 13 and 14 recorded no injection prescriptions. None of the CPs recorded the optimal level of 100% for the percentage of medicines prescribed from the EML. CP 13 reported the least at 46% whilst CP 16 reported the highest at 86%.

Table 3: Prescribing Patterns on Prescriptions presented at Community Pharmacies

CP No	District	Prescribing Indicators				
		Average medicines /prescription Reference Standard: <2	Percentage generics/prescription Reference Standard: 100	Percentage patients prescribed antibiotics Reference Standard: <30	Percentage patients prescribed injections Reference Standard: <20	Percentage medicines prescribed from EML Reference Standard: 100
1	Jasikan	1.6(1-4)	90	15	15	67
2	Ho	1.7 (1-5)	68	33	13	58
3	Ho	1.3 (1-2)	88	17	17	75
4	Ho	1.4 (1-2)	71	8	8	53
5	Ho	1.3 (1-2)	71	29	5	64
6	Ho	2.1(1-6)	65	25	6	59
7	Ho	1.7(1-4)	78	25	19	69
8	Ketu South	1.3 (1-3)	68	19	16	66
9	North Tongu	1.4 (1-3)	80	43	0	60
10	Hohoe	1.4 (1-3)	80	27	0	67
11	Kpando	1.8 (1-5)	84	21	15	81
12	South Tongu	1.2 (1-2)	81	13	0	68
13	Hohoe	1.6 (1-3)	62	4	0	46
14	Hohoe	2.1 (1-5)	74	25	0	71
15	Ketu North	1.4 (1-3)	69	0	22	54
16	Nkwanta South	1.4 (1-2)	100	0	60	86
17	Kadjebi	1.5 (1-3)	89	17	0	78
18	Ketu South	1.2 (1-2)	79	17	8	64

Total		1.6 (1-6)	75	20	10	65

4.4 Dispensing Encounters of Patients Presenting Prescriptions at Community Pharmacies

Table 4 describes the dispensing encounters by means of patient care indicators. The reference value for dispensing time was ≥60 seconds and all CPs recorded average dispensing times greater than the optimal value. CP 17 recorded the lowest average dispensing time of 102 seconds whilst CP 9 recorded the highest average dispensing time of 292 seconds. Only CP 9 recorded a 100% (optimal value) for the percentage of medicines dispensed. Further questioning revealed that medicines were not dispensed in 27% of cases; 42% due to medicines being out of stock at the CP, 28% due to the medicines being unaffordable to the patient, 19% because they had already received the medicines from hospital and 11% were a combination of these reasons. All CPs scored 0% for adequacy of labelling. In CPs 3, 9, 16 and 17 all patients/caregivers who received medicines were able to recall the correct dosage of medicines they received from the dispensers. CP 1 recorded the lowest, 64% for percentage of patients/caregivers with correct knowledge of dosage.

Table 4: Dispensing Encounters of Patients Presenting Prescriptions at Community Pharmacies

CP No	District	Patient Care Indicators			
		Average dispensing time (secs) Reference Standard: ≥60	Percentage medicines dispensed Reference Standard: 100	Percentage medicines adequately labelled Reference Standard: 100	Percentage of patients/caregivers with correct knowledge of dosage Reference Standard: 100
1	Jasikan	273 (98-610)	52	0	64
2	Ho	184 (30-415)	70	0	78
3	Ho	102 (62-190)	63	0	100
4	Ho	183 (34-512)	71	0	70
5	Ho	141 (20-308)	82	0	94
6	Ho	143 (36-381)	44	0	88
7	Ho	201 (57-537)	85	0	75
8	Ketu South	247 (53-627)	85	0	86
9	North Tongu	292 (116-600)	100	0	100
10	Hohoe	137 (48-254)	60	0	88
11	Kpando	224 (53-530)	77	0	93
12	South Tongu	115 (31-321)	89	0	87
13	Hohoe	144 (39-336)	77	0	90
14	Hohoe	261 (33-699)	82	0	92
15	Ketu North	136 (29-277)	69	0	71
16	Nkwanta South	208 (47-359)	71	0	100
17	Kadjebi	102 (62-190)	44	0	100
18	Ketu South	143 (30-278)	86	0	70
Total		184 (20-699)	75	0	85

4.5 Compliance of Community Pharmacies to the Essential Medicines Concept

Table 5 shows how CPs complied with the essential medicines concept and indicates that 67% (12 out of 18) of CPs had a copy of the Ghana Essential Medicines List

(EML) or the Standard Treatment Guidelines (local formulary). These facilities thus scored 100% for the indicator percentage availability of copy of EML or local formulary. The availability of key medicines (see Appendix 5 for list) were also measured and the mean percentage availability for all CPs combined was 97% with a range of 80-100. A total of 12 CPs scored 100% for availability of key medicines.

4.6 Characteristics of Community Pharmacies

Further CP characteristics are shown in Table 5. Seventeen percentage of CPs were accredited to health insurance schemes; mean operational year (age) of CPs surveyed was 11 (range 6 months to 33 years); mean proximity of CPs to the nearest health facilities (where it was assumed most prescriptions would have originated) was 800m (range 100m to 1.6km); 56% of health facilities in closest proximity to CPs were government owned, 22% were privately owned and 22% were owned by mission organisations.

Table 5: Community Pharmacy Characteristics

CP No	District	Essential Medicines List / Local Formulary Available	Percentage Availability of Copy of EML or Local Formulary Reference Standard: 100	Percentage Availability of Key Medicines Reference Standard: 100	Accredited to Health Insurance Scheme	Operational Years of Community Pharmacy	Distance to health facility (km)	Owner-ship of nearest health facility
1	Jasikan	Yes	100	93	No	0.5	0.7	Govt
2	Ho	No	0	100	No	8	0.1	Govt
3	Ho	No	0	100	Yes	5	0.8	Private
4	Ho	Yes	100	93	Yes	9	1	Govt
5	Ho	Yes	100	100	No	19	1.3	Private
6	Ho	Yes	100	93	No	12	1	Private
7	Ho	Yes	100	100	Yes	17	0.65	Private
8	Ketu South	No	0	100	No	20	0.3	Govt
9	North Tongu	Yes	100	100	No	0.5	0.15	Mission
10	Hohoe	Yes	100	93	No	21	0.6	Govt
11	Kpando	No	0	100	No	10	0.65	Mission
12	South Tongu	Yes	100	100	No	13	1.6	Govt
13	Hohoe	No	0	100	No	33	0.15	Govt
14	Hohoe	No	0	100	No	4	1	Govt
15	Ketu North	Yes	100	100	No	4	1.12	Mission
16	Nkwanta South	Yes	100	100	No	7	1.6	Mission
17	Kadjebi	Yes	100	87	No	11	0.5	Govt
18	Ketu South	Yes	100	80	No	0.7	1.3	Govt
Summary		12 (67%)	Mean: 67	Mean: 97 (80-100)	3 (17%)	Mean: 11 (0.5-33)	Mean:0.8 (0.1-1.6)	Gov: 56%, Miss: 22% Private: 22%

4.7 Characteristics of Pharmacists and Dispensers at Community Pharmacies

Table 6 shows characteristics of pharmacists and dispensers at CPs. Pharmacists were present at CPs at the time when 53% (170) of the encounters took place. Seventy-seven percentage (245) prescriptions were dispensed by MCAs, whilst pharmacists dispensed 9% (30) of the time. Three other groups of support staff were present at the CPs, they were pharmacy technicians (PT), physician assistants (PAs) and senior high school (SHS) graduates who have been trained on the job. A PA was the only dispenser in CP 17 whilst SHS dispensers were at CP 7.

Table 6: Characteristics of Pharmacists and Dispensers at Community Pharmacies

CP No	District	Pharmacist Present	Category of dispenser				
			Pharmacist	MCA	PT	SHS	PA
1	Jasikan	10 (77%)	10 (77%)	3 (23%)	0	0	0
2	Ho	19 (63%)	3 (10%)	27 (90%)	0	0	0
3	Ho	3 (50%)	0	4(67%)	2 (33%)	0	0
4	Ho	0	0	12 (100%)	0	0	0
5	Ho	0	0	8 (38%)	13(62%)	0	0
6	Ho	0	0	16 (100%)	0	0	0
7	Ho	30 (94%)	0	15 (47%)	0	17 (53%)	0
8	Ketu South	15 (48%)	2(6%)	24 (77%)	5 (16%)	0	0
9	North Tongu	2 (29%)	0	7 (100%)	0	0	0
10	Hohoe	8 (73%)	0	11 (100%)	0	0	0
11	Kpando	0	0	34 (100%)			
12	South Tongu	32 (100%)	4 (12.5%)	28 (87.5%)	0	0	0
13	Hohoe	25 (100%)	0	25 (100%)	0	0	0
14	Hohoe	0		16(100%)	0	0	0
15	Ketu North	9 (100%)	3(33%)	6 (67%)	0	0	0
16	Nkwanta South	5 (100%)	5(100%)	0	0	0	0
17	Kadjebi	0	0	0	0	0	6 (100%)
18	Ketu South	12 (100%)	3 (25%)	9 (75%)	0	0	0
Total		170 (53%)	30 (9%)	245 (77%)	20 (6%)	17 (5%)	6 (2%)

4.8 Quality of Care at Community Pharmacies

4.8.1 Introduction

The quality of care received by patients at CPs was measured using a scale that graded the cumulative optimal indices of CPs. This section shows the optimal indices calculated based on a total of 11 indicator measures for each CP: prescribing – five indicators (Table 7), patient care – four indicators (Table 8) and facility specific – two indicators (Table 9).

4.8.2 Prescribing Index

Table 7 shows that for the index of non-polypharmacy all CPs, with the exception of CPs 6 and 14, achieved the optimal value of 1. Only CP 16 achieved the optimal value of 1 for the index of generic prescribing. CPs 2 and 9 were the only facilities whose optimal index for antibiotic prescribing was below 1. No CP achieved the optimal value of 1 for the index of EML prescribing. The total achievable optimal prescribing index was 5 and all CPs scored a total prescribing index above 4, with the highest being 4.67 attained by CP 17 and the least being 4.04 attained by CP 14. The overall prescribing index for all CPs was 4.40.

Table 7: Prescribing Indexes at Community Pharmacies

		Prescribing Indexes					
CP No	**District**	**Index of Non- Poly-pharmacy** **Optimal Index: 1**	**Index of Generic name prescribing** **Optimal Index: 1**	**Index of Antibiotic prescribing** **Optimal Index: 1**	**Index of Injection prescribing** **Optimal Index: 1**	**Index of EML prescribing** **Optimal Index: 1**	**Total** **Optimal Index: 5**
1	Jasikan	1	0.90	1	1	0.67	4.57
2	Ho	1	0.68	0.91	1	0.58	4.17
3	Ho	1	0.88	1	1	0.75	4.63
4	Ho	1	0.71	1	1	0.53	4.24
5	Ho	1	0.71	1	1	0.64	4.35
6	Ho	0.95	0.65	1	1	0.59	4.19
7	Ho	1	0.78	1	1	0.69	4.47
8	Ketu South	1	0.68	1	1	0.66	4.34
9	North Tongu	1	0.80	0.70	1	0.6	4.1
10	Hohoe	1	0.80	1	1	0.67	4.47
11	Kpando	1	0.84	1	1	0.81	4.65
12	South Tongu	1	0.81	1	1	0.68	4.49
13	Hohoe	1	0.62	1	1	0.46	4.08
14	Hohoe	0.95	0.74	1	1	0.71	4.4
15	Ketu North	1	0.69	1	0.91	0.54	4.14
16	Nkwanta South	1	1	1	0.33	0.86	4.19
17	Kadjebi	1	0.89	1	1	0.78	4.67
18	Ketu South	1	0.79	1	1	0.64	4.43
Total		1	0.75	1	1	0.65	4.4

Table 8: Patient Care Indexes at Community Pharmacies

		Patient Care Indexes				
CP No	**District**	**Index of Dispensing time** **Optimal Index: 1**	**Index of Medicines dispensed** **Optimal Index: 1**	**Index of Medicine labelling** **Optimal Index: 1**	**Index of patients knowledge of dosage** **Optimal Index: 1**	**Total** **Optimal Index: 4**
1	Jasikan	1	0.52	0	0.64	2.16
2	Ho	1	0.7	0	0.78	2.48
3	Ho	1	0.63	0	1	2.63
4	Ho	1	0.71	0	0.7	2.41
5	Ho	1	0.82	0	0.94	2.76
6	Ho	1	0.44	0	0.88	2.32
7	Ho	1	0.85	0	0.75	2.6
8	Ketu South	1	0.85	0	0.86	2.71
9	North Tongu	1	1	0	1	3
10	Hohoe	1	0.6	0	0.88	2.48
11	Kpando	1	0.77	0	0.93	2.7
12	South Tongu	1	0.89	0	0.87	2.76
13	Hohoe	1	0.77	0	0.9	2.67
14	Hohoe	1	0.82	0	0.92	2.74
15	Ketu North	1	0.69	0	0.71	2.4
16	Nkwanta South	1	0.71	0	1	2.71
17	Kadjebi	1	0.44	0	1	2.44
18	Ketu South	1	0.86	0	0.7	2.56
Total		1	0.75	0	0.85	2.60

4.8.2 Patient Care Index

Table 8 shows that all CPs achieved the optimal level for the index of dispensing time. No facility achieved the optimal level for index of adequate medicine labelling, while only CP 9 achieved the optimal mark for the index of medicines dispensed. All patients were able to recall the correct dosage of medicines dispensed in CPs 3, 9, 16 and 17, this resulted in an optimal value of 1. The total patient care index achievable by all CPs was 4. The highest total index, 3 was attained by CP 9. The lowest was 2.16, attained by CP 1. The overall patient care index obtained by all CPs was 2.60.

4.8.2 Facility Specific Index

Table 9 shows the optimal index measure for facility specific indicators. Six CPs, 2, 3, 8, 11, 13 and 14 scored 0 for the availability of an EML/local formulary implying none was available. All CPs with the exception of CPs 2, 4, 6, 10, 17 and 18 scored the optimal index for availability of key medicines. The total facility specific index attainable was 2. Six of the CPs attained the maximum index of 2, while six CPs, 2, 3, 8, 11, 13 and 14 scored the least value, 1. The overall facility specific index obtained by all CPs was 1.64.

Table 9: Facility Specific Indexes at Community Pharmacies

		Facility Specific Indexes		
CP No	**District**	**Index of Availability of Copy of EML or Local Formulary** **Optimal Index: 1**	**Index Of Availability of Key Medicines** **Optimal Index: 1**	**Total** **Optimal Index: 2**
1	Jasikan	1	0.93	1.93
2	Ho	0	1	1
3	Ho	0	1	1
4	Ho	1	0.93	1.93
5	Ho	1	1	2
6	Ho	1	0.93	1.93
7	Ho	1	1	2
8	Ketu South	0	1	1
9	North Tongu	1	1	2
10	Hohoe	1	0.93	1.93
11	Kpando	0	1	1
12	South Tongu	1	1	2
13	Hohoe	0	1	1
14	Hohoe	0	1	1
15	Ketu North	1	1	2
16	Nkwanta South	1	1	2
17	Kadjebi	1	0.87	1.87
18	Ketu South	1	0.80	1.80
	Total	0.67	0.97	1.64

4.8.3 Quality Index

The quality index displayed in table 10 is based on summation of optimal values for each community pharmacy and shows that based on the proposed rating, four CPs - 5, 7, 9 and 12 achieved the good quality of care measure whilst the rest achieved average.

Table 10: Quality Index for Community Pharmacies

Facility No	District	Prescribing Indicators Max: 5	Patient Care Indicators Max: 4	Facility Specific Indicators Max: 2	Total Max: 11	Quality Measure Rating
1	Jasikan	4.57	2.16	1.93	8.66	Average
2	Ho	4.17	2.48	1	7.65	Average
3	Ho	4.63	2.63	1	8.26	Average
4	Ho	4.24	2.41	1.93	8.58	Average
5	Ho	4.35	2.76	2	9.11	Good
6	Ho	4.19	2.32	1.93	8.44	Average
7	Ho	4.47	2.6	2	9.07	Good
8	Ketu South	4.34	2.71	1	8.05	Average
9	North Tongu	4.1	3	2	9.1	Good
10	Hohoe	4.47	2.48	1.93	8.88	Average
11	Kpando	4.65	2.7	1	8.35	Average
12	South Tongu	4.49	2.76	2	9.25	Good
13	Hohoe	4.08	2.67	1	7.75	Average
14	Hohoe	4.4	2.74	1	8.14	Average
15	Ketu North	4.14	2.4	2	8.54	Average
16	Nkwanta South	4.19	2.71	2	8.9	Average
17	Kadjebi	4.67	2.44	1.87	8.98	Average
18	Ketu South	4.43	2.56	1.80	8.79	Average
Mean		4.37	2.59	1.63	8.58	Average

4.9 Measures of Association

Associations between some elements of that contribute to the quality of care were measured using chi-square test of association and are shown in Table 11. Dispensing by pharmacist was analysed against dispensing time ≥60 seconds and patients knowledge and neither were significant at the 0.05 level.

Table 11: Associations between Dispensing by Pharmacist and Patient Care Indicators

Patient Care Indicators		**Prescriptions dispensed by pharmacist f (%)**	**Prescription not dispensed by pharmacist f (%)**	**Chi-square**	**p-Value**
Dispensing time ≥60sec	*Yes*	29/292 (10%)	263/292 (90%)	1.0348	0.3098
	No	1/26 (4%)	25/26 (96%)		
Patients knowledge	*Good*	19/227 (8%)	208/227 (92%)	1.6111	0.2043
	Poor	6/41 (15%)	35/41 (85%)		

CHAPTER 5: DISCUSSION

5.1 Introduction

This section discusses the study results obtained. It commences with the socio-demographics of patients and caregivers presenting prescriptions and the characteristics of community pharmacies and dispensers. Subsequent sections discuss the indicators measured, quality of care and measures of associations. It should be noted that as little information is available on prescribing practices and quality of care at community pharmacy (CP) settings in Africa and other Low and Middle Income Countries (LMICs) comparisons were made with PHCC settings in these countries and CPs in other countries.

During the 6-hour study period a total of 318 prescriptions were presented at the 18 study CPs and of these 66% were for females and 34% for males. This was similar to a recent study in rural CPs in India, where females comprised 57.5% and males were 42.5% (Aravamuthan et al., 2017). The larger female to male populations at CPs implies that females are more concerned about their health than their male counterparts and this is in line with general findings on health seeking behaviours (Wathoni & Rahayu, 2014). The age grouping was similar to a study in Australia where it was found that most patients, (80.8%), who submitted prescriptions at CPs were adults (> 20 years). In this study, one reason for this could be that infants and children are more likely to receive care at the government facilities (Wathoni & Rahayu, 2014). Some patients were represented at CPs by caregivers; all caregivers were adults (18-65years), mostly male and with a mean age of 37 years. Perhaps surprisingly more caregivers were male than female, but this could be due to several factors including mobility and cultural norms which could be explored in further studies. Health insurance has become an important component of the Ghanaian health sector financing structure in recent years and the results showed that 88% of the patients were insured. This was consistent with a study in public and private PHCCs in Ghana by Ahiabu et al. (2016) where 90.3% of patients were insured.

The CPs surveyed were largely facilities that have been in operation for a considerable number of years (mean 11 years) suggesting they have sufficient experience to provide CP services to clients. A large number of them were close to health facilities, implying that patients who do not receive pharmaceutical services at hospitals for one reason or the other can easily access CPs for pharmaceutical services. For most CPs the nearest health facility was government owned and, as the majority of patients in Ghana utilise government health facilities, the CPs were suitably located.

In Ghana, as in most countries, CPs operate under the supervision of registered pharmacists (Parliament of Ghana, 2013). In this study pharmacists were present at CPs 53% of the time which was higher than a previous study in Ghana where pharmacists were present at private facilities 34.3% of the time (MOH Ghana, 2009). The absence of the pharmacist is against the law and it betrays the public as confidence in CP services are generally high (MOH Ghana, 2009). It is also expected that pharmacists will be the last person patients with prescriptions speak to when leaving the CP. The results of the study (Table 5) indicated that only 9% of patients received their medications from pharmacists which was even lower than a study in Ghana which reported 19.1% of dispensers being pharmacists (MOH Ghana, 2009). This is concerning as pharmacists are usually considered to have responsibility to ensure that patients are given the requisite knowledge about the medicines prescribed for them. This is supported by several studies which have shown that the quality of the patient-pharmacist interaction has an impact on medicine compliance (Garjani et al., 2009 in Abdulah et al., 2014).

The majority of support staff present at CPs were medicine counter assistants (MCAs) and this was consistent with a report from the UK (Mullen, 2004). It was also worrying to find that most patient client interactions (dispensing) were carried out by MCAs (77%) (Table 6). This is because the role of MCAs as defined the Ghanaian

Pharmacy Council does not include dispensing of prescriptions to patients, indeed their closest role when it comes to patient/dispenser medicines interactions is selling over-the–counter (OTC) medicines under the supervision of a pharmacist (Pharmacy Council, 2010).

5.2 Prescribing Patterns of Prescriptions Presented at Community Pharmacies

The mean number of medicines per prescription was 1.6 (range 1-6) (Table 3), which was within reference value of <2 (WHO, 2006) and implied that there was not polypharmacy which tends to be associated with an increased risk of adverse drug reactions (Alomar, 2014). Two studies at public health facilities in Ghana reported higher results (3.7 and 4) (MOH Ghana, 2009; Afriyie & Tetteh, 2014). Studies at health facilities in other African countries also reported higher results; a study at PHCCs in Egypt (2.5), a health centre study in Ethiopia (2.2) and a study at various categories of hospitals in southern Ethiopia (2.0) (Akl et al., 2014; Bilal et al., 2016; Gidebo et al., 2016). Studies conducted in CP settings in two LMICs were also higher; a study conducted at CPs in India (3.7) and a study conducted at CPs in Nepal (2.14) (Aravamuthan et al., 2017; Chapagain et al., 2016). This study surveyed prescriptions from hospitals presented at CPs. Although the results suggested that on average CPs in the Volta region do not receive polypharmacy prescriptions, the reason may be that patients received some medicines already directly from the hospital and thus only presented prescriptions for what they do not receive at CPs.

The percentage of generic prescribing of 75% (Table 3), was below the optimal value of 100%. A study conducted at PHCCs in Egypt recorded higher results (95.4%), (Akl et al., 2014). The study results was higher than that of a study at public health facilities in Ghana, commissioned by the Ministry of health (59.9%) (MOH, 2009). In CP settings in LMICs in Asia, lower percentages were recorded; a study conducted in India (2.5%) and in a study conducted in Nepal (45.18%) (Aravamuthan et al., 2017; Chapagain et al., 2016). The results suggested that prescriptions presented at CPs in

the Volta Region were often not according to generic names and thus irrational in this regard. The WHO prefers prescribing by use of INN or generic names because it allows easy identification of medicines which supports prescribing, dispensing, and communication amongst health professional (WHO, 2017a). This unsatisfactory generic prescribing could be ascribed to a number of reasons. Some prescribers may still prefer the use of brand names because of their familiarity with some brands, others may lack trust in the quality of generic products or lack knowledge about availability of generic versions of some branded products (Steinman, Chren & Landefeld, 2007). Some authors have suggested that prescribing by brand names should not be encouraged as it may lead to adverse drug reactions especially in instances where patients are unknowingly prescribed different brands of the same medicines because prescribers were not aware that patients current medication was the same as brand being prescribed (Steinman et al., 2007).

The results obtained for the percentage of patients prescribed antibiotics, 20%, (Table 3) was below the above the optimal value of < 30 suggesting rational antibiotic prescribing. Irrational antibiotic use is associated with increasing antibiotic resistance, a global problem, and may cause mortality and morbidity (WHO, 2006). The study result was lower than other studies in CP settings in LMICs in Asia and at health facility settings in Ghana and other African countries; a study at CPs in India (22%), a study at CPs in Nepal (40.44%), PHCCs in Egypt (39.2%) and Ghana (43.3%), and health centres (82.5%) in Ethiopia (Aravamuthan et al., 2017; Chapagain et al., 2016; Akl et al., 2014; Ahiabu et al., 2016; Bilal et al., 2016). However, the result was higher than that of a study at the Police Hospital in Ghana that recorded a low 11.9% for antibiotic prescribing (Afriyie & Tetteh, 2014). Although the study results suggested rational antibiotic prescribing which is a positive sign, it is important to note that some patients may have been given antibiotics at the hospital prior to presenting prescriptions at the CP.

Overall the results from 18 CPs indicated that percentage of prescriptions with injections (10%) was within the reference value of <20 suggesting rational injection prescribing. The study results was lower than those of studies at health facilities in Ghana and other African countries; a study at public health facilities in Ghana (13.3%), a study at public and private PHCCs in Ghana (24.2%) and a study at health centres in Ethiopia (11.2%) (MOH Ghana, 2009; Ahiabu et al., 2016; Bilal et al., 2016). The results was however higher than those of studies at CPs in LMICs in Asia and PHCCs in an African country; a study at CPs in Nepal (3.44%), a study at CPs in India (7.2%) and a study at PHCCs in Egypt (9.9%) (Chapagain et al., 2016; Aravamuthan et al., 2017; Akl et al., 2014). In general, prescriptions containing injections have been found to be high in lower income countries with some health workers respond to patient requests for injections even when they are not needed (WHO, 2006; MSH (Management Sciences for Health), 2012). In addition, the unnecessary use of injections is associated with increased risks of infections such as HIV, Hepatitis B and other diseases (WHO, 2006; MSH (Management Sciences for Health), 2012). However, although the rational injection prescribing is a positive sign, it must again be noted that patients who presented prescriptions may have received injections at hospitals prior to visiting the CPs.

The results showed that 65% of the medicines prescribed were listed in the Ghana EML. This was below the optimal reference value of a 100%. The result was lower than that of a study at public health facilities in Ghana (87.5%), a study at health centres in Ethiopia (92%) and a study at PHCCs in Egypt (95.4) (MOH Ghana, 2009; Bilal et al., 2016; Akl et al., 2014). The results was also lower than two studies conducted at CPs in Asian LMICs; Nepal (76.11%) and India (99.8%) (Chapagain et al., 2016; Aravamuthan et al., 2017). The result was marginally lower than results of a study at village health clinics in Western China (67.7%) (Dong et al., 2011). The comparisons above suggested that various settings in Ghana and other countries outperformed the results obtained in the study. The reasons for prescribing of non-EML listed medicines in the Volta region could be that prescribers preferred non-

EML medicines or also because patients required medicines which were not listed in the EML which hospital did not stock, hence prescriptions sent out to CPs.

5.3 Dispensing Encounters of Patients Presenting Prescriptions at Community Pharmacies

The results from the study (Table 4) showed that the average dispensing time of 184 seconds was above the optimum value of ≥60 seconds. The time spent during dispensing is considered very important for optimum patient care and is critical because errors in dispensing takes a toll on the quality of care received (James et al, 2009 in Abdulah et al., 2014). Patients non-adherence to medications may also be due to inadequate provision of medicine information which can be as a result of inadequate dispensing time, however it must be noted that other factors such as patients beliefs, poor labelling of medicines and financial challenges also can influence non-adherence (Le Grand, Hogerzeil & Haaijer-Ruskamp, 1999). The results was higher than those of studies at CP settings in an Asian LMIC and an eastern European upper middle income country; a study in Indonesia (62 seconds) and a study in Serbia (state owned-15.58 seconds, private owned-18.15seconds) (Abdulah et al., 2014; Prokic et al., 2014). In health facility settings in other African countries, mixed results were found, 47.4 seconds at PHCCs in Egypt, 127 seconds at health centres in Ethiopia and 119.1 seconds at various categories of hospitals in southern Ethiopia (Akl et al., 2014; Bilal et al., 2016; Gidebo et al., 2016). The longer dispensing time in the study as compared with other studies mentioned above suggested that dispensers spent sufficient time on the dispensing process and with patients and could be inferred that patients received optimum care. However, the findings on labelling and patient knowledge discussed below disappointedly indicate poor dispensing practices.

The results (Table 4) from this study reported that patients received on average 75% of medicines from all facilities, although some facilities recorded 100%. Patients'

receipt of all medicines prescribed them ensures they have the requisite medicines for optimum pharmaceutical therapy. Comparing the 75% to CP settings in Asia and eastern Europe showed that patients in the Volta region received less medicines prescribed; in Indonesia (96%), in India (99.8%) and in Serbia (state owned: 92.7%, private owned: 91.9%) (Abdulah et al., 2014; Aravamuthan et al., 2017; Prokic et al., 2014). Studies at health facility settings in other African countries also reported higher percentage of medicines dispensed. These were: 77.7% at public hospitals in Namibia (Kibuule et al., 2017), 86.22% at heath centres in Ethiopia (Bilal et al., 2016), 86.3% at various categories of hospitals in Southern Ethiopia (Gidebo et al., 2016) and 95.9% at PHCCs in Egypt (Akl et al., 2014). Key reasons attributed in this study were that CPs were out of stock of the medicines, patients could not afford all the prescribed medicines at the time of the visit or that they had already received the medicines from the hospital.

The result for adequacy of labelling was very poor 0% compared to the reference standard of a 100%. The WHO definition for adequate labelling is that the label must contain "at least patient name, medicine name and when the medicine should be taken" (WHO, 1993:18). No CP scored a point for adequacy of labelling by the above definition. Patients who visit pharmacies should be given properly labelled medicines as poor labelling may lead to inappropriate medication use, medication errors and all the possible negative consequences. More specifically, the absence of the name could lead to consequences such as medicine misuse, medicine abuse and medicine overdose which may be potentially fatal (Jankovic et al., 1999). The results obtained in the study was largely because all dispensers failed to write the patients name when labelling the medicines. This result of 0% which was due to a lack of patients name on labelling was similar to results obtained at CP setting in eastern Europe (Serbia) (Prokic et al., 2014) and a study of PHCCs in an African country (Egypt) (Akl et al., 2014) where the standard WHO adequate labelling definition was applied. However, a CP setting in an Asian LMIC (Indonesia) where the full WHO definition was also used reported 96% (Abdulah et al., 2014).

The MOH, Ghana (2009) study recorded 78% for adequate labelling in public health dispensaries and 62.3 % in private dispensaries, however, the definition for adequate labelling was not clearly stated. A study at health centres in Ethiopia reported an adequate labelling 60.56%; the definition used was the presence of medicine name, strength and duration of use (Bilal et al., 2016). A study at public hospitals in Namibia reported 59.3% for adequate labelling; the definition used was not elucidated (Kibuule et al., 2017). The lack of the patient name on the labelling material could not be properly explained by the quantitative study, however, a few postulated reasons could be work load, a lack of adequate labelling material, lack of regulatory policy on labelling or sufficient training. It must be noted that one CP even had labelling material with columns for patients name, dosage regimen and medicine name, yet the patients name was not written in any case. This is an important area for future investigation.

The study results (Table 4) showed that 85% of patients recalled the correct dosage of all medicines received which was below the optimum value of a 100%. Provision of information on how medicines are to be used is a way to ensure that irrational medicine (sub optimal dosing, over dosing) use from the side of the patient does not occur. In a study by MOH, Ghana (2009) public health dispensaries scored a similar 85% whilst private dispensaries scored 76.7%. A CP study in an Asian LMIC (Indonesia), reported a figure (88%) which was not too far from that obtained in the study (Abdulah et al., 2014). In a CP setting in eastern Europe (Serbia), a much lower percentage was reported; private owned dispensaries reported 56.2%, whilst state owned dispensaries reported 58.71% (Prokic et al., 2014). Other African country studies conducted at health facility settings where lower results were obtained were a study at health centres in Ethiopia (69.8%) (Bilal et al., 2016) and a study at various categories of hospitals in southern Ethiopia (78.8%) (Gidebo et al., 2016). A study at PHCCs in Egypt did report a higher value (94%) (Akl et al., 2014). When patients fail to understand dosage regimen and instructions provided to them by the health

professional, the quality of health care is compromised (Martin,Williams, Haskard & DiMatteo, 2005). Whilst patients' inability to recollect dosage of medicines is not confined to Ghana, it does never-the-less highlight another area of concern.

5.4 Compliance of Community Pharmacies to the Essential Medicines Concept

The results of the study (Table 5) showed that the availability of key medicines across all 18 CPs was 97% (80-100%) lower than the optimal value of 100% but still very good. The availability of key/essential medicines is also important because the inadequate supply of medicines can have a detrimental effect on the health of patients (Akl et al., 2014). The study results was higher than studies in health facility settings in Ghana and an African country; a study of public health facilities in Ghana (94.4%), a study at PHCCs in Egypt (78.3%) and a study at various categories of hospitals in Southern Ethiopia (65.7%) (MOH Ghana, 2009; Akl et al., 2014; Gidebo et al., 2016). The result was also higher when compared to a community pharmacy study in an Eastern European country, Serbia, where percentage availability of key medicines was 77.14% in state owned pharmacies and 80.95% in privately owned pharmacies (Prokic et al., 2014). The results at CPs in this setting may be higher than the health facilities in Africa because of possible different methods used in product sourcing.

Only 67% CPs (Table 5) had copies of the Ghana EML or a local formulary and this was lower than the reference value of 100%. It is important for health professionals to have reference materials that can provide readily available local information on medicines. With the much promoted use of the EML across the country, it was expected that CPs would have copies of the EML and/or local formularies to guide them when making choices of essential medicine purchases. The result was lower than studies at public health institutions in Ghana (75%), a hospital in Ghana (77.8%) and PHCCs in Egypt (80%) (MOH Ghana, 2009; Afriyie & Tetteh, 2014; Akl et al., 2014). A study at hospitals in Southern Ethiopia recorded a lower result, 25% (Gidebo et al., 2016). In an upper middle income country, Serbia, state owned

pharmacies reported 100% availability of EML, whilst private owned reported 42.8% (Prokic et al., 2014). Further investigation into the distribution of EML/local formularies to CPs in Ghana should be investigated.

5.5 Quality of Care at Community Pharmacies

Quality of care at each CP was also calculated using an aggregation of optimal indexes. The optimal indexes were developed through the application of a mathematical model developed by Zhang and Zhi previously applied in a study at village health clinics in China and at public and private healthcare facilities in Tanzania (Dong et al., 2011; Irunde et al., 2017). An optimal index of 1 for an indicator means that the indicator measure was rational; the farther away from 1, the less rational and an indication of poor performance with regards the indicator being measured. Aggregation of the results for each CP was used as a quality measure. In this section the study results are compared to other studies utilising this quality index.

The overall index of non-polypharmacy was 1 which implied that CPs generally received non-polypharmacy prescription. As mentioned earlier this could have resulted from patients' receipt of some medications at hospitals before visiting CPs for the remainder. This result (Table 7) was similar to that of a study at hospitals in Ethiopia (1.0) (Sisay et al., 2017), but was however higher than that of a study at public and private healthcare facilities in Tanzania (0.88) (Irunde et al., 2017) and a study at village health clinics in China (0.94) (Dong et al., 2011).

The overall index for generic prescribing was 0.75, higher than a study at village health clinics in China (0.64) (Dong et al., 2011), but lower than that of a study at health care facilities in Tanzania (0.96) (Irunde et al., 2017) and then a study in Ethiopia (0.93) (Sisay et al., 2017). The <1 generic prescribing index meant that prescriptions presented at community pharmacies in the study region were largely irrational with regards the indicator.

Overall antibiotic prescribing index was 1 and implied less antibiotic containing prescriptions were presented. Other studies, in contrast, performed poorly; a study in China (0.62) (Dong, Yan and Wang, 2011), a study in Tanzania (0.44) (Irunde, Minzi and Moshiro, 2017) and a study in Ethiopia (0.59) (Sisay et al., 2017). Similarly, index of injection prescribing was also 1, a better result than those of other studies in China (0.44) (Dong, Yan and Wang, 2011), in Ethiopia (0.42) (Sisay et al., 2017) ,and in Tanzania (0.55) (Irunde et al., 2017). The poor result from other studies mentioned may also be attributed to the fact that those were conducted at health facilities where injections are often used as compared prescriptions sent to community pharmacies that maybe largely for OPD patients.

The index of EML prescribing was 0.65, less than the optimal of 1. The result was lower than a study in Ethiopia (1.0) (Sisay et al., 2017) and a study in Tanzania (0.97) (Irunde et al., 2017). The results was marginally similar to that of a study in China (0.68) (Dong et al., 2011).

The index of dispensing time was 1 (Table 8), and implied adequate dispensing time. This result of 1 was lower than that of a study in Ethiopia (0.33) (Sisay et al., 2017). Other studies calculated the optimal index for individual facilities but did not calculate for all. One study was that of (Akl et al., 2014) at PHCCs in Egypt, where the overall average dispensing time was 47.4 seconds. The derived optimal index based on the reference value (≥60seconds) was 0.79, lower than that of this study. Another of such studies where overall index for dispensing time was not calculated but overall measure and reference value provided was also that of (El Mahalli et al., 2012) , at PHCCs in Saudi Arabia, where the derived optimal index for dispensing time was 1 based on a reported average dispensing time of 100seconds and reference value of ≥60seconds.

The index of medicines dispensed from the study (0.75) was lower than that of a study in Ethiopia (0.86) (Sisay et al., 2017). The study result was also lower than the derived Optimal index in two other studies for the same indicator; 0.996 in a study at PHCCs in Saudi Arabia (El Mahalli et al., 2012) and 0.96 in a study at PHCCs in Egypt (Akl et al., 2014).

The index for adequacy of labelling was 0, reasons discussed earlier under heading 5.3. The result obtained was similar to that of the derived optimal index in a study in Egypt (Akl et al,. 2014). The result was however lower than that of a study in Ethiopia (0.11) (Sisay et al., 2017) and the derived index for a study at PHCCs in Saudi Arabia (0.1) (El Mahalli et al., 2012).

The index of patients knowledge was 0.85, lower than the derived index in a study at PHCCs in Egypt (0.94) (Akl et al,. 2014) but higher than the derived index in a study at PHCCs in Saudi Arabia (0.79) (El Mahalli et al., 2012).

The index of availability of EML or local formulary was 0.67 (Table 9), implied non-conformance to the EML concept. This was lower than the derived value (0.90) (El Mahalli et al., 2012) from a study at PHCCs in Saudi Arabia and lower that the derived value from a study at PHCCs in Egypt (0.80) (Akl et al., 2014). Index of availability of key medicines was near optimum (0.97). This meant that community pharmacies surveyed performed well in this regard. This was higher than the derived optimal index in a study at PHCCs in Egypt (0.78) and a study of PHCCs in Saudi Arabia (0.59) (Akl et al., 2014; El Mahalli et al., 2012).

Table 10 shows an aggregation of all indices for each facility. The aggregate indices are then grouped into various quality measures. The highest was good quality of care and the least average. The overall quality of care based on the aggregations was. A careful analysis of the table (10), patient care indicators were the main reason why

most facilities scored average. This was because no facility scored a point for labelling.

5.6 Measures of Association

Associations between some elements that contribute to the quality of care at CPs were measured using chi-square tests (Table 11). The value of the chi-square test for the association between dispensing by a pharmacist and the patient knowledge was 1.611 with a p value of 0.2043. The optimum dispensing time was above 60 seconds. The chi-square result for the association between, dispensing ≥60seconds and the exposure dispensing by pharmacist was 1.0348 with a p-value of 0.3290. Both associations were not significant at the set 0.05 level.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The study found that patients presenting prescriptions at community pharmacies (CPs) in the Volta region of Ghana during the 6-hour period were mostly female, adults and subscribers to health insurance schemes in Ghana; caregivers were mostly male.

Overall prescribing indicators were good with the exception of generic prescribing and EML list prescribing which fell short of the WHO reference. Non-polypharmacy prescriptions were within range and were better than CPs in Asia and the national median of Ghana. Antibiotic and injection prescribing were also within range implying rational prescribing, however, these as well as non-polypharmacy could have been influenced by patients receiving some medicines at hospitals prior to visiting CPs. Generic prescribing was irrational, although it was better than other CPs in Asian LMICs and a recent study at health facilities in Ghana conducted by the Ministry of Health. Reasons for poor generic prescribing may include prescriber's preference for branded medicines, lack of awareness of availability of generic versions of established brands and a mistrust of generic products. Prescribing from the Ghana EML was below the WHO reference and also lower than studies in CP settings in Asian LMICs and in health facility settings in other African countries. The low usage of EML listed medicines could be due to the prescribers' preference for non EML listed medicines or prescribers feeling the need to use a product not listed in the EML.

Patient care indicators were not within WHO reference with the exception of dispensing times. Dispensing times were generally rational, however, the majority of dispensing and counselling was carried out by non-pharmacists, MCAs. Labelling of medicines and patient knowledge of dosages were extremely poor, although not unique to this setting, and the lack of pharmacist input may be a reason for these poor

practices. In addition, despite the legislative requirement pharmacists were not even present at some CPs during the study period and whilst this is a consistent trend with earlier studies conducted by the Ministry of Health in Ghana, it is a matter of concern which needs to be addressed by the regulator, the Pharmacy Council, and professional bodies.

The percentage of medicines dispensed was below the WHO standard, and also lower than CP settings in Asia and Eastern Europe with reasons including stock outs, medicines already supplied at hospitals and patients inability to afford them. However, the availability of key medicines, which are drawn from the EML was impressive. This was an encouraging finding as many CPs did not have copies of EML or local formularies.

The quality of care, graded using aggregation of optimal indices, showed that the quality of care received at CPs was between average and good. The main reason for the average quality care rating for most CPs was poor results obtained from labelling of medicines. If all CPs had better results for labelling, the quality of care would have increased from average to good. Finally, associations between the category of dispenser and the patients' ability to recall correct dosage of all medicines, and the category of dispenser and optimal dispensing time were not significant at the set 0.05 level.

6.2 Recommendations

The abstract of this study will be forwarded to policy makers such as the Pharmacy Council, the Ministry of Health and the Pharmaceutical Society of Ghana.

The following recommendations in order of priority are proposed:

1. The Pharmacy Council should improve enforcement of laws and regulations to ensure pharmacists take up their legal responsibilities.

2. Training and monitoring to improve dispensing practices of pharmacists and other support workers in labelling and information provision to patients.
3. The Pharmaceutical Society should engage pharmacists and remind them of their duties and ethical responsibilities of providing optimum pharmaceutical services to the general public.
4. Training of prescribers in EML concepts, including the use of generic names and prescribing from EML.
5. The Ministry of Health should promote the use of EML and local formularies at CPs. The national drug program of the Ministry of Health should make free copies available (including e-versions) to CPs.
6. The Pharmacy Council through periodic monitoring should ensure the availability of EML, local formularies and other important reference materials.
7. Government should put in place policies and measures to encourage CPs to enrol into the health insurance scheme as service providers. This would increase patients' access to medicines and reduce cost of accessing medicines at CPs.
8. Further in-depth qualitative studies be conducted to examine reasons behind poor patient recollection dosage, pharmacist absenteeism, poor labelling practices, and poor generic prescribing

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APPENDICES

Appendix 1: Optimal levels of Indicators

The table below shows reference values of WHO medicine use indicators from seven publications.

Indicators	**Publications**						
Prescribing Indicators	Isah et al (2002)	WHO (2006)	Dong et al. (2011)	Akl et al. (2014)	Ofori Asenso et al (2016)	El Mahali et al (2012)	Bilal (2016)
Average No of medicines prescribed	1.6-1.8	<2		≤3	<2		1.6-1.8
% of medicines prescribed by generic name	100	100	100	100	100		100
% encounters/patients with antibiotic prescribed	20.0-26.8	<30	<30	≤30	<30		20.0-26.8
% encounters/patients with injections prescribed	13.4-24.1	<20	<10	≤10	<20		13.4-24.1
% of medicines prescribed from essential medicine list or formulary	100	100	100	100	100		100
Patient Care Indicators							
Average dispensing time (sec)				≥60		≥60	>180
% medicines actually dispensed		100		100		100	100
% medicines adequately labelled		100		100		100	100
% patients with correct knowledge of dosage				100		100	100
Facility Specific Indicators							
Availability of Copy of Essential medicines list or formulary				100		100	
Availability of Key medicines		100		100		100	

Appendix 2: Volta Region community pharmacies distribution and sampling

No	District	Total number of community pharmacies	Number of sampled community pharmacies
1	Ho	11	6
2	Hohoe	5	3
3	Ketu South	4	2
4	North Tongu	3	1
5	Kpando	2	1
6	Nkwanta South	2	1
7	Akatsi South	1	4
8	South Tongu	1	
9	Krachi East	1	
10	Jasikan	1	
11	Kadjebi	1	
12	Ketu North	1	
13	Keta	1	
TOTAL		**34**	**18**

Appendix 3: Tool 1: Prescribing Indicator Form and Definitions

Tool 1: Prescribing Indicator Form

PRESCRIBING INDICATOR FORM

Community Pharmacy Code: ……
Location (Town & District): ……
Name or Code of Investigator: …….. **Date: ……**

No	Date of Rx	Age (years)	Gender M/F	# of medicines prescribed	# of generics prescribed	Antibiotic (0/1)*	Injections (0/1) *	# of medicines on EML
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12 Increase when needed								
Total								
Average								
Percentage					% of generics prescribed	% of Patients prescribed antibiotics	% Patients prescribed injections	% of EML medicines prescribed

*0=No 1= Yes

Adapted from WHO (1993) –How to investigate drug use in health facilities

CRITERIA AND DEFINITIONS FOR PRESCRIBING INDICATOR FORM

These are based on definitions used in WHOs manual on how to investigate drug use in health facilities.

Average number of medicines per prescription: This will measure the degree of polypharmacy.

Formula: AM (average number of medicines) = Total number of medicines prescribed (TM) / Total number of patients encountered

Percentage of medicines prescribed by generic name:

Formula: Percentage of generic named medicines prescribed (PGN) = Total number of generic medicines prescribed / Total number of medicines prescribed X 100

Percentage of patients with an antibiotic prescribed:

Formula: Total number of patients who were prescribed at least an antibiotic (TA)/ Total number of patients x 100

Percentage of patients with an injection prescribed:

Formula: Total number of patients who were prescribed at least an injection (TI)/ Total number of patients x 100

Percentage of medicines prescribed from essential medicines list or formulary

Formula: Total number of EML medicines prescribed (TEML) / Total number of medicines prescribed (TM) x 100

DEFINITION OF ANTIBIOTICS, AND INJECTIONS

Antibiotics

Medicines counted as antibiotic count were based on an adaptation of a recommended list in the WHO (1993) manual on how to measure drug use indicators.

No	WHO EML Medicine Code	Class
1	6.2.1	Beta Lactamase antibacterial
2	6.2.2	Other antibacterial medicines
3		Antibacterial topical medicines
4	21.1	Anti-infective Ophthalmic medicines (excluding acyclovir)
5		Other antibacterial medicines for the ear infections such as Neomycin and Polymyxin B.

Classifications were based on WHO (2017b)-WHO Model List of Essential Medicines, 20th Edition. Group 5 were not classified in the WHO EML list, thus why no code was assigned to it.

Injections

Medicine formulations that are administered through the use of syringes and needles were determined to be injections. For the purposes of the study hormones, vaccines and contraceptives that were administered by use of syringes and needles were not counted as injections.

Appendix 4: Tool 2: Patient/Caregiver Care Form and Definitions

Tool 2: Patient/Caregiver Care Form

PATIENT /CAREGIVER FORM

Community Pharmacy Code: ……

Location (Town & District): ……

Name or Code of Investigator: …….. Date: ……

No	Patient/Caregiver Identifier (if needed)	Dispensing time (secs)	# medicines prescribed	# medicines dispensed	# medicines adequately labelled	Patients knowledge of dosage (0/1) *	Pharmacist present (0/1)	Dispensing by Pharmacist (0/1)	Category of Dispenser
1									
2									
3									
4									
5									
6									
7									
8									
9									
Increase rows when needed **Count**									
Total									
Average									
Percentage				% of medicines dispensed	% of medicines adequately labelled	% of patients with correct knowledge of dosage			

*0=No 1= Yes

Adapted from WHO (1993) –How to investigate drug use in health facilities

PATIENT/ CAREGIVER EXIT SURVEY QUESTIONNAIRE

Community Pharmacy Code: ……

Patient/Caregiver No/Code: …….. **Date:**

1. Are you a CAREGIVER or PATIENT?
2. Age (if caregiver)
3. Gender (if caregiver) 0- MALE 1-FEMALE
4. Is Patient a subscriber to a Health Insurance Scheme? 0- YES 1- NO 3-DON'T KNOW
5. If Yes what type of Health Insurance Scheme? 0-PUBLIC 1- PRIVATE 2-BOTH
6. Are you filling prescription based on insurance? 0 –YES 1- NO
7. What type of insurance scheme?
   0- National Health Insurance
   1- Private Health Insurance Scheme
8. Why prescription was brought to the pharmacy?
   1) Hospital Out of stock
   2) Prefer services of the community pharmacy
   3) Long queues at hospital Pharmacy
   4) Others, Specify ……..

For those who did not receive all/some medicines on prescription ask this

9. Why did you not receive all/some medicines on prescription?
   1) Medicine out of stock
   2) Medicine not affordable
   3) I do not feel the need for the medicine
   4) Already Purchased/Received
   5) Others; Specify ……..
10. Medicine Labelling Check list

# Medicine	Patient Name	Medicine Name	Dosage
1			
2			
3			
4			
5			

CRITERIA AND DEFINITIONS FOR PATIENT/CAREGIVER CARE SHEET

These are based on definitions used in WHOs manual on how to investigate drug use in health facilities

Indicators measured here are average dispensing time, percentage of medicines actually dispensed, percentage of medicines adequately labelled and patients' knowledge of correct dosage.

Average dispensing time: Defined as the time (in seconds) between a patient arriving at the dispensary counter and leaving. The waiting time is excluded. This is calculated by dividing the total time a group of patients spend at the dispensary by the number of patients.

Formula: Average dispensing time (S) = R (total dispensing times for Q number of patients)/ Q

Percentage of medicines actually dispensed: Defined as a percentage of the total number of medicines prescribed for an N number of patients.

Formula: % of medicines actually dispensed (PD) = TD (Total number of medicines dispensed to N patients)/Total No of medicines prescribed for N patients x 100

Percentage of medicines adequately labelled: Adequate labelling is defined as a package containing at least information on patient name, medicine name and medicine dosage.

Formula: % of medicines adequately labelled (PL) = Total number of medicines dispensed to N patients adequately labelled / Total number of medicines dispensed (TD) x 100

Percentage of Knowledge of correct dosage: Correct dosage is defined as patient adequately recall dosage for all medicines dispensed.

Formula: % of patients with knowledge of correct dosage (PK) = Total number of patients who can correctly recall dosage of all medicines / total number of patients questioned x 100

Appendix 5: Tool 3: Community Pharmacy Summary Form and Definitions

Tool 3: Community Pharmacy Summary Form

COMMUNITY PHARMACY SUMMARY FORM

Community Pharmacy Code: …… Date: ……..

Location (Town & District): ……..

Distance to Nearest Health Facility? ..... Type of Health Facility……..

Ownership of Health Facility. Govt. ☐ Private ☐ NGO ☐ Mission ☐ Others……

Is the Community Pharmacy Accredited to a Health Insurance Scheme? Yes☐No ☐

Type of Health Insurance Scheme Public ☐ Private ☐

How long has community pharmacy been operating from current premises? ……

Essential medicines List Available (any) (0/1)	Current EML Available (0/1)	Ghana STG Available (any version) (0/1)	Current Ghana STG Available (0/1)	Any other Formulary Available (0/I)	Name of other Formulary Available

No	Key Essential Medicines in Stock	In Stock (0/I)	
1	ACTs (Tabs and Suspensions)		Percentage of Key Medicines in stock
2	Amoxicillin		
3	Amoxicillin plus Clavulanic acid		
4	Macrolide		
5	Oral rehydration salt		
6	Zinc tablets		
7	Iron containing products		
8	Metformin		

9	Tetracycline Eye Ointment		……
10	Thiazide Diuretics		
11	Mebendazole		
12	Ciprofloxacin		
13	Benzoic Acid Compound Ointment (Whitefields)		
14	Either, Clotrimazole (1%), Miconazole (2%) topical preparations indexed as one		
15	Diclofenac Preparations (Oral or Suppositories)		

CRITERIA AND DEFINITIONS FOR COMMUNITY PHARMACY

SUMMARY FORM

Percentage of available key medicines: A list of 15 medicines identified on the essential medicines list which are recommended for treating common problems will be created.

Formula:

Percentage of Key medicines available: Number of Key medicines in stock/ Total Number of key medicines looked out for x 100.

List of Key Medicines developed based on top ten cause of OPD attendances and death in the Volta Region (Ghana Health Service (GHS), 2014).

No	Condition	Medication
1	Malaria	ACTs (Tabs and Suspensions)
2	Acute Respiratory Tract Infections	Amoxicillin
3		Amoxicillin plus Clavulanic acid
4		Macrolide
5	Acute Diarrhoea in Children	Oral rehydration salt
6		Zinc tablets
7	Anaemia	Iron containing products
8	Diabetes Mellitus	Metformin
9	Acute Eye Infection (Conjunctivitis)	Tetracycline Eye Ointment

10	Hypertension	Thiazide Diuretics
11	Intestinal Worms	Mebendazole
12	Acute Urinary Tract Infection	Ciprofloxacin
13	Skin Diseases (Fungal)	Benzoic Acid Compound Ointment (Whitefields)
14		Either, Clotrimazole (1%), Miconazole (1%) topical preparations indexed as one
15	Rheumatism and Joint Pain	Diclofenac Preparations (Oral or Suppositories)

Appendix 6: Participant Information Sheet English (Pharmacy Staff)

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Participant Information Sheet (pharmacy staff)

Dear Participant,

Firstly, I appreciate your willingness to listen to what I have to say about this research. My name is Gabriel Essilfie-Essel and I am a Ghanaian postgraduate student of the School of Public Health, Faculty of Community and Health Sciences, University of Western Cape, South Africa. I am currently working on a mini thesis as a requirement for the completion of a MASTER OF PUBLIC HEALTH (MPH) degree. The mini thesis is being supervised by Dr. Hazel Bradley. If you have any questions you may freely ask now, if I am in your presence or contact me by through my contact details found at the end of this document.

TITLE OF RESEARCH

Quality of care of patients presenting prescriptions at community pharmacies in a region of Ghana.

PURPOSE OF RESEARCH

The purpose is to assess the quality of care of patients presenting prescriptions at community pharmacies in a region of Ghana. The results of the research will help inform policies aimed at improving the practices in the community pharmacies. Your participation is therefore very important for the issues to be found out so we all derive benefits from the findings.

WHAT WILL HAPPEN WHEN YOU AGREE TO PARTICIPATE

If you agree to participate, two major things will happen. The data collector will first and foremost observe for availability of some indicators in the pharmacy. After wards data collectors will observe you while you attend to patients after which patients will be interviewed briefly while the exit your pharmacy.

CONFIDENTIALITY

Your confidentiality will be guaranteed. Your name will not be captured on the data forms. The informed consent form you will sign will be kept in a locked cupboard free from any other person. Data will also be stored on a computer and password protected and only accessible to the researcher. After the research is conducted the manual data sheets will be destroyed without leaving a trace. If the government or any other agency requests for a report of this research, your confidentiality will still be protected.

ARE THERE ANY RISKS FOR PARTICIPATING IN THIS RESEARCH?

All human interactions and talking about self or others carry some amount of risks. We will nevertheless minimise such risks and act promptly to assist you if you experience any discomfort, psychological or otherwise during the process of your participation in this study. Where necessary, an appropriate referral will be made to a suitable professional for further assistance or intervention

BENEFITS

You may not receive direct or immediate benefits by participating in this research. The findings of the research will greatly inform pharmacy owners, practitioners and policy makers on areas of patient care in community pharmacies which need to be improved. In the future any changes to policy and practices from the findings will help everyone. It will not cost to you to participate; the only cost will be the time you spend talking to us.

VOLUNTARY PARTICIPATION AND WITHDRAWAL

You have the free will to participate or withdraw from the research at any point after agreeing to participate. No penalties will be imposed on you for declining or withdrawing. Neither will it mean you will be ruled out form being selected for any research conducted by us in the future.

INFORMED CONSENT

You are required to sign an informed consent form before participating in the study. The form is attached to this information sheet for you to read and then take a decision.

QUESTIONS

If you have any questions about the research study itself, please contact me **Gabriel Essilfie-Essel** at **H/No 60A Mawuli Estates, Ho** and on **Telephone number :0244415147**. **Email: gabrielessel@gmail.com**

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

Prof Helen Schneider
School of Public Health
Head of Department
University of the Western Cape
Private Bag X17
Bellville 7535
soph-comm@uwc.ac.za

Prof José Frantz
Dean of the Faculty of Community and Health Sciences
University of the Western Cape
Private Bag X17
Bellville 7535
chs-deansoffice@uwc.ac.za

This research has been approved by the University of the Western Cape's Research Ethics Committee. (REFERENCE NUMBER: BM/16/5/29)

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
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C-Block, Top Floor, Room 28
University Of the Western Cape
Private Bag X17
Bellville 7535

Appendix 7: Participant Information Sheet English (Patient/Caregiver)

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2809, Fax: 27 21-959 2872

E-mail: soph-comm@uwc.ac.za

Participant Information Sheet (PATIENT/CAREGIVER)

Dear Participant,

Firstly, I appreciate your willingness to listen to what I have to say about this research. My name is Gabriel Essilfie-Essel and I am a Ghanaian postgraduate student of the School of Public Health, Faculty of Community and Health Sciences, University of Western Cape, South Africa. I am currently working on a mini thesis as a requirement for the completion of MASTER OF PUBLIC HEALTH (MPH) degree. The mini thesis is being supervised by Dr. Hazel Bradley. If you have any questions you may freely ask now, if I am in your presence or contact me by through my contact details found at the end of this document.

TITLE OF RESEARCH

Quality of care of patients presenting prescriptions at community pharmacies in a region of Ghana.

PURPOSE OF RESEARCH

The purpose is to assess the quality of care of patients presenting prescriptions at community pharmacies in a region of Ghana. The results of the research will help inform policies aimed at improving the practices in the community pharmacies. Your participation is therefore very important for the issues to be found out so we all derive benefits from the findings.

WHAT WILL HAPPEN WHEN YOU AGREE TO PARTICIPATE

If you agree to participate, two major things will happen. The data collector will observe from afar while you are being attended to at the pharmacy. Afterwards the data collector will ask you a few questions on your way out. The time you will spend will actually depend on how long you spend at the pharmacy. The data collector will not spend more than 15 minutes asking you questions after you have been attended to at the pharmacy.

CONFIDENTIALITY

Your confidentiality will be guaranteed. You will be identified by a code which will be linked to the data sets gathered from surveying you but not your name. The data collector will not ask you for your name. The informed consent form you will sign or thumbprint will be kept in a locked cupboard free from any other person. Data will also be stored on a computer and password protected and only accessible to the researcher. After the research is conducted the manual data sheets will be destroyed without leaving a trace. If the government or any other agency requests for a report of this research, your confidentiality will still be protected.

ARE THERE ANY RISKS FOR PARTICIPATING IN THIS RESEARCH?

All human interactions and talking about self or others carry some amount of risks. We will nevertheless minimise such risks and act promptly to assist you if you experience any discomfort, psychological or otherwise during the process of your participation in this study. Where necessary, an appropriate referral will be made to a suitable professional for further assistance or intervention

BENEFITS

You may not receive direct or immediate benefits by participating in this research. The findings of the research will greatly inform pharmacy owners, practitioners and policy makers on areas of patient care in community pharmacies which need to be improved. In the future any changes to policy and practices from the findings will help everyone. It will not cost to you to participate; the only cost will be the time you spend talking to us.

VOLUNTARY PARTICIPATION AND WITHDRAWAL

You have the free will to participate or withdraw from the research at any point after agreeing to participate. No penalties will be imposed on you for declining or withdrawing. Neither will it mean you will be ruled out form being selected for any research conducted by us in the future.

INFORMED CONSENT

You are required to sign an informed consent form before participating in the study. The form is attached to this information sheet for you to read and then take a decision.

QUESTIONS

If you have any questions about the research study itself, please contact me **Gabriel Essilfie-Essel** at **H/No 60A Mawuli Estates, Ho** and on **Telephone number :0244415147**. **Email: gabrielessel@gmail.com**

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

Prof Helen Schneider
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BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
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Appendix 8: Participant Information Sheet in Ewe

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2809, Fax: 27 21-959 2872

E-mail: soph-comm@uwc.ac.za

DODOGBALE NA ĐƆNƆ KPLE ĐƆNƆDZIKPƆLA

NYEƑE KPEDEƗUTƆ LƆLƆA,

Xɔ nyeƒe akpedada be adotom ase nusiwo magblɔ tso nugɔmekuku ya ŋu. Ɲknye enye Gabriel Essilfie-Essel eye menye Ghanavi dzidzi si le School of Public Health, Faculty of Community and Health Sciences, University of Western Cape, le South Africa. Ne mewu ɖɔ ya nu dedie la, woanam dzesigbale abe MASTER OF PUBLIC HEALTH (MPH). Dr. Hazel Bradley ele ɖɔ ya dzi kpɔ. Mɔɖeɖe le be abia biabia desiadem fifila aloo ate ŋu ado biabia la dam to nyeƒe gaƒomɔ ɖzesi ya lɛ agbale la ƒe nuwuwu.

NUGƆMEKUKU LA ƑE TANYA:

Dzikpɔkpɔ nyuietɔ na ɖɔnɔwo le duwofe atikexɔƒe le Ghana ƒe nuto ademɛ.

NUGƆMEKUKU LA ƑE TADODZINU

Dodo nyuitɔ na ɖɔnɔwo le dusuewo ƒe atikɛna ƒe le Ghana ƒe nuto demɛ enye tadodzinu na nugɔme kuku sia.

Eƒe nutsome nuwo akpede dodo wɔla wo ŋu hena afɔdede nyuitɔ na ɖɔnɔwo le miaƒe atikexɔƒewo. Eyata wõ ƒe kpekpedeŋu le nugɔmekuku ya me hia vevie ŋutɔ be miakata miahpɔ dzidzeme.

NUKA ATSO WOƑE KPEKPEDEƝU YA ME?

Ne elõ de dzi la, nu eve le dzɔdzɔ ge. Nugɔmekula anɔ aɖzɔge ale ŋku de ŋuwo le esime eyi de atikexɔ la. Le ema megbe a, nugɔmekula abia biabia de wo. Xeyiyi gbegble a deke manɔ me o, elabena aza abe gaƒoƒo wi atõ pɛ le biabia kple ŋudodoa ŋu le esime adogo tso atikɛxɔfe la.

KAKADEDZI BE ŊKƆWO MADZE LE DODO SIA ME O

Ŋkɔwo madze le dodo ya ƒe akpa deke o, ke boŋ dzesi a deko anɔ woƒe ŋudodo a woŋu. Medze be na yɔ ŋkɔ wo na nugɔmekula o. woatu agbale site na dɛ asi la de adaka de me eye woƒe ŋudodo wo ha anɔ computer si anɔ nugɔmekula la dede gbɔ. Le nugumekuku la ƒe megbe la, wõatu dzo agbale sia agbale si wõza le ɖɔwɔwɔ la me eye woanɔ Computer la dzi ko. Ne ohia be dzidudu aloo ɖɔwɔ ƒea de ahia nutsotso atso dɔwɔwɔ la me la, ŋkɔ wo madze le afima ha o.

KUXI KA ANƆ ANYI LE WOƑE KPEKPEDEƝU NANA LA ME?

Kuxi wo nɔna amegbetɔ ƒe dɔwɔwɔ sia ŋu, gake mina wo kakadedzi be ni mia na nuvɔ a deke adzɔ de woƒe kpekpedeŋu nana me o.

Ne wõahia be miawɔ dɔdɔdo de le dɔ sia me la, miadi dɔwɔla adodoe wo be woãkpe de miaŋu.

VIDE KA LE NYE ƑE KPEKPEDEƝU NANA LA ME?

Numetsonu sia ado le nugɔmekuku ya me akpe de atikɛnaƒe dɔwɔlawo, dzidudu kple dɔwɔƒe bubua wo ŋu ale be woãwɔ dodo nyuitɔwo na vide ame gede tsɔ kpede wo ŋutɔ ŋu.

Ke efia be wõƒe ɣeyiyi si neza la trɔ zu vide na ame gede.

LƆLƆNU FAA DƆWƆWƆ KPLE GBEGBE

Mɔdede le be na kpede miaŋu le miaƒe nugɔmekuku sia me alo agbe be makpede miaŋu o. Amedeke makpɔ mɔ ahe nya deke de ŋuwo le wõƒe gbegbe ta o. Mɔ le be go bubu me la, miate ŋu ayɔ wo na kpekpde ŋu ɣeyiyi bu me faa.

LƆLƆDEDZI

Ehia be n'ade asi agbale te be elɔ̃ be kpekpedeŋu le dɔwɔwɔsia me. Lɔlɔdedzi agbale sia la kpede dodo gbale ya ŋu.

BIABIAWO

Ne biabia dewo le asiwo ku de dɔ si ne wɔ la ŋu la, dim le dzesi siawo dzi:

Gabriel Essilfie-Essel le **H/No 60A Mawuli Estates, Ho** ƒo ka nam le: **0244415147**. **Email:** gabrielessel@gmail.com

Nenye be kuɣi ade le numetsotso sia ŋua, yor kafodzesi siawo:

Prof Helen Schneider
School of Public Health
Head of Department
University of the Western Cape
Private Bag X17
Bellville 7535

soph-comm@uwc.ac.za

Prof José Frantz
Dean of the Faculty of Community and Health Sciences
University of the Western Cape
Private Bag X17
Bellville 7535
chs-deansoffice@uwc.ac.za

This research has been approved by the University of the Western Cape's Research Ethics Committee. (REFERENCE NUMBER: BM/16/5/29*)*

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
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Appendix 9: Participant Information Sheet in Akan (Twi)

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2809, Fax: 27 21-959 2872

E-mail: soph-comm@uwc.ac.za

ƆNEA ƆKA ADESUA DWUMADIE YI HO NSƐM (ƆYAREFO/AYAREFOƆ HWƐFO)

Ɔdɔfoɔ a woka dwumadie yi ho, nea edikan, mewɔ ahomeka sɛ wagye atum sɛ wobetie wɔ aso pa mu nea mereka afa nhwehwem yi ho. Medin de Gabriel Essilfie Essel a meyɛ Ghana ni; na merekɔ sukum anaa osuani wɔ School of Public Health, Faculty of Community and Health Sciences, University of Western Cape, South Africa. Na mmom mprenpren yi mereyɛ nhwehwɛm akyerɛkyerɛ mensɔ hwɛ a ebetwa toɔ ho akadeɛ ma manya MASTER OF PUBLIC HEALTH (**MPH)** abodin. Dr. Hazel Bradley na ɔretene tene me fa madesua no ho. Sɛ wowɔ nsɛmmisa anaa asɛmisa bi a wowɔ ho kwan sɛ wobɛyɛ. Wobebisa mankasa ana afa makyikwan abɛɛfo kwan so a y'antitim wɔ nsɛm yi awiei pɛɛ.

NHWEHWEM DWMADIE NO TIBAN

Enti ayarefoɔ a wo kura nkrataa kɔgye nnuru wɔ brɔfu nnuru afrafra kɔ yiye anaa?

DƐN NE NHWEHWEM NO BOTAE

Botae ne sɛ wobehwɛ na ayarefoɔ a wokurakura nkrataa benya nnuru pa afiri adwuma a wɔfrafra borɔfo nnuru no hɔ na wanya ayaresa papa; na nea ebefiri nhyehyeɛi no mu aba ma ɛretɔ sin no, watumi de nneɛma pa agu akwan mu ayʊ no yiye; na nea ɛyɛ no nso, wohyɛ mu kena.

SƐ WOGYE TUMI SƐ WODE WOHO BƐHYƐ DWUMADIE NO MU A, DƐN NA ƐBƐBA

Nneɛma ahorow mienu na ebehia. Nea wɔhwɛ yae no bɛhwɛ nneɛma mu afiri akyiri wo bere ko a obi regye n'ayaresa no afiri borɔfo nnuru

afrafafo no hɔ. Ɛno akyi no nea w'ahu afa ho no nyinaa, abebisa wo nsɛm bi afa ho. Bere a wobesɛe wɔ hɔ no bɛkyere bere a wosɛei wɔ nnuru afrafra no hɔ. Na mom ɔrensɛe bere bebree a ɛbɛbro sima dunum.

YƐMMFA WO HO NSƐM BIARA NNTO BAHA

Wo ho nsɛm biara ɛrenkɔ abɔnten mma obi nte anaa nnhunu na mom yɛbɛma wo ahyɛnsodeɛ bi wonkotoo na wunim. Ɔnea ɔgye wo ho nsɛm no mpo ɛremmisa wodin. Na ɔnea ɔhwehwɛ wo ho nsɛm no nkuto na obentimtim n'ensa nsɛnkyerɛni na wakɔtum ahyɛ beaeɛ bi obi ɛrennhunu agyesɛ ɔnea ɔyɛ nhwehwem no nkutoo na onim. Ɛno akyi nso no, wode beguabɛɛfo mfidie so de asɛm bi ato so a wonkutoo na wonim. Akɔyɛ sɛ kradua safoa, wunkutoo na wubetumi abue. Wɔyɛ nhwehwem no nso wie a nea wɔde agu nkrataa so no nyinaa, wɔbɛsɛe no. Sɛ mpo aban anaa adwumakuo bi bisaa anaa hwehwɛ a, wɔrennya. Wo ho banbɔ ayɛ krado.

EHU ANAA OSURO BI WƆ OBI A OPƐ SƐ ƆDE NEHO HYE SAA NHWENHWE YI MU ANAA?

Obiabiara a ɔne obi bedi wuɔ ankasa ho nkɔmɔ anaa obi forforo bi ho nkɔmmɔ no, ehu anaa osuro kakra wɔ mu. Nanso ɔkwan biara so no wobeyi saa hu afri hɔ na wadi wakyi pintin wɔ osuo mu o anaa owia mu o; sɛ biribi akyekyere anaa ahyɛ wo so. Sɛ ebehia mpo sɛ yɛde bɛhyɛ obi foforo nsa ma wabua wo afiri saa haw no mu a, yɛbɛyɛ.

MFASODE ANAA ABADEƐ BƐN NA ƐWƆ MU

Ebia wɔrennya mfasoɔ anim anim yi ara nanso mpanin sɛ wa bom na ɛkyerɛ w'adɔ; ebia na daakye nneɛma akɔ yiye ma obiara aserew.

WANKWASA WODE WOHO BEHYE MU A OBIBIARA NHYƐ WO SO ANAA WOBEFIRI MU WƆ WAKOMA MU

Sɛ wonya gye tum sɛ wobehyɛm mu a, saa ara na wobetumi afiri aberebiara wopɛ mu a akwansideɛ biara nni ho.

ƆKWANBƐN NA OBI A WAGYE ATUM NO BEHU NOGYINABEA?

Wɔde ho krata bɛtare yi ho ma wankasa wakenkan ahunu mu nsɛ, ate ase ansa na wode wonsa ahyɛ ase.

NSƐMMISA

Sɛ wowɔ nsɛmmisa bi a, makyi kwan ne Gabriel Essilfie Essel, H/No 60A Mawuli Estates, Ho. Anaa frɛ mʋ wɔ 0244415147 anaa makyiri kwan wɔ abɛɛfo kwan so ne Email gabrielessel@gmail.com.

Wo be tumi abisa mmpanin fo yi so nsɛm

Prof Helen Schneider
School of Public Health
Head of Department
University of the Western Cape
Private Bag X17
Bellville 7535
soph-comm@uwc.ac.za

Prof José Frantz
Dean of the Faculty of Community and Health Sciences
University of the Western Cape
Private Bag X17
Bellville 7535
chs-deansoffice@uwc.ac.za

This research has been approved by the University of the Western Cape's Research Ethics Committee. (REFERENCE NUMBER: BM/16/5/29)

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
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Bellville 7535

Appendix 10: Consent Form-English (Pharmacy Staff/ Patient/Caregiver)

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2809, Fax: 27 21-959 2872

E-mail: soph-comm@uwc.ac.za

CONSENT FORM

Title of Research Project: Quality of care of patients presenting prescriptions at community pharmacies in a region of Ghana

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

Participant's name _____
Participant's signature _____
Date_____

Name of Researcher/person taking the CONSENT_____

Signature of Researcher /person taking the CONSENT _____

Date _____
Day/month/year

A copy of this CONSENT form has been provided to the participant.

Appendix 11: Consent Form-Ewe (Patient/Caregiver)

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2809, Fax: 27 21-959 2872

E-mail: soph-comm@uwc.ac.za

LÕLÕDEDZI ƒE AGBÃLE

Nugɔmekuku ƒe Tanya: Dzikpɔkpɔ nyuietɔ na dɔnɔwo le duwo ƒe atikɛxɔfee le Ghana ƒe nuto ademɛ.

Wodɛ dodo ya ɣɔmɛ nam le nye ŋutɔ ƒe dɛgbɛ mɛ eye wodo nyeƒe biabia wo kãtã ŋu nam. Menya nye ƒe dɔlasi eye mẽlɔ tso dzimɛ faa be makpede dodo ya ŋu. Mese egɔme xa be ŋkɔnye madze le dodo ya fe afisiafio eye mɔdede le be mate ŋu ade dokuinye le dodo ya me ɣesiaɣi vɔ̃vɔ̃ ma nɔ me.

ŊkɔnyeE:_____

Nyeƒe dzesi:_____

Egbe ƒe nkɛkɛ:_____

Nugɔmekula ƒe ŋkɔ:_____

Nugɔmekula ƒe dzesi:_____

Egbe ƒe nkɛkɛ:_____

LÕLÕDEDZI ƒe agbãle sia ha anɔ kpedeŋutɔ la asi

Appendix 12: Consent Form- Akan (Twi) (Patient/ Caregiver)

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2809, Fax: 27 21-959 2872

E-mail: soph-comm@uwc.ac.za

AGYE ATUM KRATAA

Nhwehwem Dwumadie No Tiban: Hwɛpa a ɛsɛ sɛ brɔfo nnuru afrafrafo wɔ ɔman yi mu de hwɛ ayarefoɔ kɔ yiye anaa?

Wayi adesua no mu nsɛm nyinaa akyerɛ me wɔ mankasa mekasa a meka mu ma mate aseɛ sɛ mede meho bɛhyɛ mu a obi nnhyɛ me so. Manya meho ntiaseɛ nso sɛ obibiara ɛrentumi nnyi menipasu nkyerɛ obi. Na mansan manya meho ntiaseɛ sɛ aberebiara a mɛye madwene sɛ mɛgyae anaa mefri adesua no mu no, mekɔ a mere mma nkyerekyere mu biara a mere mma hu nea ɛbesi m'akwan mu biara; sɛ mpo mehwere mfasoɔ a menya afiri mua; ɛnyɛ hwee.

NEA ƆHYƐ ADESUA NO MU BI DIN.....

NEA ƆHYƐ ADESUA NO MU DIN NSAANO NSENKYERƐ NE.....

DA NO.....

ƆNEA ƆYƐ NHWEHWEM NO DIN.....

N'ENSA ANO DIN NSENKYERƐNE.....

DA NO.....

DA/BOSOM/AFE

Wɔde saa krataa yi baako a wayi no saa pɛpɛɛpɛ ama ɔdesuafo yi.

Appendix 13: UWC BMREC Approval Letter

UNIVERSITY of the WESTERN CAPE

OFFICE OF THE DIRECTOR: RESEARCH
RESEARCH AND INNOVATION DIVISION

Private Bag X17, Bellville 7535
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T: +27 21 959 2988/2948
F: +27 21 959 3170
E: research-ethics@uwc.ac.za
www.uwc.ac.za

06 December 2016

Mr G Essilfie-Essel
School of Public Health
Faculty of Community and Health Sciences

Ethics Reference Number: BM/16/5/29

Project Title: Quality of care of patients presenting prescriptions at community pharmacies in a region of Ghana.

Approval Period: 24 November 2016 – 24 November 2017

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

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval. Please remember to submit a progress report in good time for annual renewal.

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

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

PROVISIONAL REC NUMBER -130416-050

FROM HOPE TO ACTION THROUGH KNOWLEDGE.

Appendix 14: Permission Letter for Pharmacy Management

The Manager
……
Date:

Dear Sir/Madam

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a registered Master's student in the School of Public Health, University of the Western Cape, Cape-Town, South Africa. My supervisor is Dr. Hazel Bradley.

The proposed topic of my research is to assess the quality of care of patients presenting prescriptions at community pharmacies in the Volta region of Ghana.

I am hereby seeking your consent to conduct this research at your facility. To assist you in reaching a decision, I have attached to this letter a copy of participation information sheet. You will also be required to sign a consent form (attached).

Upon completion of the study, I undertake to provide you with a bound copy of the mini-thesis.
Should you require any further information, please do not hesitate to contact me or my supervisor through the contact details available on the information sheet.

Your permission to conduct this study will be greatly appreciated.

Yours sincerely,

…….

Gabriel Essilfie-Essel