

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



**RATIONAL USE OF MEDICINES IN COMMUNITY
PHARMACIES IN THE LEDZOKUKU-KROWOR**

MUNICIPALITY

BY

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HEALTH DEGREE**

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DECLARATION

I, **Brenda Yayra Opong** hereby declare that this research is an independent and original work of mine carried out under supervision apart from references to other works which I have duly acknowledged. This dissertation has not been presented either in whole or in part for the award of another degree in any institution.

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(DATE)

INTEGRI PROCEDAMUS

DEDICATION

I dedicate this work to God Almighty for His Faithfulness, Love, Divine Mercy and abundant Grace bestowed on me and to my dearest David, Alisa, Adrian, and Brianna for the support and sacrifices you made while I undertook this programme.



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ABSTRACT

Rational use of medicines (RUM) for all medical conditions is an essential element in achieving quality of health and medical care for patients. Yet more than 50% of all medicines worldwide are prescribed, dispensed or sold inappropriately. Ensuring the availability, affordability and rational use of quality medicines is an issue of concern in developing countries. Irrational drug use affects quality of health care and access and exerts undue financial burden on the health care system and on patients and increases morbidity and mortality and has implications for resistance to anti-infectives. Community Pharmacies by their ease of access and high patronage serve as a vital source of information on drug usage to members of the community and should promote the safe use of drugs.

The main objective of this study was to assess rational use of quality and accessible medicines in community pharmacies in the Ledzokuku-Krowor municipality using WHO level II facility core based indicators.

A descriptive cross-sectional design employing the quantitative method was employed to take prospective data from 6 community pharmacies and 180 clients using pre –tested structured questionnaires.

Majority (53.3%) of the patients for whom medicines were intended for were females whilst those aged 30- 59 years were in the majority (46.7%). About 98.8 % of clients travelled to the community pharmacy in < 1hour and at a cost 0.42 times the daily wage of the lowest paid salaried government worker. Availability of key essential medicines was high (92.2%) and no expired medicine was found in any of the dispensaries. These medicines were conserved under conditions that scored 80%. The Median Price Ratio (MPR) of all the surveyed medicines ranged from 0.13 to 26.11

implying that medicines were being sold at a range 0.13 times lower and 26.11 times higher than the international reference price.

As much as 60.83% of prescription medicines were bought without prescriptions. Labelling of medicines in the municipality was low -58.9% although 88.2% of them had adequate knowledge on how to take their medicines. The average cost of medicines bought was 0.73 times the daily wage of the lowest paid salaried government worker.

In general, the level of the rational use of medicines in community pharmacies was found to be good, although there were some major sub optimal performance regarding some patient care practices.

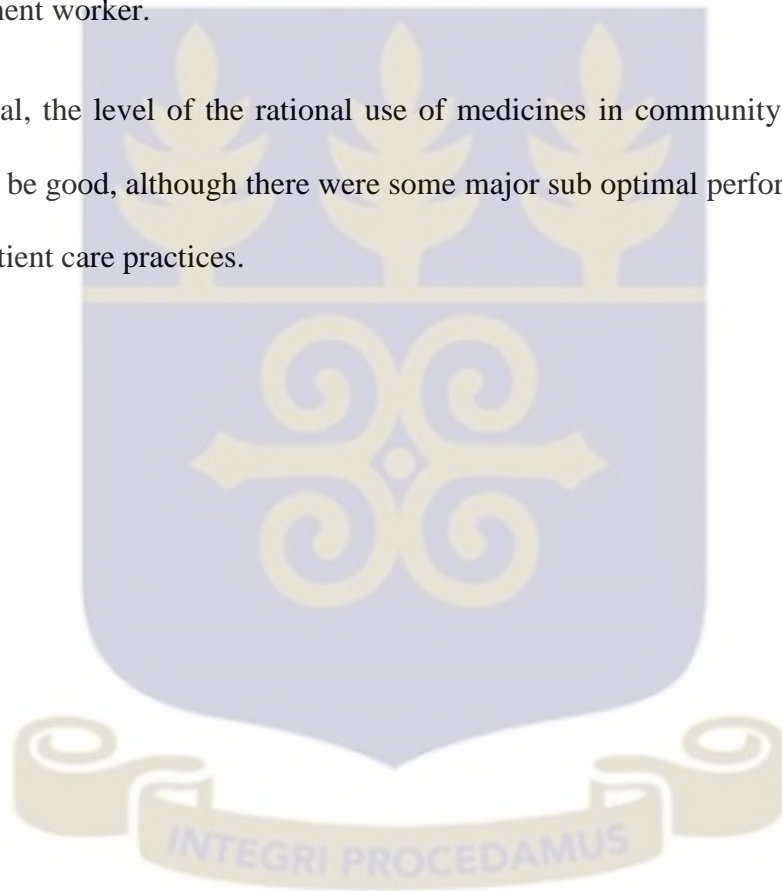
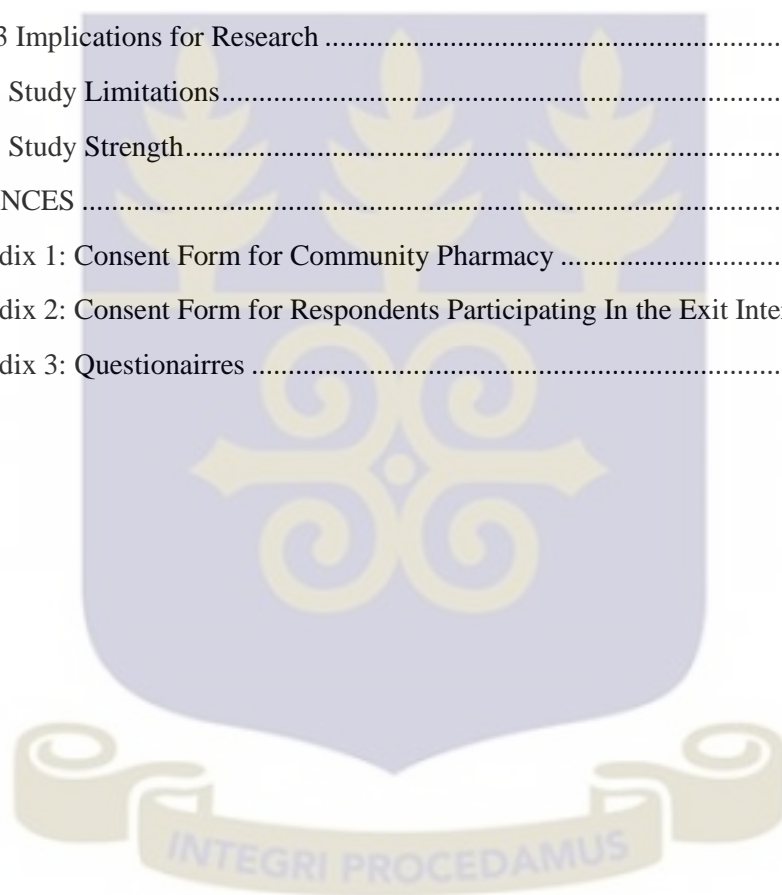


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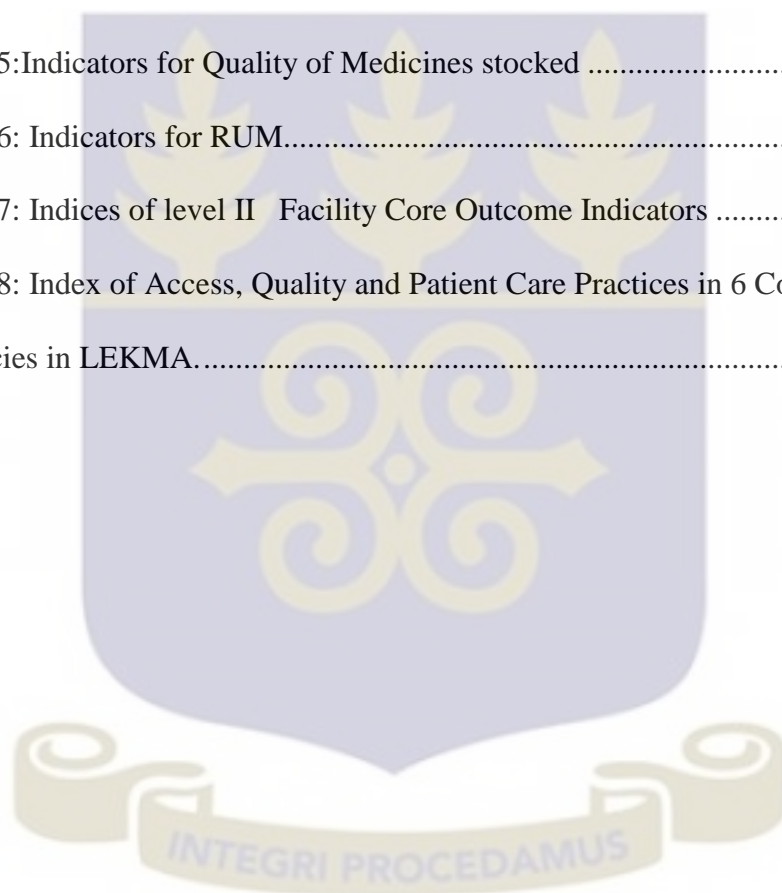
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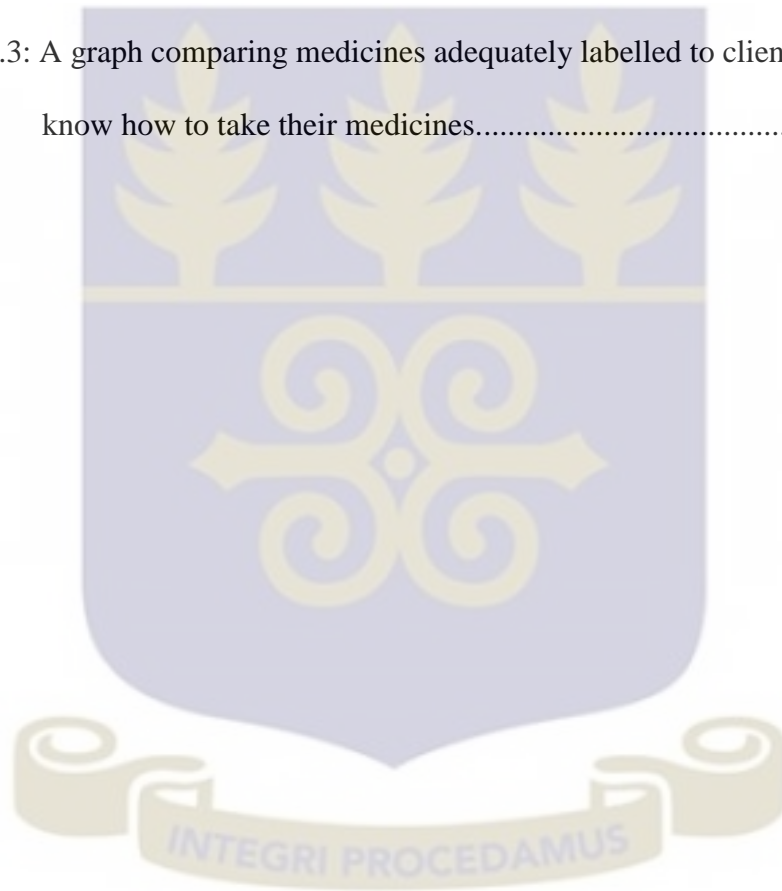
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LIST OF ACRONYMS

EDL	-Essential Drugs List
INRUD	-International Network for Rational Use of drugs
IRF	-International Reference Price
LEKMA	-Ledzokuku-Krowor Municipal Assembly
MDW	-Minimum Daily Wage
MOH	-Ministry of Health
MPR	-Mean Price Ratio
MSH	-Medicines Sciences for Health
RUM	-Rational Use of Medicines
SD	-Standard Deviation
STG	-Standard Treatment Guidelines
WHA	-World Health Assembly
WHO	-World Health Organization



DEFINITION OF TERMS

For the purposes of this study,

Access refers to the physical availability of key essential medicines, affordability and prices of medicines. It has also been discussed in relation to availability of a pharmacist in the community at the time of survey.

Affordability refers to the cost of medicines bought expressed as a ratio of the daily wage of the lowest paid unskilled government worker.

Availability means the proportion of key essential medicines available in the community pharmacies at the time of survey

Client refers to the person physically present in the community pharmacy who may not be the one to take the medicines bought

Community Pharmacy means a privately owned pharmacy that is primarily concerned with the provision of pharmaceutical services to the community in which it is located.

Cost of Medicines means the amount in GHC that the client paid out of pocket for medicines bought from the community pharmacies surveyed.

Geographical Access refers to the length of time patients takes to get to the community pharmacy.

Key Essential Medicines means a selection of 15 tracer essential medicines that satisfy the priority health care needs of LEKMA and is expected to be available at all times in the pharmacy.

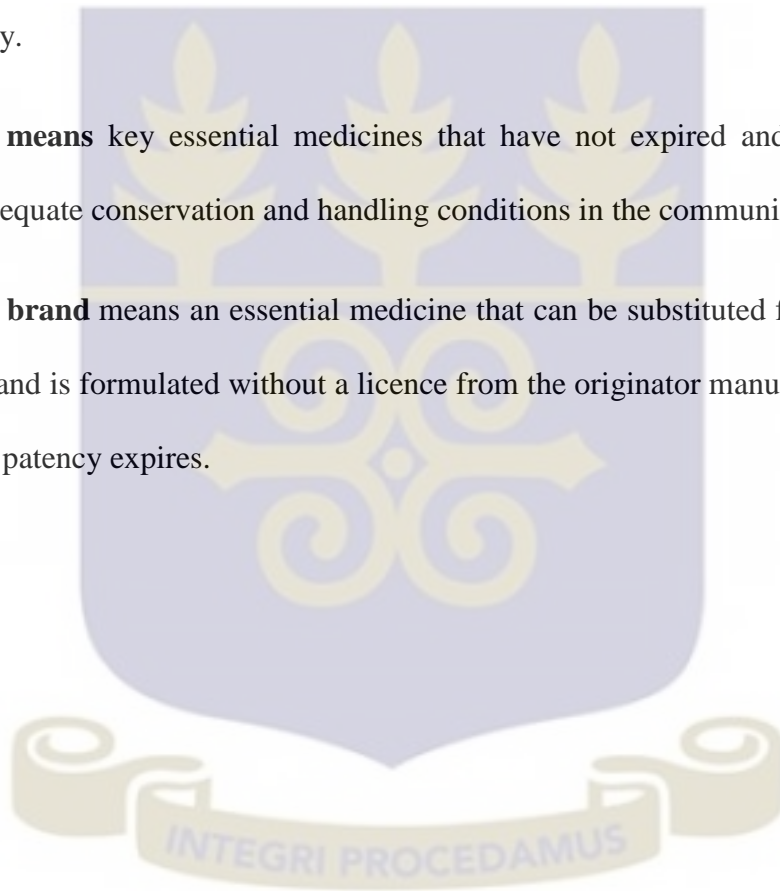
Optimal Index means a defined limit of 1 or 100, based on an optimum level, at which results obtained for a variable is considered most favorable or acceptable.

Originator brand refers to an essential medicine that was first authorized internationally for promotion under patency based on certification of its efficacy, quality and safety, according to requirements at the time of authorization.

Patient means the person for whom medicines were bought from the community pharmacy.

Quality means key essential medicines that have not expired and are being kept under adequate conservation and handling conditions in the community pharmacy.

Generic brand means an essential medicine that can be substituted for the originator product and is formulated without a licence from the originator manufacturer and sold after the patency expires.



CHAPTER 1

INTRODUCTION

1.1 Background

Medicines generally, have been used as a means of relieving or curing the symptoms of diseases, maintaining health and preventing diseases. However, the effective use of medicines to play the roles mentioned above has been undermined. There have been issues and concerns of abuse, underuse or overuse; with consequent negative implications on the efficacy of medicines. Further concerns have been raised over the guaranteed quality, sufficient quantities, access and affordability of these medicines in terms of their prices for effective health outcomes (WHO, 2011). This forms the basis of rational use of medicines (RUM).

1.1.1 Rational use of medicines

Experts on the rational use of medicines, at a conference convened by the World Health Organization (WHO) in Nairobi in 1985, defined rational use as follows: “The rational use of drugs requires that patients receive medications 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 their community”(Management Sciences for Health, 2012, p 27)

Irrational use of medicine occurs when one or more of the aforementioned conditions are not met. This may happen in various ways such as when too many medicines are given to a patient (poly-pharmacy); incorrect use of antimicrobials often in inadequate dosages for non-bacterial infections; unnecessary use of injections when oral

formulations would be more appropriate; failure to adhere to treatment guidelines; inappropriate self-medication, often of prescription-only medicines (WHO, 2002).

It is estimated worldwide that more than 50% of all medicines are prescribed, dispensed, or sold inappropriately, while 50% of patients fail to take them correctly (K. Holloway & Dijk, 2011).

Some strides have been made since 1985 to improve access to essential medicines with special focus on developing countries. Appropriately so, because notwithstanding the hard work of the WHO, development agencies and governments, irrational use of medicines and inequitable access to quality medicines persists (WHO, 2011).

Rational use of medicines in developing countries and by extension in Ghana has often been described as deficient. Factors such as health care organization and provision, availability of appropriate and timely information, policies on health and drugs as well as cultural attitudes and perceptions influence RUM (Smith, 2004). Also, medicine use is affected by a number of interlinked factors including the healthcare system, physicians, pharmacists and the community. These actors contribute to the curative process and may be the perpetrators of irrational use of medicine in more ways than one.

1.1.2 Community pharmacies

Community Pharmacies are healthcare facilities that specialize in the provision of pharmaceutical services mostly to the community they are sited in. They are therefore a vital source of information on drug usage to members of the community they serve. Proximity and ease of access, possibility of credit or the

option to purchase small quantities at a time and availability of quality medicines and services are some of the reasons advanced for their high patronage (Goel, Ross-Degnan, Berman, & Soumerai, 1996). The prospect therefore for pharmacists to play a pivotal role in the promotion of RUM cannot be overemphasized.

A number of studies have been conducted to measure rational use of medicines but mostly in public health facilities in Ghana such as those conducted by Afriyie, (2014) and Ahiabu, Tersbøl, Biritwum, Bygbjerg, & Magnussen, (2015) on the pattern of rational drug use in Ghana Police Hospital and a retrospective audit of antibiotic prescriptions in primary health-care facilities in Eastern Region, Ghana respectively. The Ministry of Health (MOH) also conducted a pharmaceutical situation assessment of Ghana in 2009 in both public and private health facilities including some private medicine outlets. Conversely limited studies on RUM have been carried in community pharmacies in Ghana.

This study seeks to measure the rational use of quality medicines in community pharmacies taking into consideration their accessibility, availability and affordability, to make a case for the development of strategies aimed at maximizing their contribution to the provision of primary healthcare in the country.

1.2 Problem statement

The core concept of rationality in the use of medicines in the preventive or curative management of clinical cases is hinged on the principle of cost-effectiveness of the drug with respect to the health system. The efficacy, the therapeutic window of the drug and the role of the patient in complying with the requirements of such drugs to

achieve expected therapeutic outcomes is paramount (Almarsdóttir & Traulsen, 2005). Irrational use of medicines has enormous implications on health outcomes and as such seen as a global problem with consequential effect on the health system of a country (WHO, 2011).

A third of the world's population does not have access to essential medicines (WHO, 2011) even though the use of medicines is at the core of clinical care intervention. In developed countries, 10-20% of the national health budgets is spent on medicines while that for developing countries where poverty is endemic and resources are generally inadequate to meet the budgetary needs of the citizenry, health care expenditure on medicines is high; ranging between 20% and 40%. It is therefore exceptionally serious that most of these medicines are not being used rationally (Kumar et al., 2013).

Of utmost concern in the delivery of primary health care in less developed countries is the proportion of the population who do not receive treatment for illness based on their health system's generated standard guidelines (WHO, 2011). For example, in developing and transitional countries such as Ghana, in primary care, less than 40% of patients in the public sector and 30% of patients in the private sector are treated in accordance with standard treatment guidelines (WHO, 2011).

The inappropriate use of drugs may exert undue financial burden on the health care system as well as on patients. For example, drugs are estimated to constitute 60 - 80 % of the cost of health care in Ghana. Therefore, medicines, if irrationally used frequently, in addition to leading to ineffective/incomplete treatment, resistance to various medicines, patient non-compliance with a negative cumulative effect on the quality of pharmaceutical care; and increase in morbidity and mortality, also lead to

too much spending on medicines and wastage of resources by both healthcare professionals and patients.

1.3 Justification of study

A review comprising 900 studies conducted between 1990 and 2009 in primary health-care settings in 104 developing and transition countries including Ghana, concluded that, medicine use is not improving over time (K. A. Holloway, Ivanovska, Wagner, Vialle-Valentin, & Ross-Degnan, 2013) .

In Ghana, unlike many developed countries, electronic monitoring of medicine use through insurance data and electronic medical records is unavailable. The measurement of RUM routinely is recommended so as to generate the much needed data for improving the use of medicines through feedback to all stakeholders (WHO, 2011).

Again, further research to know whether RUM is worsening in Ghana has been recommended by Ahiabu et al, (2015) on finding out from similar studies that a generally high antibiotic use is the practice in primary health facilities.

The incorporation of the dimensions of access, quality and affordability of medicines in studies of RUM have been mostly conducted on country-wide scale.

A study to assess the rational use of medicines as a step in addressing this national and global problem, more so, in community pharmacies which are usually the first port of call for medication needs of people living in the community.

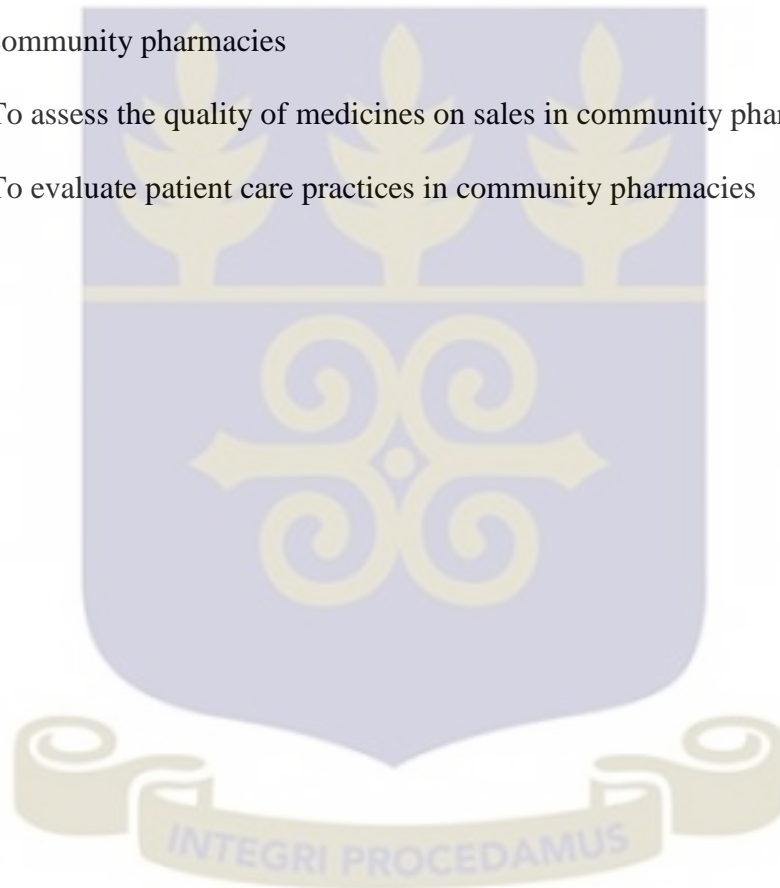
1.3 Objective of study

1.3.1 Main objective

The main objective of this study was to assess rational use of medicines in community pharmacies in the Ledzokuku-Krowor Municipality.

1.3.2 Specific objectives

1. To assess availability, affordability and accessibility of essential medicines in community pharmacies
2. To assess the quality of medicines on sales in community pharmacies
3. To evaluate patient care practices in community pharmacies



1.4 Conceptual framework

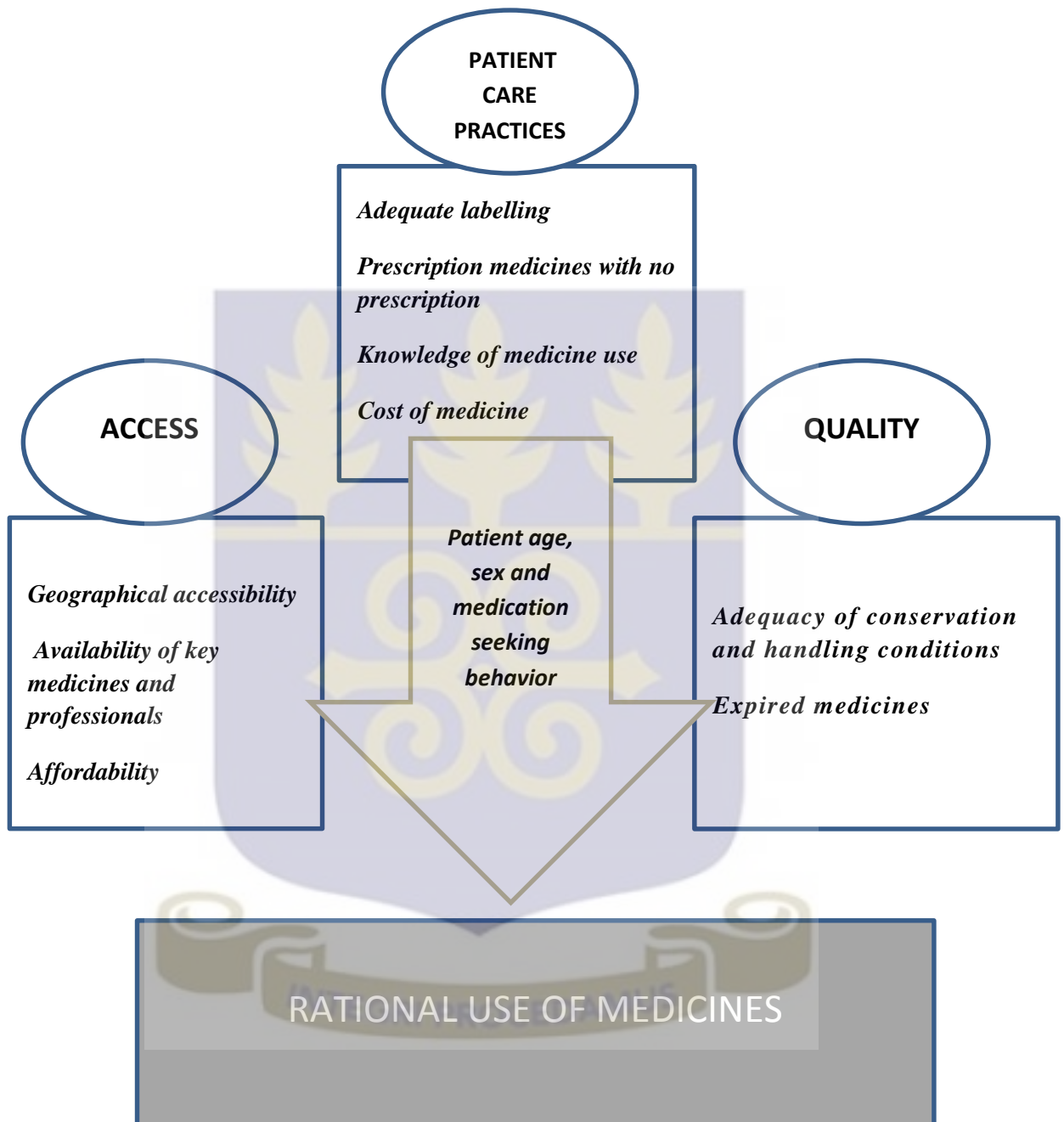


Figure 1.1: Conceptual framework for rational use of medicines.

1.4.1 Narrative on conceptual framework

As shown in Figure 1.1, good dispensing practices in pharmacies consisting primarily of adequate labelling of medicines accompanied with appropriate counseling and drug

information enhances compliance- a huge component of rational use of medicines. These practices and other provisions such as the use or misuse of prescription medicines could be affected by the professional prescribing and dispensing in the pharmacy.

Access to and availability of affordable essential medicines used to treat common conditions has life-saving consequences for individuals apart from it being a major public health benefit.

An equally important factor that needs to be assured is the quality of the medicines being stocked and dispensed in the pharmacies. This can be estimated by assessing the conservation and handling conditions as well as the expiry status of medicines in the pharmacies. Also to be investigated are client's age, sex and medication seeking behavior which are factors that could influence type of medicines use.

The optimal fulfilment of the highlighted conditions culminates in the use of medicines rationally.

1.5 WHO Level II facility-based core indicators for estimating RUM

The WHO Level II facility-based core indicators provide information on pharmaceutical outcomes. These indicators provide a methodically developed survey that assesses the degree of access to and rational use of quality medicines (Matsoso Precious, Velasques German, 2006).

A review of literature suggests that this methodology has mostly been applied to evaluate country pharmaceutical situations.

RUM has been measured in varied ways in different studies but mostly using WHO/INRUD core drug indicators comprising prescribing, patient care and facility indicators. In this study however, the researcher sought to estimate RUM in a geographical area (LEKMA municipality) adapting the segments of the level II indicators applicable to private drug outlets since access and quality are integral components of the rationality of medicine use.



CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter is a review of literature on RUM and topical issues around it. It is based on experimental reports from developing and developed countries, placing prominence on findings and methodological issues. Databases searched for relevant journals include PubMed, Biomed Central, Science Direct, Google Scholar among others using keywords such as Rational Use of Medicines, community pharmacy, medicines use, access, quality irrational drug use and WHO Level II indicators .

Areas of extensive coverage include studies done on indicators measuring RUM, WHO strategies to improve RUM, Access, Quality and Affordability of medicines, Medicines Use, Community Pharmacy Practice and the Regulatory environment of the Country.

2.2 Rational Use of Medicines background

Efforts continue to be made since the Nairobi conference to promote RUM on all fronts in the healthcare system of subscribing countries. Varied resolutions have been endorsed in the area of medicines such as resolution WHA39.27 on the revised drug strategy and resolution WHA54.11 on the revised medicines strategy. For instance Resolution WHA54.11, aims at ensuring access to needed essential medicines and that these medicines are safe, efficacious and are of good quality; most importantly, these medicines should be prescribed and used rationally (WHO, 2007).

2.3 WHO strategies to improve RUM

WHO in consideration of the gap remaining in knowledge on RUM, WHO instituted twelve core policies and plans to facilitate RUM namely mandated multi-disciplinary national body to coordinate medicine use policies; development of Clinical guidelines; essential medicines list based on treatments of choice; drugs and therapeutics committees in districts and hospitals; problem-based pharmacotherapy training in undergraduate curricula; continuing in-service medical education as a licensure requirement; supervision, audit and feedback; independent information on medicines; public education about medicines; avoidance of perverse financial incentives ; appropriate and enforced regulation; sufficient government expenditure to ensure availability of medicines and staff (WHO, 2002)

2.4 Methodologies for measuring RUM

In the quest for evidence based strategies and interventions to promote RUM, the International Network for the Rational Use of Drugs (INRUD) was formed in 1989 to carry out multi-disciplinary intervention research projects. Subsequently, WHO/INRUD indicators were introduced to ensure uniformity in drug use investigation in primary health care facilities. These indicators have become benchmarks against which a number of researches have been conducted WHO, 2002).

In consideration of the intricacies of the pharmaceutical sector, with its several and varied elements having the potential to influence access to and rational use of quality medicines, the WHO developed a meticulous method for evaluating pharmaceutical situations at national and international levels. Crucial questions that do not have sufficient answers such as “do people have access to essential medicines? Are people

getting medicines that are safe, effective and of good quality? Are these medicines being used properly?” (Matsoso Precious, Velasques German, 2007) are investigated all aimed at improving access to and use of medicines of good quality.

Level II facility-based core indicators of this survey guide measure access, quality and medicines use. This tool, which has been pre-tested in a number of countries since 2003 and refined, allows the selection of forms from the level II facility survey to monitor situations.

In this study, the researcher seeks to adapt the level II facility indicators relevant to private drug outlets –community pharmacies- in this instance and in a geographical area –LEKMA- to expand the scope of RUM to include an evaluation of the accessibility and quality of medicines being used.

2.5 Access to medicines

International treaties and governments all across the world recognize access to health care as a fundamental human right. This is further strengthened in the United Nation’s third sustainable development goal of ensuring healthy lives as well as promoting the welfare of people of all ages. Embedded in this goal is the aim to ‘Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines’(United Nations, 2014, p9).

Inequitable access to medicines that treat priority infections is therefore a deviation from the pursuit of the fundamental right to health. This inequity is worse in Africa and Asia’s most deprived countries, where a considerable 50% of the populace lacks such access(Stone, 1999). Access to medicines is defined by the WHO as ‘the

equitable availability and affordability of essential medicines during the process of medicine acquisition” (Paniz, Fassa, Maia, Domingues, & Bertoldi, 2010, p.1). Barriers to access are classified as stemming either from the demand side or the supply side. The capacity to use services by individuals and communities is a demand- side constraint whilst features of health services that hamper service uptake are supply side constraints. Geographical, financial and availability concerns are some identified barriers to accessing medicines (Bigdeli et al., 2013).

2.5.1 Geographical access to medicines

Hitches with a uniform development of the health system may result in a disparity in between urban and rural areas. Community pharmacies alongside other health facilities are typically concentrated in regional capitals and towns. Medicines, apart from being constantly available and affordable should be accessed in outlets that are less than an hour’s walk from households. It is crucial to ensure that geographical access is not a barrier to accessing medicines since pricing of medicines already poses a challenge to patients. The WHO (2004) in the world medicines situation reported that in Africa, only three (6.7%) out of forty-five countries surveyed had very high access to medicines implying that >95% of the populace had access to medicines within an hour’s walking distance. Also, 72% of countries with < 50% of its populace having access to medicines are in the low-income category with more than 50% of those in Africa whilst 80% of countries with very high access are in Europe and the America’s (Matsoso Precious, Velasques German, 2006).

In Ghana, the Pharmacy Council until the amendment of the Pharmacy Act, Act 489 and the promulgation of the Health Professions Regulatory Bodies Act, Act 857 of

2013 was responsible for regulating the distribution of pharmacies and over-the-counter medicines shops. Pharmacies although concentrated in cities are generally sited within 400m of each other whilst OTCMs are sited at least 1km from each other improving the distribution of these outlets over time.

A WHO pharmaceutical situation survey conducted in Ghana in 2009 reported that none of respondents surveyed took more than an hour to get to the private dispensaries whilst 11.7% did take more than an hour to get to the public dispensaries implying a better geographical access to private dispensaries (Arhinful, 2009).

2.5.2 Availability of essential medicines

Essential medicines are described as

Those that satisfy the priority health care needs of the population. They are selected with due regards to public health relevance, evidence on safety, efficacy, quality and comparative cost-effectiveness. They are intended to be available within the context of functioning health systems at all times in adequate amount and appropriate dosage forms with assured quality (Kebede, Kebebe Borga, & Mulisa Bobasa, 2015, p. 121)

The Ghana National drugs programme under the auspices of the Ministry of Health publishes the Standard Treatment Guideline (STG) and the Essential Drugs List (EDL) or formulary. These address two particularly important components of medicines use i.e. an adequate supply of essential drugs and access to unbiased information about these drugs. These are needed for the effective functioning of health personnel at all levels.

In Ghana, the standard treatment guidelines (STG) with an accompanying list of essential medicines (ESL) was first published in 1983 and periodically revised by the Ministry of Health to support RUM. The STG is a compilation of first line treatments for common ailments and serves as a guide for prescribers- doctors, medical assistants and midwives - as well as pharmacists, dispensers, plus other healthcare staff who prescribe at primary care facilities. (STG, 2010). The Ghana pharmaceutical situation survey conducted by MOH (2009) reported that 87.5% of medicines prescribed were part of the EML which was an indication of good adherence of physicians to the EML although the optimal value of 100% is desirable.

Medicines on the EML are usually older drugs which use have been tested and established in clinical care and cost lower than newer medicines (WHO, 2011). Rational prescribing is therefore implied when prescriptions are generated according to the EML.

In a review conducted by Maiti, Bhatia, Padhy, & Hota (2015) of essential medicines in India, they reported that availability of essential medicines was still lacking particularly in public facilities, forcing patients to buy from the private sector where medicines are relatively highly priced or abstain treatment in total. Further, even though India is among the leading manufacturers of generic medicines globally, a huge proportion of the populace lacked access to essential medicines.

The results of a WHO/INRUD patient and facility indicator study in ten public health facilities in Egypt revealed that two-20%- of the facilities did not have a copy of EDL/formulary and the percentage of key drugs in the stock was 78.3; falling short of a proposed optimal value of 100% in each category. Shortage of the drug supply of essential drugs that treat common health problems is harmful to health status of

patients. Moreover, this probably increases the potential of prescribing medicines which are out of the stock or recommending originator brands which are usually more expensive alternatives.

The need for pharmacists to be increasingly mindful of these provisions for RUM although they are primarily for profit institutions is rife as they engage in the act of “prescribing” medicines for simple ailments of common occurrence in their community pharmacies (HPRBA, 2013).

2.5.3 Medicine Pricing

There is a wide variation in the retail prices of essential medicines. Essential medicines are often more expensive in the private sector, as such, dependence on supply of medicines by the private sector often implies that essential medicines are too costly for deprived patients to pay for.

Mark up on medicines consist of but may not be restricted to import duties, taxes, cost incurred due to distribution and operational overhead costs. Retail prices of medicines could therefore contain as high as 80% of ex-manufacturer prices. (Stone, 1999)

The survey of medicine prices has been streamlined by the WHO and health action international (HAI). Applicable aspects of the survey have been included in the WHO level II facility-based core outcome indicator survey guide. To standardize prices of medicines as well as to appreciate the variation in prices across facilities and countries, local prices are expressed as ratios of the international reference price (IRP). The Medicine Sciences for Health’s (MSH’s) International Drug Price Indicator Guide has been identified as having the most useful set of standard reference prices. The list of Median prices listed in the drug price indicator guide is readily

available, comparatively stable and regularly updated (Matsoso Precious, Velasques German, 2006; Stone, 1999).

2.5.3.1 MSH's international drug price indicator guide

The MSH drug price guide reports current procurement prices presented by suppliers either for profit purposes or not-for-profit purposes to developing countries for multi-source products. Buyer prices are only used when supplier prices are unavailable. Medicines surveyed must necessarily have an IRP and attention paid to them being originator brands or lowest priced generic medians available in the community pharmacy. Medicine price indicator guides are limited in indicating prices patients pay in either the private or public sectors and essential but patented medicines (MSH/WHO, 2014; Stone, 1999)

2.5.3.2 Median price ratio

The median price ratio (MPR) is the ratio of the local unit price of a medicine to the IRP which gives an indication of the number of times the medicine is more expensive or cheaper than the IRP. For instance an MPR of 3 for a medicine in Ghana means it is being sold at a price thrice the IRP. An MPR of 3 and below is acceptable for the private sector whilst 1 or less is taken is considered efficient procurement in the public sector (Kheder & Ali, 2014).

In a study evaluating medicine prices in Sudan by Kheder (2014), the median MPR for essential medicines surveyed in the private sector was 4.08. Thus medicines were being sold for about four times the IRP which would be considered unacceptable

since the MPR was greater than 3. This is almost comparable to a median MPR of 3.5 reported for Ghana in by Arhinful (2009) but is however an improvement on what was stated in a WHO report on access to affordable medicines in 2003 where median MPR of >6 was observed in 33 developing countries for lowest-priced generic medicines in the private sector (WHO, 2003). Conversely, similar studies conducted in China reported a median MPR of 0.98 for lowest priced generic medicines for private sector patient prices for essential medicines which is within acceptable limits (Jiang et al., 2013). Also, a median MPR of 2.05 was observed by Nyanwura (2013) in private medicine outlets in an essential medicines availability and affordability survey in the Builsa district of the Northern Region, Ghana.

2.6 Affordability

At the core of deliberations and decisions of healthcare are matters bordering on affordability. While expected to contain public healthcare expenditure, health policy formulators and politicians in nations all over the world are very often faced with the challenge of safeguarding and, where applicable, increasing access to sufficient and quality health care services for all in need at the same time (Niëns & Brouwer, 2013). Medicines are vital to effective treatment outcomes; typically however, people have no choice but to resort to obtaining their medication from the private sector since free quality medicines are not usually available in public health facilities. Also, the community pharmacies offer the additional benefit of less waiting times, proximity and flexibility in payment in some instance.

The issue of affordability is stressed since private sector prices of medicines are usually higher, yet still has to be considered alongside an individual's basic. In

measuring the affordability of medicines in this study, the cost of medication paid for is compared to the daily wage of the lowest paid unskilled government worker – which in this study was equated to the current minimum wage of GHC8.00 (GOG, 2016) in Ghana. The obtained values give a measure of affordability which is acceptable if a day's wage or less is needed for a full course of treating an acute condition or a month's supply of medication for chronic illnesses (Stone, 1999).

Affordability studies conducted in Sudan by Kheder (2014) reports that 53% of selected standard treatments cost a day's wage or less in private pharmacies whilst 4.1 wages was needed to treat a family with a hypertensive father, asthmatic child and a mother with upper respiratory tract infection in a month.

In similar work conducted on a national scale, surveyed treatments cost less than a day's wage (Arhinful, 2009). Likewise, 88.9% of common adult conditions surveyed in the Builsa district requires 1.67 of a day's wage and less than a day's wage for treating children (Nyanwura & Esena, 2013).

2.7 Patient care indicators

These indicators assess the experience of patients in pharmacies and how well they have been prepared to deal with pharmaceuticals that have been prescribed and dispensed. Parameters looked out for include average number of medicines purchased, number of prescription medicines purchased without prescription, percentage of drugs actually labeled and patients' knowledge of correct dosage (Matsoso Precious, Velasques German, 2007).

Average number of medicines dispensed gives an indication of the degree of polypharmacy in the pharmacy. Polypharmacy takes place when more than required medicines are used by patients usually five or more. For instance, the use of cough preparations, antibiotics, analgesics and multivitamins for an upper respiratory infection. It has been estimated that 30% -40% of elderly patients with co-existing morbidities tend to take five or more medicines (NPS, 2000). Prescribers who double up as dispensers promote polypharmacy for profit motives. Polypharmacy increases irrational use of medicines since patients may either forget to take some of the medicines or be confused about their usage. Worse still, the experience of side-effects may result in total non-compliance. In a prescribing study conducted in Ethiopia, the mean number of medicines prescribed was 1.9 (SD 0.91). This is more acceptable than the mean number of 3.7 reported by Afriyie, 2014 in a prescribing indicator study in the Police Hospital in Ghana. Also Ahiabu et al., 2015 reported an average of 4 medicines prescribed in a study conducted in primary healthcare facilities in the Eastern region of Ghana.

In a developing country like Ghana, about 40% of the population is not literate, and hence it is essential that medicines are appropriately labeled and appropriate instructions given to suit the needs of such patients (Marfo, Owusu-Daaku, & Kyerewaa-Akromah, 2013)

In a study by Marfo et al., (2013) to assess the quality of labeling and patient knowledge of the administration of medicines dispensed from a community pharmacy in Ghana, 91% (254 of a total of 280) of labels on dispensed medicines examined were required to have a cautionary or advisory label but only 33% (88) had them. In the same study, 63% (177) knew the name of their medicines while 57 % (159) knew

the duration of their therapy. In addition, 50% (140) patients knew of precautions they needed to observe while taking their medications. With regard to the overall knowledge score, 23% (64) patients were graded excellent as being able to recall all the six aspects of labelling the study assessed.

The poor labeling reported by Marfo et al., (2013) is a decline from results reported by the MOH, (2009) after the country wide pharmaceutical survey where the percentage of medicines adequately labeled was 78.1% and 62.3% at public health facility dispensaries and at private pharmacies respectively. Similarly, approximately one in seven clients -14.3% and one in four clients -25%- in the public and private dispensaries did not know how to take their medications.

More so, a cross-sectional study aimed at evaluating the drug use pattern in private and public health sectors in Wolkite, a town in South West Ethiopia produced results comparable to that obtained by (Marfo et al., 2013) . 53.1 % (274) dispensed drugs were adequately labeled in private drug retail outlets as compared to 69% (457) in the public pharmacies. Also, 54% (278) of patients in the private and 44% (292) patients in public drug retail outlets had adequate knowledge of drug instructions (Tsega, Ergetie, & Berhane, 2012).

The call for effective counseling of patients on their dosage regimen has been at the heart of pharmacy practice and pharmaceutical care. Counseling not only improves knowledge and by extension compliance but also eliminates or reduces potential complications due to ineffective treatment outcomes. Compliance rates can therefore be affected by the quality of labeling and time spent on patient counseling, thereby improving or otherwise the rational use of medicines. Prolongation of dispensing time is thus an essential stride toward improving patient care. Short dispensing time <60 s

is not sufficient to explain dosage regimen, adverse effects of drugs, all precautions, and actually label and dispense a drug.

Nonetheless, this was observed in a study conducted using WHO/INRUD indicators in ten public health care dispensaries in Egypt where an average dispensing time of 47.4s was reported (O. A. Akl, El Mahalli, Elkahky, & Salem, 2014). Comparable results were recorded by Tsega et al., (2012) with average dispensing times of 17.5 seconds in the private and 11.1 seconds in public drug retail outlets.

2.8 Medicines use

“Drug use in developing countries has frequently been described as irrational” (Smith 2004, p. 235) - in a report of studies evaluating pharmacy practice in Ghana. It is subject to a host of factors, a prominent one being the influence of cultural outlooks or perceptions and individual health beliefs of health and drug therapy.

Anecdotal evidence suggests that people believe the assistance of medicines is needed to fight every disorder so much so that the body is not trusted to fight even diarrhea and common cold which are self-limiting. Medicines are taken not only at the start of an illness but for preventive purposes. Evidence of this is noticed in increasing drug sales of vitamins and other food supplements which are patronized due to the perception of disease prevention by taking them (Hardon, Hodgkin, & Fresle, 2004).

People’s choice of medicine and its source depends largely on the perceived cause and severity of the disease.

In Ghana, for example, people consider heat to be the main cause of measles.

Heat also causes constipation and stomach sores in children. To treat measles

people use Septrin (cotrimoxazole) syrup, multivitamin syrup, calamine lotion, akpeteshie (local gin) and a herbal concoction given as an enema to ‘flush out’ the heat (Hardon et al., 2004 ,p.8). .

Studies on drug use show a clear trend in drug use culture in communities. People share the view that a set of medicines are routinely used to treat most simple ailments and would demand for them in their local private drug outlets (Hardon et al., 2004).

For example, in Ghana, most people acknowledge artemisinin-based combination therapies (ACTs) for malaria and buy it from their community pharmacies at the sign of fever and loss of appetite.

Again, most drug use studies show people would rather rely on private and unofficial channels than on public health facilities for their medicinal needs (Hardon et al., 2004). They would therefore purchase medicines from these outlets without prescriptions. In a study conducted by Garofalo, Di Giuseppe, & Angelillo, (2015), in which they assessed the determinants of oral medication use without prescriptions, 84.1% of participants self-medicated because they considered the illness too mild and therefore did not need the services of a doctor. Of this, 32.9% said they refilled old prescriptions. 65.6% of respondents had inappropriately self-medicated at least once in the 12-month period.

Factors influencing consumers’ choice of where to obtain their medicines are previous practice, distance and cost of transportation, stigma associated with visiting formal health facilities, considerations of health and family and available information. Likely sources of information apart from package inserts which are not always available are radio and television programmes, educational sessions organized as part of primary

health care programmes, community health workers , drug sellers in small shops or markets , traditional healers who have incorporated pharmaceuticals into their therapeutic regimes, magazines, newspapers and comics, re-used prescriptions and popular health books advertisements.

2. 9 Regulatory environment

The practice of pharmacy is regulated by the Pharmacy Council, an agency of the Ministry of Health. The Council derives its mandate from the Health Profession's Regulatory Bodies Act (HPRBA) - Act 857. The Act outlines procedures and standards for training and licensing of pharmacists and other members of the pharmaceutical care team such as pharmacy technicians.

Act 857 requires the presence of a pharmacist in pharmacies at all times that it is opened to the public. The Act again mandates the pharmacist to give medical aid for simple ailments of common occurrence (HPRBA, 2013). The extent to which this mandate can be carried is not defined, although one can generally assume that such recommendations should not involve prescription only medicines.

Irrational prescribing is a consequence of an inadequacy in the availability and accessibility of properly trained personnel. The lack of appropriately trained personnel leads to irrational prescribing by untrained personnel. Moreover, the success of RUM promotion is hinged on qualified and competent personnel carrying executing the RUM core components.

In the pharmaceutical survey by MOH (2009), a pharmacist was present in 61.1% and 34.3% of public dispensaries and private pharmacies respectively; mostly, pharmacy

aides and assistants were doing the dispensing and counseling if any of patients / clients. This is an indication that the law concerning the presence of a pharmacist in the pharmacy when it is opened to the public is not adhered to particularly in the private sector.

Again, the drugs policy makes mandatory the prescribing of medicines by generic name and generic substitution in both the public and private sectors, however, enforcement of the policy is poor especially in the private sector.

2.10 Community pharmacy practice

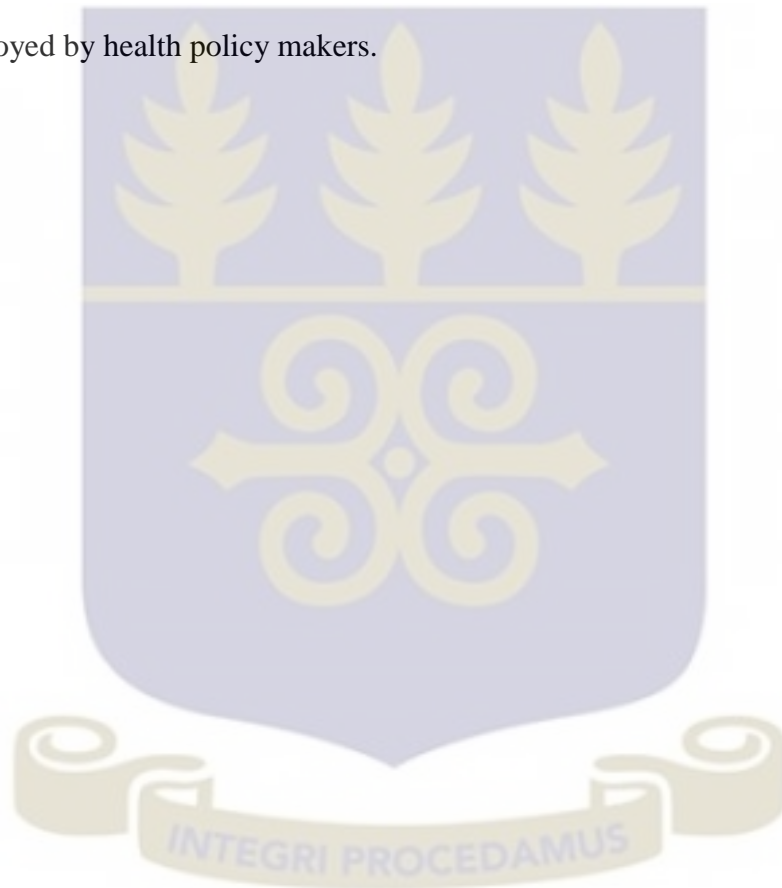
Community pharmacies serve society's need for both medicinal products and pharmaceutical services. Community pharmacies are considered as the most accessible and economical source of health care delivery. Keeping in view the importance of community pharmacies and their outreach to patients, many developing countries have optimized this area of health care services in a way to ensure the safe and effective use of drugs. However, community pharmacy is a blend of professional services within the context of a business enterprise (Ali & Khan, 2015)

It is widely believed that pharmacists could make a greater contribution to the provision of primary health care, especially in developing countries. Particular strengths of pharmacy services commonly cited include their accessibility within many communities and the opportunities for advising on the management of health problems. The potential for pharmacy to respond to health care needs and contribute to specific health policy objectives is receiving greater prominence both

internationally and in individual countries. However, despite this widely acknowledged potential, development of the practice has been limited.

2.11 Conclusion

Sufficient consideration should be given to monitoring interconnections between medicines, their availability, financing, health information, human resource and service delivery. This will enable better health systems strengthening interventions to be employed by health policy makers.



CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter provides an in-depth account of the study purpose, design, site, and setting. Details of sampling and data collection methods used are provided as well as the analysis employed. It also reports on quality assurance and ethical considerations.

3.2 Study design

A descriptive cross sectional study was employed in this study using quantitative approach to evaluate access, quality and rational use of medicines. The study was conducted adapting the WHO operational package for assessing, monitoring and evaluating country pharmaceutical situations. Prospective data was collected with strategies of enquiry being WHO level II facility-based core drug use structured questionnaires for exit interviews and facility indicators to measure access, quality and patient care practices in private drug outlets (Matsoso Precious, Velasques German, 2007).

3.3 Study area

The study was conducted in the Ledzokuku-Krowor Municipal Assembly (LEKMA). The municipal assembly was established on 1st November, 2007 under the Legislative Instrument -LI 1865. The Municipal is part of the sixteen (16) Municipalities in the Greater Accra Region of Ghana and has its Administrative Capital at Nungua. It is

bordered on the north by Accra Metropolitan Assembly, on the east by Tema Metropolitan Assembly, on the West by La Dade Kotopon and on the south by the Gulf of Guinea as shown in Figure 3.1 below (Ghana Statistical Service, 2014).

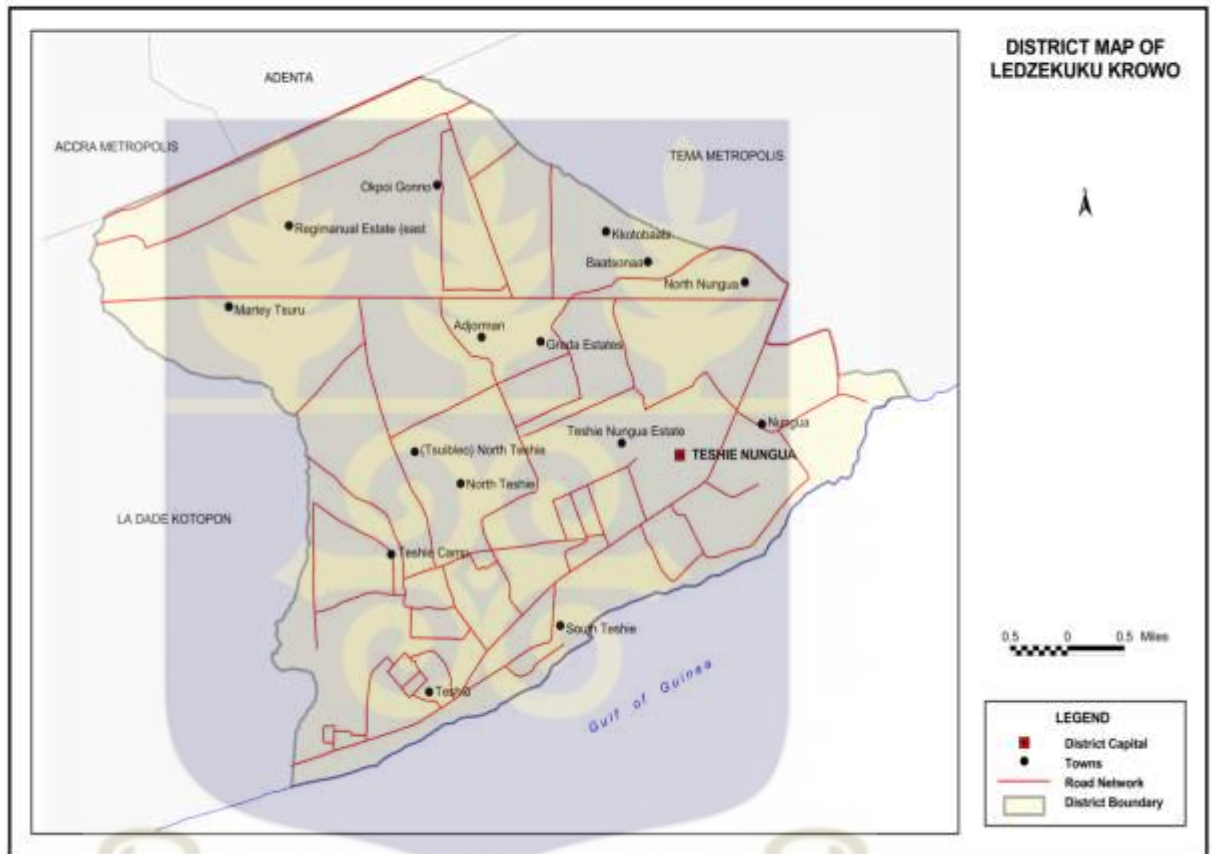


Figure 3.1: Map of Ledzokuku-Krowor municipality (Adapted from Ghana Statistical Service, 2014)

3.3.1 Demography

The eighty-two (82) communities in the municipality cover an estimated total land area of 50 square kilometers with a population of is 227,932 according to the 2010 Population and Housing Census. This represents 5.7% of the region’s total

population. Males constitute 47.9% and females 52.1% (Ghana Statistical Service, 2014).

3.3.2 Municipal economy

19% and 28% of the working class are low and high income earners respectively whilst majority – 53% are middle income earners. Fishing and trading are other economic activities within the Municipality since it is a coastal area which shares boundary with the Gulf of Guinea.

3.3.3 Health facilities in the municipality

LEKMA has a total of 16 health facilities made up of 3 hospitals, 11 clinics and 2 health centres/posts which are government, quasi-government, mission and private facilities. There are seventy- seven (77) community pharmacies in the municipality which are fairly distributed across the municipality (Pharmacy Council, 2015).

3.4 Study population

The study population comprised all retail pharmacies in the LEKMA associated with each public health and all clients who visited the community pharmacies for their medication needs and were willing to participate in the study.

3.5 Sampling

3.5.1 Sample size determination

To obtain a representative sample on RUM from community pharmacies, the WHO/INRUD recommends that you first identify the major public health facility within the district/municipality. If the municipality is large and there is more than one public facility, you categorize the public facilities under geographical areas. For each public facility within a geographical area, you identify retail outlets (i.e. community pharmacies). Next you select two retail outlets for client exit interviews and facility indicators within the retail outlet (Matsoso Precious, Velasques German, 2007).

For this study, three main public health facilities were identified. Following the recommendation, two community pharmacies closer to the public health facilities were randomly selected making a total of 6 community pharmacies. For each community pharmacy, 30 client exit interviews were conducted (total of 180 for the 6 pharmacies). Facility indicator data were also collected from the 6 pharmacies. The detailed random sampling procedure is explained subsequently.

3.5.2 Sampling and recruitment of respondents

Stratified sampling was employed for the study;

At the first level, three (3) public health facilities used as reference points were purposively sampled with the first being the main municipal hospital, then the municipal polyclinic and the community clinic. These fairly represent different levels of public healthcare provision.

At the second level, to obtain the six (6) community pharmacies,

- a) all retail pharmacies in the geographical area associated with each public health facility were listed according to proximate distance
- b) the closest pharmacy to each of the three public health facilities was purposively sampled
- c) the second community pharmacy was systematically sampled i.e. the remaining pharmacies were sequentially numbered from 1 to the last pharmacy on the list. A random number was then selected between 0 and 1 (i.e. 0.01-0.99) using computer generated random number table. This random number was multiplied by the number of retail outlets remaining on the list, rounding the number up to the next whole number. For instance, for the second pharmacy close to the LEKMA Hospital to be sampled, a random number of 0.56 was obtained and multiplied by the 23 pharmacies listed around it. The resulting 12.88 was rounded up to 13 and the pharmacy in the 13th position was sampled. This study provided that the pharmacy on the next consecutive *i*th position (14th position in this case) would be sampled to replace the originally sampled one should there a decline to consent.

The third level i.e. recruitment of the thirty (30) clients per community pharmacy- This was done by simple random sampling once they were willing to participate in the study (Matsoso Precious, Velasques German, 2007). Table 3.2 below gives a summary of the sampling done.

To eliminate the Hawthorn effect - where people modify or improve an aspect of their behavior in response to their awareness of being observed- that may arise, an

allowance of 5 more clients was studied in each facility but these were not included in the analysis of the data (Shojania, Duncan, McDonald, Wachter, & Markowitz, 2001).

Table 3. 1: Community pharmacies sampled for study

Pharmacy Code	Facility	Code Description	Code for clients sampled for Exit Interview
PH1-A	Prolife Pharmacy Ltd	Pharmacy closest to the major public health facility- LEKMA Hospital	PH1-A-EI-001 – PH1A-EI-030
PH2-A	Marisa & May Pharmacy Ltd	Pharmacy closest to the second public health facility- (LEKMA Polyclinic)	PH2-A-EI-001 – PH2-A-EI-030
PH3-A	Beach Road Pharmacy Ltd	Pharmacy closest to the third public health facility- Teshie Community Clinic	PH3-A-EI-001 – PH3-A-EI-030
PH1-B	Ernest Chemists Ltd	Second Pharmacy sampled in relation to the major public health facility- LEKMA Hospital	PH1-B-EI-001 – PH1B-EI-030
PH2-B	Samest Pharmacy Ltd	Second Pharmacy sampled in relation to the 2nd public health facility- LEKMA Polyclinic	PH2-B-EI-001 – PH2-B-EI-030
PH3-B	Health Consult Pharmacy Ltd	Second Pharmacy sampled in relation to the 3rd public health facility- Teshie Community Clinic	PH3-B-EI-001 – PH1-B-EI-030

3.6 Data collection

In the collection of prospective data from exit interviews, peak periods were made use of since most community pharmacies usually record high client attendance at those times. Peak periods were between 1000hrs GMT and 1400hrs for pharmacies closest to the public health facilities and between 1600hrs GMT and 2100hrs GMT for those farther away.

Exit interviews were conducted out of the earshot of workers in the pharmacy for clients leaving the dispensing area/pharmacy after they had bought medicines. This was done in a manner so as not to disrupt the normal activities of the pharmacies.

Facility indicator data in the six pharmacies was collected by direct observation with the use of checklists and interaction with the personnel in charge of the pharmacy.

Lastly, in depth interviews were conducted with the dispensing professional on duty at the time of data collection. These were both digitally and manually recorded

3.7 Data collection tools

WHO survey forms for level II facility-based indicators - which are structured questionnaires-applicable to private drug outlets - were adapted in this study. Level II health facility indicators make available systematic data that measure outcomes on access and rational use of quality medicines as well as giving signal of the quality of medicines stocked in pharmacies. A basket of 15 essential tracer medicines was developed to check the availability of key medicines. This was done by blending the WHO model list of key drugs with essential medicines used in treating five common disease conditions that present to pharmacies in the municipality (Matsoso Precious, Velasques German, 2007).

3.7.1 Study variables

The following are the variables in the study and the indicators measured.

3.7.1A Dependent/Outcome variable

Rational Use of Medicines

3.7.1B Independent variables

I. Access – relates to geographical accessibility – travel time and cost incurred in going to the pharmacy, the availability and affordability of key essential medicines for treating common infections in the municipality. Access to professional dispensing and counselling is also examined. The indicators used to measure this variable were;

- Travel time to the pharmacy
- Travel Cost to the Pharmacy
- Availability of key medicines
- Price of key medicines in stock
- Dispensing Personnel on duty

II. Quality – It is expensive to measure the actual quality of medicines through laboratory testing of samples. However, the presence of expired medicines on pharmacy shelves and adequate handling and conservation conditions are proxy indicators for the quality of medicines available to clients.

Proxy indicators for quality of medicines measured in the pharmacies were

- medicines expired on the shelves in pharmacies
- Adequacy of conservation conditions and handling of medicines in both storerooms and dispensaries of the pharmacies.

III. Patient care practices – This relates to dispensing practices and medicines use in the pharmacy. It included interviewing clients those who directly demanded for their medicines, those whose prescriptions were filled and those for whom medicines were prescribed by the pharmacy personnel. Indicators measuring this variable were

- Average number of medicines purchased
- medicines adequately labelled (name of medicine and how it should be taken)
- prescription medicines bought with no prescription
- patients know how to take medicines (patient knows dosage and duration of all dispensed medicines),
- Average cost of medicines bought (amount patient paid out-of-pocket for medicines).

IV. Other independent variables of interest measured were age and sex of patient, means to pharmacy, prescriptions presented and medicines bought by direct demand.

3.8 Data analysis

Data entered on the survey forms were checked for completeness and consistency. Coding used for each form was double checked prior to the transfer of each pharmacy's results onto the corresponding Summary Form. The data entered on the Survey Forms were calculated following the instructions specified by Matsoso Precious, Velasques German, (2006) as follows;

3.8.1 Access

- % travel time to the pharmacy was measured by dividing number of clients travelling to each pharmacy in the various duration

classifications by number of clients interviewed (n=30) multiplied by 100. Classification of access used were very low access if <50%, low to medium access for 50-80%, medium to high access for 81% -95% and very high access for >95% clients accessing the pharmacy in less than one hour

- Travel Cost to the Pharmacy was calculated by dividing the median cost of travel to each pharmacy by the total number of clients interviewed. This was expressed as the a ratio of the current daily wage of the lowest paid unskilled government worker – GHC 8.0
- % availability of key medicines was calculated by dividing number of medicines available out of the basket of 15 essential medicines by 15 multiplied by 100. Availability of individual medicines was calculated as a percentage (%) of pharmacies where the medicine was found. Mean availability is also reported for the overall basket of medicines surveyed. The availability data refer only to the day of data collection at each pharmacy and may not mirror average monthly or yearly availability of medicines at the pharmacies.
- Price of key medicines in stock was calculated by converting the median price for each medicine from GHC to \$ and expressing it as a ratio of a standard set of international reference prices (IRP) which is in \$. This is the median price ratio (MPR) which is set at < 2.5 for this study due to mark-ups along the supply chain although generally, an MPR of 1 or less indicates an efficient public sector procurement system. Conversion rate used -the average rate during the period of data collection- was **\$1.00 = GHC3.9639** (OANDA, 2016)

The ratio expresses how much higher or lower the local medicine price is than the IRP, e.g. an MPR of 2 implies the local medicine price is twice that of the international reference price. Median price ratios enable comparisons of data across countries.

The IPR used in this study is the 2014 Management Sciences for Health (MSH) reference prices. The MSH Guide consolidates frequently updated data from price lists of large, non-profit generic medicine suppliers and is always available and relatively stable. The prices do not usually include insurance or transportation charges (MSH/WHO, 2014).

3.8.2 Quality

- % medicines expired was calculated by dividing the number of expired medicines out of a basket of 15 essential medicines by 15 multiplied by 100. Optimum level was 100% for this indicator.
- % conservation conditions and handling of medicines was calculated by dividing the number of fulfilled conditions on the checklist by the total number of conditions on checklist multiplied by 100. Optimum level was 100% for this indicator.

3.8.3 Patient care practices

- Average number of medicines purchased was calculated by dividing the total number of individual medicines bought by interviewed clients by the number of interviewed clients multiplied by 100. This is an indication of polypharmacy and the optimal level was set at ≤ 3 for this study (Desalegn, 2013).

- % prescription medicines bought with no prescription was calculated by dividing the number of prescription medicines bought with no prescriptions by the number of prescription medicines purchased.
- % medicines adequately labelled was calculated by dividing the number of medicines adequately labelled (name of medicine and how it should be taken) by the number of medicines purchased by interview clients. Optimum level was 100% for this indicator.
- % patients' knowledge of correct dosage was calculated by dividing the number of patients who sufficiently stated the quantity, frequency and duration of dispensed medicines by the number of dispensed medicines. Optimum level for this indicator was 100%.
- Average cost of medicines bought was calculated by dividing the median amount patient paid out-of-pocket for medicines bought by the total number of clients interviewed in each. This was expressed as a ratio of the current daily wage of the lowest paid government worker.

Since means can be skewed by outlying values, median values have been used in this analysis as a better representation of the midpoint value.

Data was also entered into Excel and imported for analysis into Stata version 13. The coded variables were then labelled appropriately and commands issued to obtain descriptive statistics such as percentages, percentiles, mean, median, and standard deviation. A p-value of 0.05 was assumed for statistical significance.

An optimal index of 1 was defined for each categorical variable. The closer to 1 a variable score is, the better the pharmacy's performance in terms of access, quality and patient care practices. Then a total index of rational facility-specific drug use

(IRFSDU) was calculated for each pharmacy by summing up the indices. This permits comparison of rational use of quality medicines activities within community pharmacies for benchmarking (Akl, El Mahalli, Elkahky, & Salem, 2014).

3.9 Ethical considerations

Ethical Clearance was sought from the Ghana Health Service Ethics Review Committee. Permission of superintendent pharmacists or personnel in charge of community pharmacies was sought, prior to the commencement of the study.

The procedure for the exit interview was clarified to each respondent by the principal investigator/ research assistant. Respondents appended their signature/thumbprint to a consent form. Participants who did not understand the English language were interviewed in Ga, Twi or Ewe after a thorough explanation of the procedure.

Respondents were informed of the choice to withdraw from the research before or at any time during the interview if they were uncomfortable with the line of questioning. They were also assured of no risks for being part of the study apart from the inconvenience of time and the answering of some questions which may appear personal.

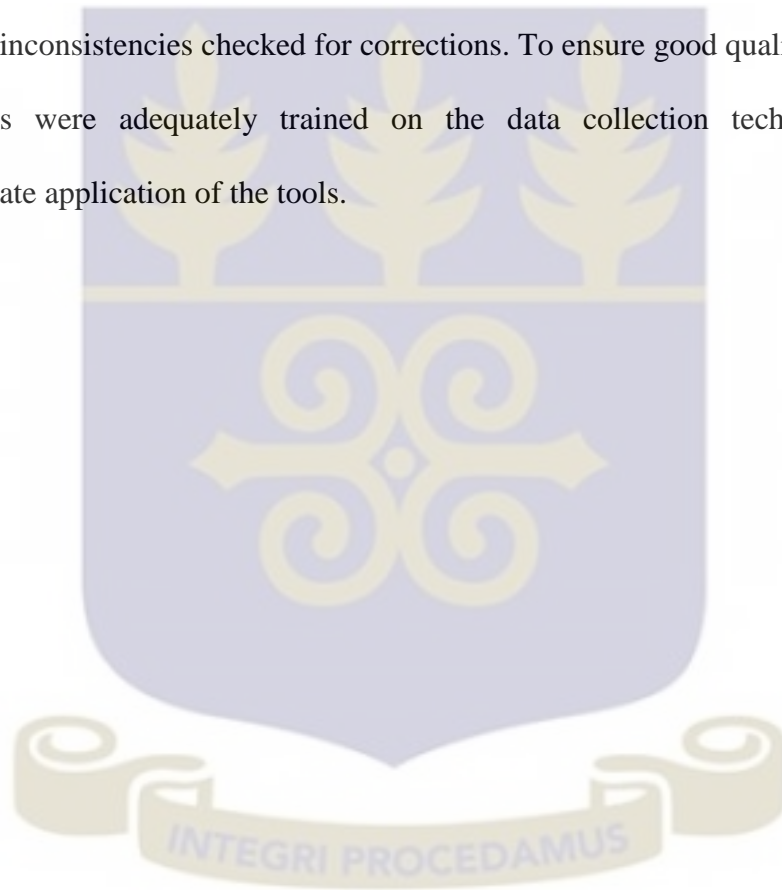
There were no direct benefits to participants for participating in the study. Indirectly however, it is hoped that information from this study will help advance pharmaceutical service delivery in the municipality.

All participants were assured of confidentiality and anonymity; all recordings made during the data collection are for the purposes of this research and is accessible only to the research team. Safe keeping of data is assured on completion of the study.

3.10 Quality assurance

A pre-test was conducted before the actual study to ensure that the tools elicit appropriate responses and necessary modifications done. Questions were sufficiently translated into the local language as the case may be to ensure adequate understanding by respondents. Pharmacies included in the pre-test were not part of the actual study.

All completed questionnaires were checked on the field by the principal investigator and any inconsistencies checked for corrections. To ensure good quality data, research assistants were adequately trained on the data collection techniques and the appropriate application of the tools.



CHAPTER 4

RESULTS

4.1 Introduction

In this chapter, results from questionnaire surveys are presented. These consist of exit interviews conducted on clients leaving the sampled community pharmacies and indicators measured from the pharmacies and professional on duty at the time of data collection. Background characteristics are presented foremost and the rest as per each specific objective.

4.1: Background information

Majority of patients intended to take the medications bought were females, accounting for 53.3% (96) of the respondents. Patients aged between 5 and 14 were the least- 5.6% (10) whilst those aged 30 – 59 were the highest -46.7% (84). Children aged less than 5 years formed 10% (18) of the patients as shown in the table 4.1 below.



Table 4.1A: General characteristics of respondents

	PH1-A	PH2-A	PH3-A	PH1-B	PH2-B	PH3-B	Total	Pearson's χ^2	P
	n=30	n=30	n=30	n=30	n=30	n=30	n=180		
Background Information - No. (%)									
Sex									
								4.286	0.509
Male	12 (14.3)	16 (19.1)	16 (19.1)	16 (19.1)	14 (14.7)	10 (11.9)	84(46.7) (100)		
Female	18 (18.8)	14 (14.6)	14 (14.6)	14 (14.6)	16 (16.7)	20 (20.8)	96(53.3) (100)		
Age (yrs.)									
								28.819	0.091
< 5 yrs.	6 (33.3)	2 (11.1)	1 (5.6)	3 (16.6)	1 (5.6)	5 (27.8)	18(10.0) (100)		
5 – 14	1 (10.0)	1 (10.0)	2 (20.0)	1 (10.0)	4 (40.0)	1 (10.0)	10 (5.6) (100)		
15 – 29	7 (14.6)	13 (27.1)	5 (10.4)	6 (12.5)	12 (25.0)	10 (10.4)	48(26.7) (100)		
30-59	11 (13.1)	12 (14.3)	16 (19.1)	16 (19.1)	11 (13.1)	18 (21.4)	84(46.7) (100)		
> 60	5 (25.0)	2 (10.0)	6 (30.0)	4 (20.0)	2 (10.0)	1 (5.0)	20 (11.1) (100)		

Table 4.1B below shows that majority of clients i.e. 64.4% (116) walked to the pharmacies and the waiting time before being attended to was less than 10minutes for 93.9% (169) of them. Clients who presented to the pharmacy with a prescription were 32% (40) and 67.8% (122) of clients were supplied medicines specified by themselves.

Table 4.1B: Characteristics of respondents

	PH1- A	PH2- A	PH3- A	PH1- B	PH2- B	PH3- B	Total	Pearson's χ^2	P
	n=30	n=30	n=30	n=30	n=30	n=30	n=180		
Means to facility								57.59	<0.001
Walking	17 (14.7)	22 (19.0)	24 (20.7)	13 (11.2)	24 (20.7)	16 (13.8)	116 (64.4) (100)		
Cycling	0	2 (22.2)	0 (0)	1 (11.1)	3 (33.3)	3 (33.3)	9 (5.0) (100)		
Public Transport	8 (44.4)	0	6 (33.3)	0	2 (11.1)	2 (11.1)	18(10.0) (100)		
Private Transport	5 (13.5)	6 (16.2)	0	16 (43.2)	1 (2.7)	9 (24.3)	37(20.6) (100)		
Waiting time								7.4556	0.189
< 10 minutes	26 (15.4)	28 (16.6)	30 (17.8)	28 (16.6)	30 (17.8)	27 (16.0)	169 (93.9) (100)		
10-20 min	4 (36.4)	2 (18.2)	0	2 (18.2)	0	3 (27.3)	11 (5.1) (100)		
Prescription								33.429	<0.001
No	13 (9.3)	27 (19.3)	30 (21.4)	24 (17.1)	25 (17.9)	21 (15.0)	140 (77.8) (100)		
Yes	17 (42.5)	3 (8.0)	0	6 (15.0)	5 (12.5)	9 (22.5)	40 (32.2) (100)		
Medication specified by client								23.098	<0.001
No	19 (32.8)	6 (10.3)	3 (5.2)	9 (15.5)	9 (15.5)	12 (20.7)	58 (32.2) (100)		
Yes	11 (9.0)	24 (19.7)	27 (22.1)	21 (17.2)	21 (17.2)	18 (14.6)	122 (67.8) (100)		

4.2 Access

Table 4.2 provides a summary of key access indicators used in the survey. Travel time to the pharmacies was less than 30 minutes for 92.2 % (166) of clients whilst 1.1% (2) clients took more than an hour to get to the pharmacy. Only one out of the six

pharmacies did not have a professional dispensing at the time of data collection. A pharmacy aide was dispensing. Again only one out of the six pharmacies had in stock all the medicines in the basket of 15 selected essential medicines. The results show that all six pharmacies had available most (at least 13) for treating common conditions.

Table 4.2: Access indicators

	PH1-A	PH2-A	PH3-A	PH1-B	PH2-B	PH3-B	Total
Geographical accessibility							
Travel time							
< 30 mins	22 (13.3)	28 (16.9)	29 (17.5)	28 (16.9)	29 (17.5)	30 (18.1)	166(92.2) (100)
31 mins- 1hr	7 (58.3)	2 (16.7)	1 (8.3)	1 (8.3)	1 (8.3)	0	12 (6.7) (100)
>1 hr.	1 (50.0)	0	0	1 (50.0)	0	0	2 (1.1) (100)
Availability							
Dispensing personnel on duty (0=No, 1=Yes)							
Pharmacist	1	0	1	1	1	1	
Pharmacy Aide	0	1	0	0	0	0	
% Medicines in stock							
n=15	15 (100.)	14 (93.3)	13 (86.7)	13 (86.7)	13 (86.7)	14 (93.3)	

Altogether, the mean travel cost to a pharmacy was 3.34 with a standard deviation of 7.19. The affordability of travel cost estimated as the number of days wage of the lowest paid government worker was 0.42. This means that 0.42 of the daily wage is

needed as cost of transportation to the pharmacy. The median amount was 0 implying that more than half of the clients walked to the pharmacy.

Table 4.3: Travel cost to the pharmacy

Pharmacy Code	Mean (GHS) (n=30)	Standard deviation	Lower quantile	Median	Upper quantile	Ratio of mean travel cost to the current minimum daily wage of GHS 8
PH1-A	6.02	9.24	0	1.1	8	0.75
PH2-A	3.33	7.58	0	0	0	0.42
PH3-A	0.53	0.99	0	0	1	0.07
PH1-B	7	10.95	0	0.5	10	0.86
PH2-B	0.52	0.77	0	0	1	0.07
PH3-B	2.63	4.1	0	0	4	0.33
Total	3.34	7.19	0	0	2.15	0.42

Daily wage of lowest paid unskilled government worker – GHC 8.0

A tablet each of Artesunate-Amodiaquin and Artemether Lumefantrine were being sold at MPRs of 0.13 and 0.4 respectively, implying that they were being sold for far less -0.13times and 0.4 times respectively- than the IPR; Ceftriaxone 500mg IM/IV which was the least available medicine however had the highest MPR of 26.11. The mean percentage availability of all medicines was 92.2. Eleven (73.3%) essential medicines were available in all the community pharmacies. The details are shown in Table 4.4 below.

Table 4.4: Median Price Ratio of 15 essential medicines

No	Medicine	% Availability	Mean Price (GHC)	S.D	Median Price (GHC)	Median Price (\$)	Median IRP (\$)	MPR
1	Artemether- Lumefantrine 20mg/120mg tab	100	0.29	0.12	0.27	0.0681	0.1703	0.4
2	Artesunate-Amodiaquine tab	66.7	0.35	0.29	0.13	0.0328	0.2434	0.13
3	Oral Rehydration Salt (ORS)	100	0.77	0.11	0.7	0.1765	0.1068	1.65
4	Zinc 10mg tab	83.3	0.04	0.01	0.05	0.0126	0.0072	1.75
5	Amoxicillin-Clavulanic acid 625mg tab	100	1.91	0.34	1.85	0.4666	0.2	2.33
6	Ceftriaxone inj. 500mg im/iv	50	81.67	2.89	80	20.1765	0.766	26.11
7	Ciprofloxacin 500mg cap/tab	100	0.37	0.09	0.3	0.0757	0.043	1.76
8	Mebendazole 500mg tab	100	5.58	2.69	6	1.5132	0.2355	6.43
9	Diclofenac 50mg cap/tab	100	0.3	0.25	0.2	0.0504	0.0067	7.52
10	Ferrous Sulphate tab	100	0.1	0.12	0.03	0.0076	0.0029	2.62
11	Omeprazole 20 mg cap/tab	100	0.39	0.32	0.3	0.0757	0.018	4.21
12	Paracetamol 25mg/ml syrup/susp	100	0.03	0.1	0.04	0.0101	0.0054	1.87
13	Magnesium Trisilicate tab	100	0.2	0.04	0.2	0.0504	0.004	12.6
14	Salbutamol 0.1 mg/dose inhaler	100	0.11	0.02	0.1	0.0252	0.0105	2.4
15	Gentian violet	83.3	1.8	0.27	2	0.5044	0.1236	4.08
Mean Availability of medicines		92.2						

IRP-International Reference Price

MPR- Median Price Ratio

4.3 Quality of medicines

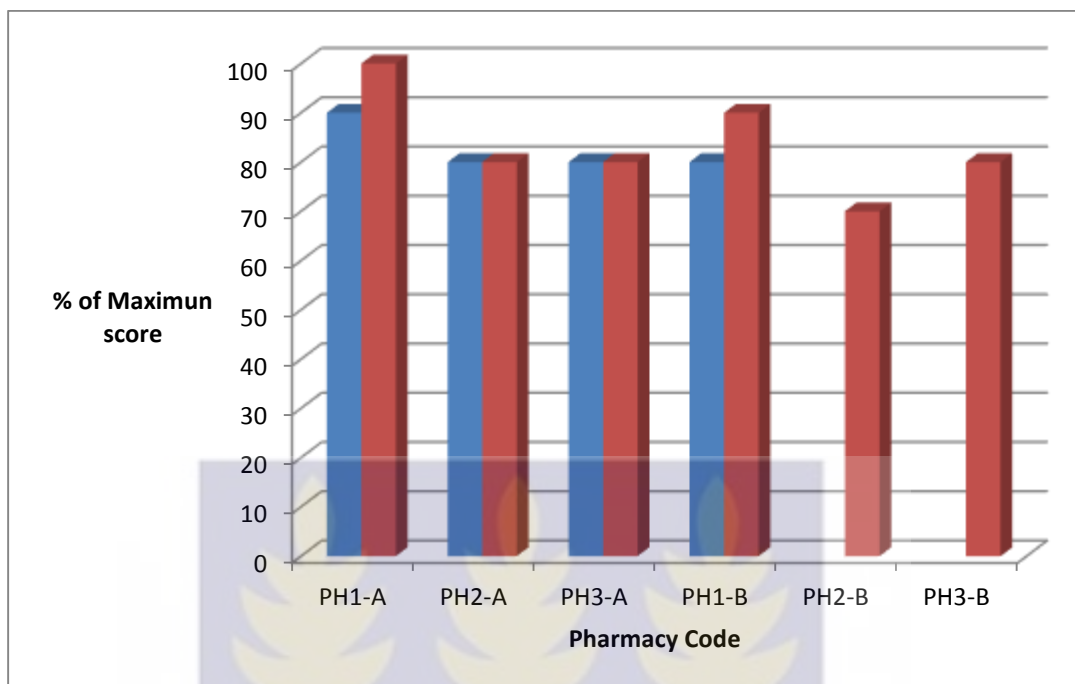
The result for proxy indicators of quality of medicines available to client are presented in table 4.5. No expired medicines were found in any of the pharmacies.

Fig. 4.1 shows the score of storage conditions in dispensaries and storerooms of the pharmacies surveyed. PH2-B and PH3-B did not have storerooms.

Table 4.5: Indicators for quality of medicines stocked

Pharmacy Code	% medicines expired	% Score of conservation condition in storeroom	% Score of conservation condition in dispensary
PH1-A	0	90	100
PH2-A	0	80	80
PH3-A	0	80	80
PH1-B	0	80	90
PH2-B	0	-	70
PH3-B	0	-	80
Median	0	80	80





Blue- Score of conservation condition in storeroom; Red - Score of conservation condition in dispensary

Figure 4.1: Score of storage and handling conditions in storerooms and dispensaries.

4.4 Patient care practices

Table 4.6 shows that the average number of medicines bought was 1.39 and majority (60.83) of prescription medicines bought was without prescription. It was also observed that though only 58.9% of all medicines bought were adequately labelled, 88.2% knew how to take their medications. This comparison is shown in figure 4-3.

The mean and median cost of medicines incurred by a patient was GHC 16.36 and 6.00 respectively with a ratio of 0.75 to the MDW indicating that most people used 0.75 times the daily salary of the lowest paid government worker to purchase medicines. On adjusting for outliers, the mean, median and ratio to the MDW was GHC 13.93, GHC 5.8 and 0.73 respectively.

Results for indicators measuring patient care and dispensing practices are presented in table 4.6 below.

Table 4.6: Indicators for patient care practices

Indicator	PH1-A	PH2-A	PH3-A	PH1-B	PH2-B	PH3-B	TOTAL
Average number of medicines purchased : n=30							
Mean	1.53	1.2	1.2	1.37	1.43	1.63	1.39
(SD)	(0.71)	(0.48)	(0.61)	(0.61)	(0.68)	(1.07)	(0.75)
Median	1	1	1	1	1	1	1
% prescription medicines bought without prescription							
	26.7	90.9	100	68.8	44.4	66.7	60.83
% medicines adequately labelled							
	58.7	69.4	33.33	56.1	76.7	57.1	58.9
% patients know how to take medicines: n=30							
No	4	0	6	3	4	6	23 (12.8)
	(17.39)		(26.09)	(13.04)	(17.39)	(26.09)	(100)
Yes	26	30	24	27	26	24	157(88.2)
	(16.56)	(19.11)	(15.29)	(17.20)	(16.56)	(15.29)	(100)
Average cost of medicines: n=30							
Mean	11.53	12.15	7.4	28.31	11.46	27.29	16.36
(SD)	(16.48)	(24.19)	(13.25)	(54.59)	(14.35)	(35.41)	(30.90)
Median	4	3.75	3	11.6	8.25	15	6
Ratio of Median cost to MDW	0.5	0.47	0.38	1.45	1.03	1.88	0.75
Average cost of medicines: n=28 (Eliminating Outliers of n=2)							
Mean (SD)	8.16	6.19	4.18	17.72	8.25	20.13	13.93
	(10.6)	(8.39)	(3.94)	(18.12)	(6.17)	(21.11)	(19.5)
Median	4	3.5	3	10.6	7.65	14.5	5.8
Ratio of Median cost to MDW	0.5	0.44	0.38	1.33	0.96	1.81	0.73

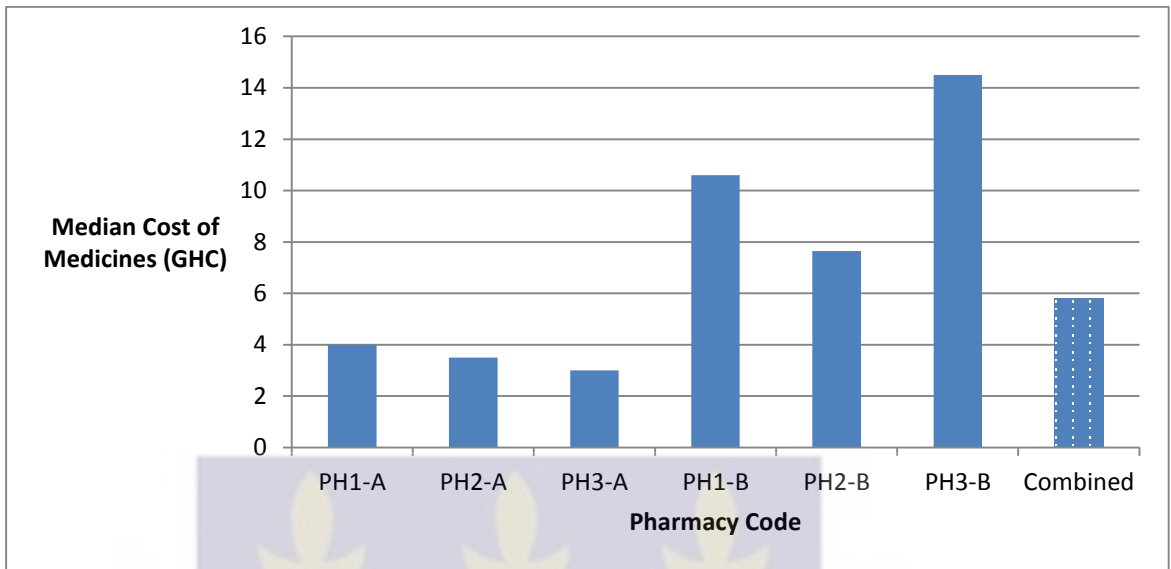


Figure 4.2: A comparison of median cost of medicines bought in the community pharmacies

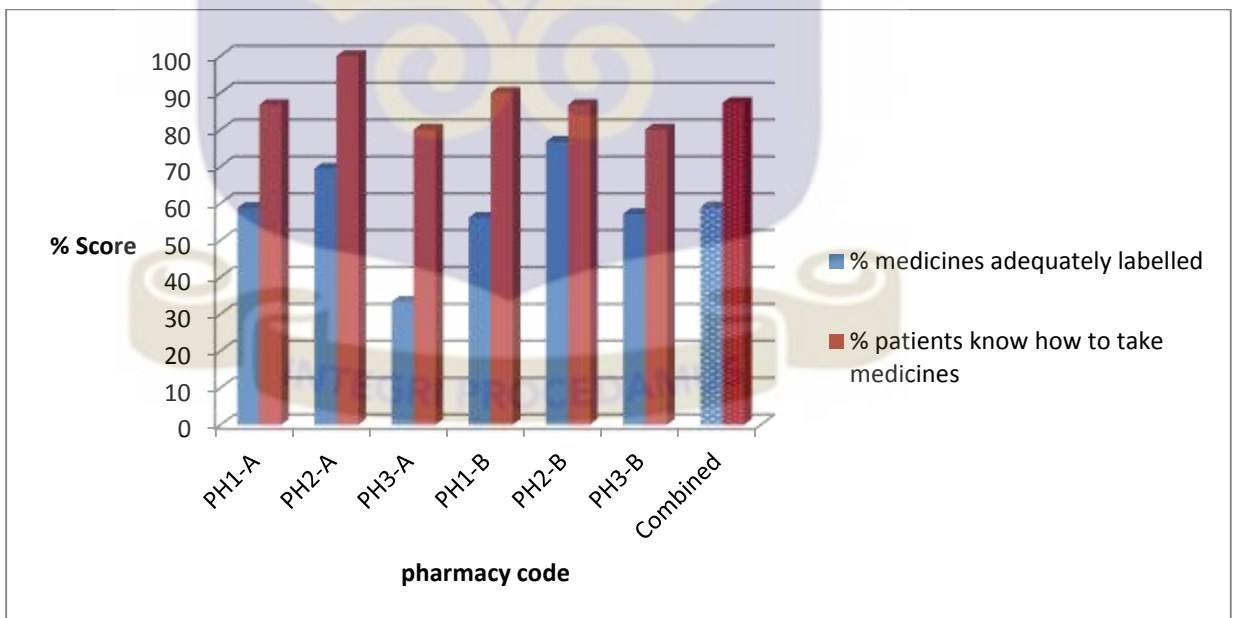


Figure 4.3: A graph comparing medicines adequately labelled to clients who knew how to take their medicines.

Table 4.7: Indices of level II facility-based core outcome indicators

Indicators	Optimal level	Optimal Index
Access		
%People traveling within 1hr to Pharmacy	>95	1
% Availability of Key medicines	100%	1
Availability of pharmacist	Yes	1
Quality		
% medicines not expired on shelves	100%	1
% adequacy of conservation conditions in dispensary	100%	1
Medicines Use		
Average no of medicines purchased	≤ 3	1
% prescriptions adequately labelled	100	1
% patients knowing how to take medicines	100	1

The pharmacy with the highest cumulative score of indicators was PH1-A whilst the one with the least score was PH2-A. The median score for all the facilities was 7.16 as shown in Table 4.8.



Table 4.8: Measurement of indices of access, quality and patient care practices in 6 community pharmacies in **LEKMA**

Indicators	PH1-A	PH2-A	PH3-A	PH1-B	PH2-B	PH3-B
Access						
% Travel time within 1hr to Pharmacy	1	1	1	1	1	1
% Availability of Key medicines	1	0.93	0.87	0.87	0.87	0.93
Availability of pharmacist	1	0	1	1	1	1
Total	3	1.09	2.87	2.87	2.87	2.93
Rank	1	4	3	3	3	2
Quality						
% medicines not expired on shelves	1	1	1	1	1	1
% adequacy of conservation conditions in dispensary	1	0.8	0.8	0.9	0.7	0.8
Total	2	1.8	1.8	1.9	1.7	1.8
Rank	1	3	3	2	4	3
Patient care practices						
Average no of medicines purchased	1	1	1	1	1	1
% prescriptions adequately labelled	0.59	0.69	0.33	0.56	0.77	0.57
% patients knowing how to take medicines	0.87	1	0.8	0.9	0.87	0.8
Total	2.46	2.69	2.13	2.46	2.64	2.37
Rank	3	1	5	3	2	4
Total IRFSDU	7.46	5.58	6.8	7.23	7.21	7.1
Rank	1	6	5	2	3	4

CHAPTER 5

DISCUSSION

In this chapter, the results pertaining to the three specific objectives have been analyzed within the framework of existing literature. Results of other studies conducted relating to the indicators were employed in the discussion to determine consistencies or contrasts with the study results obtained while submitting possible explanations to observations made.

Community pharmacies remain the first port of call for the medication needs of people living around it as 77.8 % of patients did not present to the pharmacy with prescriptions and 67.8% of them specified medications to be bought. Majority of the clients interviewed walked to the pharmacy and over 90% of them waited less than ten minutes to be attended to. This underscores the importance of ensuring RUM in community pharmacies since convenience plays a major role in people resorting to obtain their first aid from pharmacies. The ratio of female to male patients in this study was 1: 1.14 whilst those aged between 30-59 years were in the majority. High significance ($p < 0.001$) was observed for the indicators “waiting time, presentation of prescription and Medicine specified by client”.

A significant majority (98.89%) of clients accessed the community pharmacies within one hour, indicating a very high geographical access (Matsoso Precious, Velasques German, 2006). This is consistent with the results obtained by Arhinful K. D, (2009) in a WHO pharmaceutical situation assessment in Ghana where 100% of patients traveled under one hour to private dispensaries with average travel cost of 0.1 of minimum daily wage . In this study however, clients spent an average of 0.4 of the

minimum daily wage to travel to the pharmacy a fourfold increase in the observation made by Arhinful K. D (2009). This raises concerns of cost becoming a barrier to access to those who spend on travels to pharmacies though proximity may not be a problem. Nonetheless, travels to both pharmacies around the largest public health facility in the municipality recorded the highest ratios of 0.75 and 0.86 respectively. This may be an indication that patients had to spend more to travel for referral treatment as well as to fill prescriptions obtained after being diagnosed.

It is proposed that essential medicines should be available at all times within the framework of effective health systems in sufficient amounts. A median percentage availability of 90 was observed across all pharmacies for the basket of 15 essential medicines. This is higher as compared to results from earlier studies conducted in Ghana, Ethiopia and China where median percentage availability was 73.3, 72 and 53 respectively (Arhinful K., 2009; Jiang et al., 2013; Kebede, Kebebe Borga, & Mulisa Bobasa, 2015). Though availability observed here pertains to the day of observation and cannot be generalized as the prevailing situation, it is safe to attribute such improvement to increased distribution by wholesalers and increased generic manufacturing in Ghana. It is important to note that Artemether-Lumefantrine 20mg/120mg tab, Oral rehydration salt (ORS) and paracetamol syrup/suspension targeted at kids in the treatment of malaria and diarrhoea were available in all the pharmacies. This implies a life saving measure for children in the community.

Not only should essential medicines be available but they should be at prices that individuals can afford. The prices clients paid for lowest-priced generic medicines ranged from 0.13 times to 12.6 times international reference prices (IRP). The median MPR of 2.5 falls within the acceptable ratio set for this study and is low compared to

the MPR of 6.5 in developing countries reported by WHO (2003) but an improvement on pricing of approximately 3.5 reported by Arhinful (2009). This is satisfactory considering all costs that would have been incurred along the supply chain. An MPR of 26.11 was observed for Ceftriaxone 500mg IM injection and could be attributed to the fact that only the originator brand was available in the pharmacies that had it in stock. Both Artemether-Lumefantrine and Artesunate-Amodiaquine had MPRs less than 1. This observation may be the result of subsidies on anti-malarials or increased local manufacturing which eliminates some costs such as shipping and handling charges.

Irrespective of how rationally medicines are dispensed and used, treatment outcomes will be poor if the medicines are of low quality. There were no expired medicines on the shelves in the pharmacies which is consistent with the 2009 Ghana pharmaceutical situation survey where no expired medicines were found in pharmacies surveyed. Also WHO reported same in private pharmacies in eleven low income countries (Matsoso Precious, Velasques German, 2006). The mean percentage adequacy of 80% observed for conservation and handling conditions in dispensaries and storerooms is higher than that observed in a similar survey in Sudan - 56% and 65% respectively (Kheder & Ali, 2014). It is safe to assume in view of these proxy indicators that medicines sold in the pharmacies are of good quality. The close proximity to a secondary level health facility could account for PH1-A ensuring all the relevant conservation standards are observed thus having the highest percentage score of 100% in conservation conditions.

Direct demand for medicines by patients and advertisements on medicines are significant drivers of medicines use. Appropriate and adequate information on

medicines is needed to manage expectations of patients (Matsoso Precious, Velasques German, 2006).

The average number of medicines purchased was 1.39 with a standard deviation of 0.75. This is a measure of polypharmacy which is set at ≤ 3 . Considering that a majority of clients did not present prescriptions and a further majority of such clients directly demanded for the medicines bought indicates either most patients needed first aid or a refill of medications being already taken. Most studies measuring this indicator have done so in public dispensaries such as that conducted in Alexandria, Egypt where average number of medicines per encounter was 2.5 (Akl, et al., 2014) and in Ethiopia by Angamo, Wabe, & Raju, (2011) where they recorded mean number of medicines from dispensaries surveyed as 1.98 to 2.24. The relatively low finding by this study however presents the need for further enquiry to ascertain whether or not prescription medicines were being abused unnecessarily since 60.83% of all prescription medicines bought were without prescriptions –only a slight improvement from the 66.7% observed in 2009 (Arhinful, 2009). The availability of prescription medicines may be a result of lax regulation and encourage the practice of self-medication

The percentage of medicines adequately labelled was low-58.9%. The importance of adequate labelling to a patient should not be underestimated as clients to the pharmacy are sometimes not the final users of the medicines and may need to refer to labels to ensure effective treatment outcomes. This is a better observation than that reported in Egypt and Saudi Arabia by (O. a. Akl et al., 2014; El Mahalli, 2012) where 0% and 10% respectively. However other studies conducted in Nigeria and Indonesia reported 84.5% and 99% sufficient labelling of medicines (Abdulah et al.,

2014; Enato & Chima, 2011). The potential of drug misuse or abuse is increased by poor labelling.

Despite the relatively low percentage labelling, patient's knowledge of correct dosage was high-88.2%. The proposed optimal value for this study was 100%. Verbal instructions on dosage were practiced more whilst in other cases patients knew the right dose from repetitive usage of the medicine. This trend was observed similar studies conducted in Egypt and Saudi Arabia where the corresponding knowledge of correct dosage reported were 94% and 79.3% respectively. The trend was reversed in Indonesia where 88% of patients knew how to take their medicines when 99% had been adequately labelled. Compliance is influenced by patients' knowledge and pharmacists need to ensure they provide adequate information to patients. The presence of a pharmacist in all pharmacies surveyed except in PH2-A did not significantly increase the adequacy of labelling observed. There could be a gap between theory (knowledge of good dispensing practices) and application that needs to be addressed. Also, pharmacists could be engaged in other operational functions of the pharmacy hence neglecting the supervisory role they are expected to exercise on subordinate staff.

Although it is challenging to evaluate accurate affordability, treatments costing a day's wage or less (entire treatment cost for an acute ailment or a 30-day medicine supply for chronic conditions) are generally considered affordable (Jiang et al., 2013; Stone, 1999). The median cost of medicines purchased was 5.8 corresponding to 0.73 of the daily wage of the lowest paid government worker which is affordable. However, considering that this applies to patients who may have come for only first aid purposes, there is the potential for catastrophic spending for the poor family in

society in the incidence of having to manage several conditions concurrently. This is consistent with similar studies conducted in Sudan where a month's supply of generic brand of Amlodipine required 0.7 of a day's wage of lowest paid public sector worker. Also in studies conducted in private sector in China, lowest prices generic medicines for most conditions had reasonable affordability of < a day's wage (Jiang et al., 2013). Comparatively, in a study conducted in the Builsa District of the Northern Region of Ghana, the average treatment for adult disease conditions was not affordable at 1.67 days' wage, but 0.78 days' wage for a child's disease condition (Nyanwura & Esena, 2013).

Medicines are indispensable and cost-effective tools in health care and important elements of health systems. Ensuring a high access to affordable essential medicines coupled with adequate patient care practices surely increases rationality in medicines use.



CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

In this chapter key conclusions have been drawn based on observations and findings made from the study. Some pertinent recommendations having implications for policy, practice and research have been put forward. Limitations and strengths of the study have also been outlined.

6.1 Conclusion

In LEKMA, members of the community have reasonable geographical access to community pharmacies. Nonetheless, the cost of traveling to the pharmacies could hinder access to medicines for the poor in the community

A relatively high availability of essential medicines was observed in this study although the prices of these medicines had varied ratios to international reference prices with significant price differences between the lowest brand generic medicines and the single originator brand observed. The possibility of catastrophic spending exists for the poor patients if treatment is done using originator brand of medicines. Obtaining treatment for malaria and diarrhoea in the community would not be challenging although Artesunate-Amodiaquin also recommended as first line treatment of malaria was not available in a couple of pharmacies.

Medicines sold in the pharmacies are of good quality to the extent of their non-expired states and the adequate storage and handling conditions in the pharmacies.

Polypharmacy was not a subject of concern in the municipality although majority of patients obtained prescription medicines without prescription. Pharmacists were available in almost all the pharmacies studied however dispensing practices were poor. This raises concerns about the involvement of pharmacists in patient care and dispensing practices in the pharmacies even though they may be physically present or it being a case of falling standards. Either way members of the community are exposed to abuse and misuse of medicines when medicines are not adequately labelled. Although an appreciable number of patients had sufficient knowledge of how to take their medications, no patient should be left uninformed as regards their medicines since medicines have the potential to cause great harm if not properly used.

In general, medicines were affordable in the municipality since patients needed an amount less than a day's wage to purchase their medicines.

This study in assessing rational use of medicines incorporating the availability, accessibility and affordability of essential medicines concludes that community pharmacies in LEKMA performed fairly well although they performed poorly with labelling of medicines.

This study hopes to inform the development of strategies aimed at maximizing the contribution of community pharmacies to the provision of primary healthcare and improving rational use of medicines.

6.2 Recommendations

The study provides the following recommendations;

6.2.1 Implications for Policy

1. Strategies to further improve availability and affordability of medicines in LEKMA should be pursued to ensure that the poor households are not impoverished in the event of the occurrence of multiple chronic conditions- The National Health Insurance Scheme needs to be revamped and properly implemented to ensure equity in healthcare financing of which medicines are included. It is worthy of note that all pharmacies surveyed except PHI-A were not registered with the scheme or had discontinued as providers due to delayed reimbursement.
2. All stakeholders including the Pharmacy Council, Community Pharmacy Practice Association and the Food and Drugs Authority should be engaged to consider a range of strategies that provides more useful information to consumers about appropriate use of medicines whilst monitoring information offered to the public in drug advertisements.

6.2.2 Implications for Practice

1. Good dispensing practices should be adhered to. Personnel in pharmacies need to follow a minimum set of criteria in the dispensing of any medicine.
2. Public education on medicines use to targeted groups should be strengthened and should take into account cultural and social factors that underpin medicine seeking behavior of people in each community.
3. Continuous professional development (CPD) sessions for pharmacists should include updates on RUM.

4. The Pharmacy Council should focus and intensify its monitoring activities on dispensing practices in community pharmacies in order to bridge the gap between theory and practice.

6.2.3 Implications for Research

1. A qualitative research dimension to this study should to be carried to provide a holistic view of the observations made in this study.
2. A household survey on medicines use is recommended to provide information on the demand side of access to medicines and RUM.

6.3 Study Limitations

In conducting this research, two limitations were encountered. These are;

1. Data on availability of essential medicines were collected at a specified time and involved defined strengths and dosage forms of these medicines; therefore, the results may not be a reflection of the situation all year round. Again, therapeutic, strengths and dosage form alternatives have not been accounted for.
2. Computing affordability based on daily wage of the lowest paid government worker wages could lead to may lead to results that are hopeful meanwhile a substantial percentage of the populace receive lesser amounts.

6.4 Study Strength

The main strength of this study is the dimension of access and quality incorporated into the evaluation of rational use of medicines at a sub-national level.



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APPENDICES

Appendix 1: Consent Form for Community Pharmacy

Name of Community Pharmacy:

Study Title: Rational Use of Medicines in Community Pharmacies in the Ledzokuku-Krowor Municipality

Name: Brenda Yayra Opong

Qualification: MPH Resident

Address: Box LG 13, Department of Health Policy Planning and Management,
School of Public Health, College of Health Services, University of
Ghana, Legon.

Telephone Number: 0262201094

E-mail: brendaopong@gmail.com

Introduction

I am Brenda Yayra Opong, a resident of the School of Public Health, University of Ghana, Legon. (**Show School ID card for verification**). I am in this pharmacy to carry out a study on Rational Use of Medicines. The investigation will assess the availability of some medicines and an exit interview of some of your clients on their medication choices. The study is purely an academic research which forms part of my work for the award of a Master of Public Health Degree. I am pleased to invite you to be part of this study. I would like you to read this consent so that you may decide to be part or not of my study. If you seek confirmation or clarification, please contact;

Dr. Genevieve Naa Okailey Aryeetey

Department of Health Policy Planning and Management,

School of Public Health, College of Health Services, University of Ghana, Legon.

Telephone Number: 0244-865-387

E-mail: gcaryeetey@ug.edu.gh

Benefits

There are no direct benefits to you for participating in the study. We hope however, that the information from this study will help improve service delivery and quality of care in this pharmacy and others in the municipality and the country at large.

Possible Risks/Discomfort

The risks involved in partaking in this study are minimal. These are the inconvenience that the interview will cause and the time you will spend to answer the questions- about 20 minutes. Also, some of the questions may appear personal; however, the well trained personnel and I will conduct the interview in order to minimize the risks.

Confidentiality

All the instruments used for data collection will be safely kept and will be available only to the research team. Your name shall not be mentioned in any report or publication that may come out of this study.

Voluntary participation

Participation in the study is absolutely voluntary. You have the right to refuse to partake in the study even though you qualify. Participants can refuse to answer a question or withdraw in the process without any consequences.

Ethical Approval

This study has been approved by the Ethical Review Board of Ghana Health Service.

For further information and inquiries please contact;

Hannah Frimpong

Administrative Secretary

Ghana Health Service Review Committee

Tel. No: 0507041223

VOLUNTEER AGREEMENT

The above document describing the benefits, risks, and procedures for the research entitled “Rational Use of Medicines in Community Pharmacies in the Ledzokuku Krowor Municipal Assembly” have been explained to me. I am satisfied with all the responses given me. Therefore, I agree to participate as a volunteer.

Name of Participant

Sign/Thumbprint:

Date

.....

Brenda Y. Opong

Appendix 2: Consent Form for Respondents Participating In the Exit Interview

Respondent Code

Study Title: Rational Use of Medicines in Community Pharmacies in the Ledzokuku-Krowor Municipality

Principal Investigator: Brenda Yayra Opong

Qualification: MPH Residentt

Address: Box LG 13, Department of Health Policy Planning and Management , School of Public Health,, College of Health Services, University of Ghana, Legon.

Telephone Number: 0262201094

E-mail: brendaopong@gmail.com

General Information about Research

Correct use of medicines for all diseases is an important factor in achieving quality of health and medical care for patients and the community. Irrational or incorrect use of medicines has a number of negative effects such prolonged illness.

This study seeks to find out how correctly medicines are used so as to inform appropriate authorities such as the Ministry of Health on ways to improve medicine use.

If you seek confirmation or clarification, please contact;

Dr. Genevieve C. Aryeetey

Department of Health Policy Planning and Management,
School of Public Health, College of Health Services, University of Ghana, Legon.
Telephone Number: 0244-865-387
E-mail: gcaryeetey@ug.edu.gh

Benefits

There are no direct benefits to you for participating in the study. We hope however, that the information from this study will help improve service delivery and quality of care in this pharmacy and others in the municipality and the country at large.

Possible Risks/Discomfort

The risks involved in partaking in this study are minimal. These are the inconvenience that the interview will cause and the time you will spend to answer the questions. Also, some of the questions may appear personal; however, the well trained personnel and I will conduct the interview in order to minimize the risks.

Confidentiality

All the instruments used for data collection will be safely kept and will be available only to the research team. Your name shall not be mentioned in any report or publication that may come out of this study.

Voluntary participation

Participation in the study is absolutely voluntary. You have the right to refuse to partake in the study even though you qualify. Participants can refuse to answer a question or withdraw in the process without any consequences.

Ethical Approval

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VOLUNTEER AGREEMENT

The above document describing the benefits, risks, and procedures for the research entitled “Rational Use of Medicines in Community Pharmacies in the Ledzokuku-Krowor Municipal Assembly” have been explained to me. I am satisfied with all the responses given me. Therefore, I agree to participate as a volunteer.

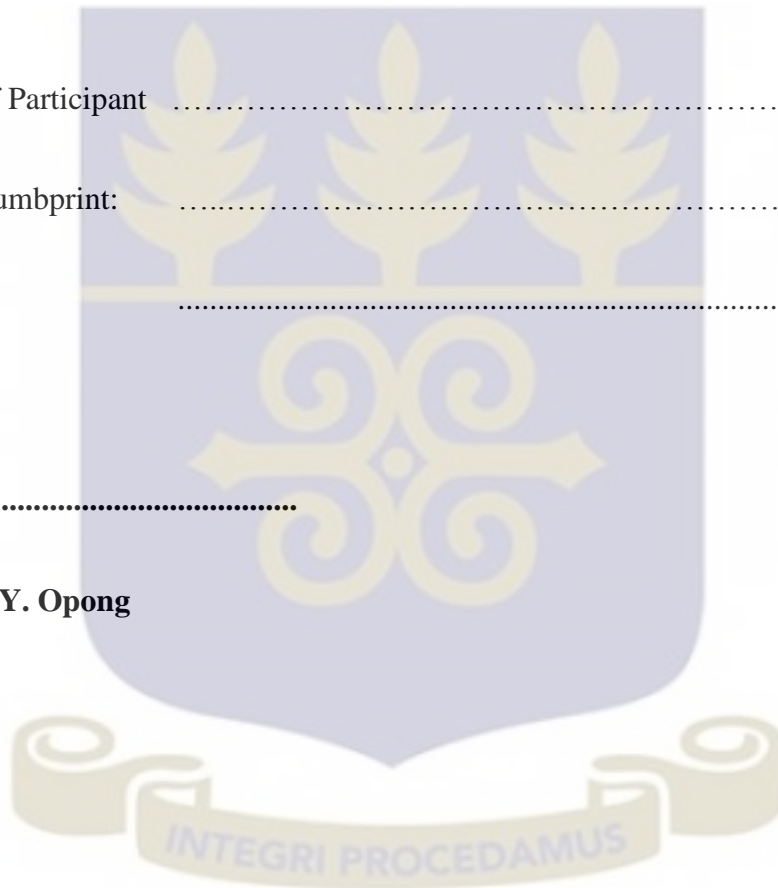
Name of Participant

Sign/Thumbprint:

Date

.....

Brenda Y. Opong



Appendix 3: Questionnaires

Exit Interview Questionnaire

A: General Background

1. Questionnaire number.....
2. Date.....
3. Name of pharmacy.....
4. Locality (location).....

B: Various indicators

Variable	Response
1. Who is the medicine for 0. Self 1. Other	<input type="text"/>
2. Sex 0. Male 1. Female	<input type="text"/>
3. Age (at last birthday).....	
4. How many medicines did you purchase?	
5. Did you purchase medicine with prescription? 0. No 1. Yes	<input type="text"/>
6. How many prescription medicines did you purchase with prescription?	
7. How many prescription medicines did you purchase without prescription?	
8. Did you request for the unprescribed medicines yourself? 0. No 1. Yes	<input type="text"/>
9. How many of your medicines were adequately labelled?	
10. Do you know how to take the medicines?	<input type="text"/>

Variable	Response
0. No 1. Yes	
11. Were you told how to take the medicines, what not to eat while taking the medicine or the side effect? 0. No 1. Yes	<input data-bbox="1182 443 1337 528" type="text"/>
12. How much did you pay in total for all your medicines?	
13. How did you get to the pharmacy? 0. Walking 1. Cycling 2. Public transport 3. Private transport 4. Other (specify).....	<input data-bbox="1177 645 1332 730" type="text"/>
14. How long did it take you to get here (minutes/hours)	
15. Can you estimate your transport cost? 0. No 1. Yes If yes, how much?	<input data-bbox="1177 1037 1332 1122" type="text"/>
16. How long did you have to wait to be served? 0. Less than 10 minutes 1. 10-20 minutes 2. More than 30 minutes	<input data-bbox="1177 1270 1332 1355" type="text"/>
17. Were you generally satisfied with the service received? 0. No 1. Yes	<input data-bbox="1177 1440 1332 1525" type="text"/>
18. If No, why do you say so	

Questionnaire for Pharmacies

A: General Background

1. Questionnaire number.....
2. Date.....
3. Name of pharmacy.....
4. Locality (location).....

Variable	Response
1. Who is the owner of this pharmacy? 0. Pharmacist 1. Non-pharmacist	<input type="text"/>
2. Is the pharmacist for this facility available now? 1. Yes 2. No	<input type="text"/>
3. What is your current job title 1. Pharmacist 2. Nurse 3. Pharmacy aide 4. Health assistant 5. Untrained staff 6. Other (Specify).....	<input type="text"/>
4. Do you have a standard treatment guideline 1. Yes 2. No	<input type="text"/>
5. Do you have an essential Medicines List 1. Yes 2. No	<input type="text"/>



SECTION B

Availability of medicines to treat common conditions and price

	Key medicines to treat common conditions	In stock Yes==1, No==0	Expired medicines on shelves Yes==1, No==0	Lowest unit price of the medicine
1	Artemether- Lumefantrine 20mg/120mg tab			
2	Artesunate-Amodiaquine tab			
3	Oral Rehydration Salt (ORS)			
4	Zinc 10mg tab			
5	Amoxicillin-Clavulinic acid 625mg tab			
6	Ceftriaxone inj. 500mg im/iv			
7	Ciprofloxacin 500mg cap/tab			
8	Mebendazole tab			
9	Diclofenac 50mg cap/tab			
10	Ferrous Sulphate tab			
11	Omeprazole 20 mg cap/tab			
12	Paracetamol 25mg/ml syrup/susp			
13	Magnesium Triscilicate tablets			
14	Salbutamol 0.1 mg/dose inhaler			
15	Gentian violet			

SECTION C

Adequate conservation conditions and handling of medicines

	Checklist	Store room True==1, False==0	Dispensing Area/Room True==1, False==0
1	There is a method in place to control temperature (e.g. roof and ceiling with space between them in hot climates, air conditioners, fans etc.)		
2	There are windows that can be opened or there are air vents		
3	Direct sunlight cannot enter the area (e.g. window panes are painted or there are curtains/blinds to protect against the sun)		
4	Area is free from moisture (e.g. leaking ceiling, roof, drains, taps etc.)		
5	There is a cold storage in the facility		
6	There is a regularly filled temperature chart for the cold storage		
7	Medicines are not stored directly on the floor		
8	Medicines are stored in a systematic way (eg alphabetical, pharmacological)		
9	Medicines are stored first-expiry-first out (FEFO)		
10	There is no evidence of pests in the area		
11	Tablets/capsules are not manipulated by naked hand		

WHO Summary Forms

General information: Public health facility pharmacy/dispensary

Facility _____ **Date** _____
Region _____ **Investigator** _____

1) Does the law require a pharmacist to be present during hours of operation of public/government pharmacies/drug outlets?

Yes No

2) Is a pharmacist present at the time of the visit?

Yes No

Assessment

- 1 complies with the law (items 1 and 2 are both Yes)
2 does not comply with the law (item 1 Yes and item 2 No)
3 no requirement for pharmacist presence (item 1 No)

3) Who is dispensing during the time of visit? (check all that apply)

- Pharmacist (1=Yes; 0=No) Pharmacy aide/ health assistant
(1=Yes; 0=No)
 Nurse (1=Yes; 0=No) Untrained staff (1=Yes; 0=No)



Survey form 10: Private pharmacy/drug outlet

Indicator: % key medicines available
 % medicines expired

Facility _____ **Date** _____
Region _____ **Investigator** _____

Key medicines to treat common conditions [A]	In stock Yes=1, No=0 [B]	Expired medicines on shelves Yes=1, No=0 [C]	Lowest unit price of the medicine paid by patient [D]
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
	[B ¹] = Sum of B =	[C ¹] = Sum of C =	
	[B ²] = % in stock = B ¹ ÷ 15 x 100 =	[C ²] = % expired = C ¹ ÷ B ¹ x 100 =	

Survey form 13: Private pharmacy/drug outlet
Indicator: Adequate conservation conditions and handling of medicines

Facility _____ **Date** _____
Region _____ **Investigator** _____

Checklist	Storeroom True=1, False=0 [A]	Dispensing Area/Room True=1, False=0 [B]
1. There is a method in place to control temperature (e.g. roof and ceiling with space between them in hot climates, air conditioners, fans, etc).		
2. There are windows that can be opened or there are air vents.		
3. Direct sunlight cannot enter the area (e.g. window panes are painted or there are curtains/blinds to protect against the sun).		
4. Area is free from moisture (e.g. leaking ceiling, roof, drains, taps, etc.).		
5. There is a cold storage in the facility		
6. There is a regularly filled temperature chart for the cold storage		
7. Medicines are not stored directly on the floor.		
8. Medicines are stored in a systematic way (e.g. alphabetical, pharmacological).		
9. Medicines are stored first-expiry-first our (FEFO).		
10. There is no evidence of pests in the area.		
11. Tablets/capsules are not manipulated by naked hand.		
	[A ¹] = Sum of A [A ²] = Score = $A^1 \div 10 \times 100 =$	[B ¹] = Sum of [B ²] = Score = $B^1 \div 10 \times 100 =$

Survey form 14: Private pharmacy/drug outlet - Exit interview

Indicators: Average number of medicines purchased
 % prescription medicines bought without prescription
 % medicines adequately labelled

% patients know how to take medicines
 Average cost of medicines
 Geographical accessibility of facilities

Facility _____ **Date** _____
Region _____ **Investigator** _____

Patient sex M/F F=1, M=0 [A]	Age 1) Less than 5 yrs. 2) 5 – 14years 3) 15 – 59years 4) more than 60 [B]	Number of medicines purchased [C]	Number of prescription medicines [D]	Number of prescription medicines purchased with no prescription [E]	Number of medicines adequately labelled [F]	Patient knows how to take medicines Yes=1, No=0 [G]	Amount patient paid for purchased medicines [H]	How long did it take to the patient to get to the health facility today? 1) <30min; 2) 31min-1h; 3) > 1h [I]	How much did it cost him/her to come here [J]
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									
19.									
20.									
21.									

Patient sex M/F F=1, M=0 [A]	Age 1) Less than 5 yrs. 2) 5 – 14years 3) 15 – 59years 4) more than 60 [B]	Number of medicines purchased [C]	Number of prescription medicines [D]	Number of prescription medicines purchased with no prescription [E]	Number of medicines adequately labelled [F]	Patient knows how to take medicines Yes=1, No=0 [G]	Amount patient paid for purchased medicines [H]	How long did it take to the patient to get to the health facility today? 1) <30min; 2) 31min-1h; 3) > 1h [I]	How much did it cost him/her to come here [J]
22.									
23.									
24.									
25.									
26.									
27.									
28.									
29.									
30.									
[A ¹] = Sum customers= [A ²] = Sum females= [A ³] = % females = A ² ÷ A ¹ x 100 =	[B ¹] = Sum of 1= [B ²] = Sum of 2= [B ³] = Sum of 3= [B ⁴] = Sum of 4=	[C ¹] = Sum of C = [C ²] = Average number of medicines purchased by customers = C ¹ ÷ A ¹ =	[D ¹] = Sum of D [D ²] = Average number of prescription medicines purchased by customers	[E ¹] = Sum of E = [E ²] = % prescription medicines bought without prescription = E ¹ ÷ D ¹ x 100 =	[F ¹] = Sum of F [F ²] = % adequately labelled = E ¹ ÷ C ¹ x 100 =	[G ¹] = Sum of G [G ²] = % know how to take medicines = G ¹ ÷ A ¹ x 100 =	[H ¹] = Sum of H [H ²] = Average cost = H ¹ ÷ total patient A ¹ =	[I ¹] Sum of 1= [I ²] Sum of 2= [I ³] Sum of 3=	[J ¹] = [J ²] = Average transport [J ³] = Average transport cost to minimum daily salary = [J ²] ÷ [K] =

[K] = Lowest daily government salary (divide weekly salary by 7 or monthly salary by 30) = D 17.78



GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

*In case of reply the
number and date of this
Letter should be quoted*



*My Ref: GHS/RDD/ERC/Admin/App
Your Ref. No.*

Research & Development Division
Ghana Health Service
P. O. Box MB 190
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Tel: +233-302-681109
Fax + 233-302-685424
Email: Hannah.Frimpong@ghsmail.org

11th March, 2016

Brenda Yayra Opong
University of Ghana
School of Public Health
Legon, Accra

ETHICS APPROVAL - ID NO: GHS-ERC: 69/12/15

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol titled:

“Rational Use of Medicine in Community Pharmacies in the Ledzorkuku-Krowor Municipality”

This approval requires that you submit yearly review of the protocol to the Committee and a final full review to the Ethics Review Committee (ERC) on completion of the study. The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification without ERC approval is rendered invalid.

You are also required to report all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.

You are requested to submit a final report on the study to assure the ERC that the project was implemented as per approved protocol. You are also to inform the ERC and your sponsor before any publication of the research findings.

Please note that this approval is given for a period of 12 months, beginning 11th March, 2016 to 10th March, 2017. However, you are required to request for renewal of your study if it lasts for more than 12 months.

Please always quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....

PROFESSOR MOSES AIKINS
(GHS-ERC VICE-CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra

INTEGRI PROCEDAMUS



DEPARTMENT OF HEALTH POLICY,
PLANNING AND MANAGEMENT
SCHOOL OF PUBLIC HEALTH

May 27, 2016

Ref. No.:

Dear Sir/Madam,

LETTER OF INTRODUCTION


I wish to introduce to you **Opong Brenda Yayra**, Master of Public Health (MPH) student of the Department of Health Policy, Planning and Management, School of Public Health, University of Ghana, Legon. As part of the requirement for the award of her MPH degree, she is expected to undertake a piece of research to enable her write her dissertation.

Her research topic is "**Rational use of medicines in community pharmacies in the Ledzokuku-Krowor Municipality**".

It will be appreciated if you could provide her with the necessary support to undertake her research work in your institution. She has obtained ethical clearance from Ghana Health Service Ethical Review Committee for this work

Thank you for your cooperation.

Yours sincerely,


Dr. Reuben Esena
Head of Dept.



COLLEGE OF HEALTH SCIENCES

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