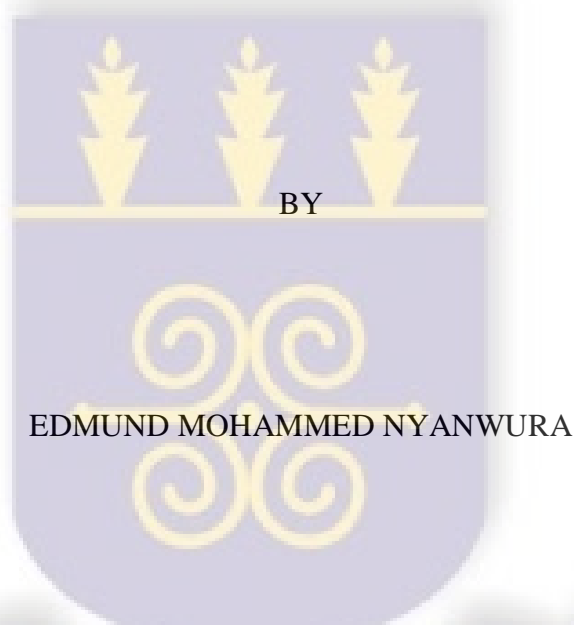SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

ESSENTIAL MEDICINES AVAILABILITY AND AFFORDABILITY: A CASE

STUDY OF THE TOP TEN REGISTERED DISEASES IN BUILSA DISTRICT

BY

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OF **MASTER OF PUBLIC HEALTH** DEGREE

AUGUST 2010

DECLARATION

I hereby declare that with the exception of articles and books which have been quoted, cited and duly acknowledged in the references of this project, all information produced from this project is as a result of my own work and diligence in obtaining data. To the best of my knowledge, no part of this work has been obtained from a previous publication or accepted for the award of any degree in any University or institution of higher learning except where due acknowledgement is made in this text.

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DEDICATION

This work is dedicated to my lovely daughters, Mitsulaina and Thulinda, with affection;
and to my unborn twin boys, with great expectations.

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ABSTRACT

Background

Access to essential medicines is a major component for an effective health service delivery system. The purpose of this study was to evaluate the availability and affordability of essential medicines used in the treatment of the top ten registered diseases in Builsa District in the year 2009.

Method

The survey was a cross sectional descriptive study, that employed both quantitative and qualitative approaches, following the standardized World Health Organization and Health Action International (WHO/ HAI) methodology (WHO and HAI, 2008a). Price and availability data for 20 medicines were collected from 11 public service delivery points and 4 private licensed chemical sellers' stores. Medicine prices were compared with international reference prices (IRPs) to obtain a median price ratio. The daily wage of the lowest paid unskilled government worker was used to gauge the affordability of medicines.

Results

The percentage availability of 20 essential medicines was 73% (SD±19.3) for all the medicines outlets. The availability of 20 essential medicines for the Clinic and Health Centre levels was 85% (SD±17) higher than the private Licensed Chemical Sellers with

71.3% (SD±35.6). The availability of 10 essential medicines for Community level was 62.5% in the CHPS compounds, which was lower than the private Licensed Chemical Sellers with 77.5%. Artesunate + Amodiaquine used as first line for malaria treatment was found in 80% of medicine outlets. The prices of medicines to patients were high at the public health delivery points with a comparative Median Price Ratio (MPR) of 1.84 times international reference prices (IRP), while that of the private Licensed Chemical Sellers was 2.05 times the IRP. It takes more than a day's wage to treat malaria in an adult client.

Conclusion

The availability of essential medicines for the treatment of the top ten diseases of 2009 in the Builsa district is fairly high. The average cost of treatment for the common diseases was unaffordable to the un-insured clients, with the median price ratio of medicines above the acceptable range of 1.5 for public health delivery points.

Key words: Availability, Affordability, Essential Medicine, Builsa district.

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LIST OF ABBREVIATIONS

BDA   - Builsa District Assembly

Cap/Tab   - Capsule/ Tablet

CHAG   - Christian Health Association of Ghana

CHO   - Community Health Officer

CHPS   - Community-based Health Planning and Services

DH   - District Hospital

DHA   - District Health Administration

DHMT   - District Health Management Team

EML   - Essential Medicines List

GH¢   - Ghana Cedis

GNDP   - Ghana National Drugs Programme

HAI   - Health Action International

HC   - Health Centre

IB   - Innovator Brand

Inj   - Injection

IRP   - International Reference Price

LPG   - Lowest Priced Generic

MCA   - Medicines Counter Assistant

MOH   - Ministry of Health

MPR   - Median Price Ratio

MSH   - Medicine Science for Health

OPD   - Outpatient Department

RMS   - Regional Medical Stores

STG   - Standard Treatment Guidelines

Susp   - Suspension

TML   - Tracer Medicines List

UN   - United Nations

WHO   - World Health Organization

DEFINITION OF TERMS

For the purpose of this survey:

Key tracer essential medicines refer to selected tracer medicines in the Ghana National Essential Medicines List that must be available at all times in a health service delivery point.

Median Price Ratio is the median unit price of a medicine divided by the unit of international reference price of the medicine in Ghana Cedis (GH¢).

Availability refers to the percentage of medicine outlets in which the essential medicine concerned was available at the time of survey.

Affordability refers to cost of treatment in relation to peoples' income. That is the amount of daily wage of the lowest-paid unskilled government worker in comparison with the cost of a defined course of treatment for a specific condition.

Access is defined as having key tracer essential medicines available and affordable at public health delivery facilities or Licensed Chemical Sellers stores present for the population in the catchment areas between the 2nd and 3rd of June 2010.

Essential medicines are medicines intended to be available within the context of preventive and curative health services, in the appropriate dosage forms and at a price the individual and community can afford; collated on a National E

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Medicines are an essential component of health care delivery in any country. They span all major areas of health care delivery (GNDP, 2004b); however, there is evidence that medicines shortage is a major barrier to access to essential medicines in sub-Saharan Africa (Jitta et al., 2003).

Even though medicines are the most significant tool that society possesses to prevent, alleviate, and cure diseases (Quick, 2003(a), WHO, 2004a), more than one-third of the world's population lacks reliable access to essential medicines (WHO, 2004a, Jamshed et al., 2009), a situation that undermines health systems' objectives of equity, efficiency and health development. The situation is even worse in many poor African countries, where it is estimated that 50%-60% of the populace lacks such access (Tetteh, 2008, DFID, 2004). This makes recording of the top ten causes of illness in every region useful, so that the essential medicines needed for the prevention, alleviation and cure of illnesses in the region, would be made available.

In Ghana, the percentage availability of fourteen (14) key medicines surveyed in 2002 was 73.9% in public facilities, with a median stock out duration of 79.5 days (GNDP, 2002). Another survey of thirty-nine (39) key medicines revealed availability of less than 50% in public sector for twenty-seven (27) medicines; while prices of the medicines were

high and unaffordable for many (GNDP, 2006). However, there is no single solution to medicines access problem given its multiple dimensions: availability, acceptability, affordability and accessibility (Tetteh, 2008, Obrist et al., 2007). This study sought to determine the availability and affordability dimensions of medicines access; and concentrated mainly on availability and affordability of essential medicines for the treatment of the top ten registered diseases for 2009 in the Builsa district.

1.2 Statement of the Problem

Clients' attendance in Builsa district health facilities continuously increased from 66,825 people in 2007 to 86,956 clients in 2008 and 102,915 attendants in 2009; translating into 0.8 through 1.27 OPD visits per capita over the period (DHMT, 2010). Such heavy patient load contributes to frequent stock-outs of essential medicines.

Medicines are essential to health service delivery, and yet there is no community pharmacy to support the needy when the public facilities run out of stock; and thus compound the problem of access to essential medicines to the community.

This study therefore seeks to assess the availability of essential medicines for the treatment of the top ten registered diseases for the year 2009, and the affordability of these essential medicines to clients in the Builsa district as a measure of access to medicines by the populace.

1.3 Conceptual Framework of Availability and Affordability to Essential Medicines
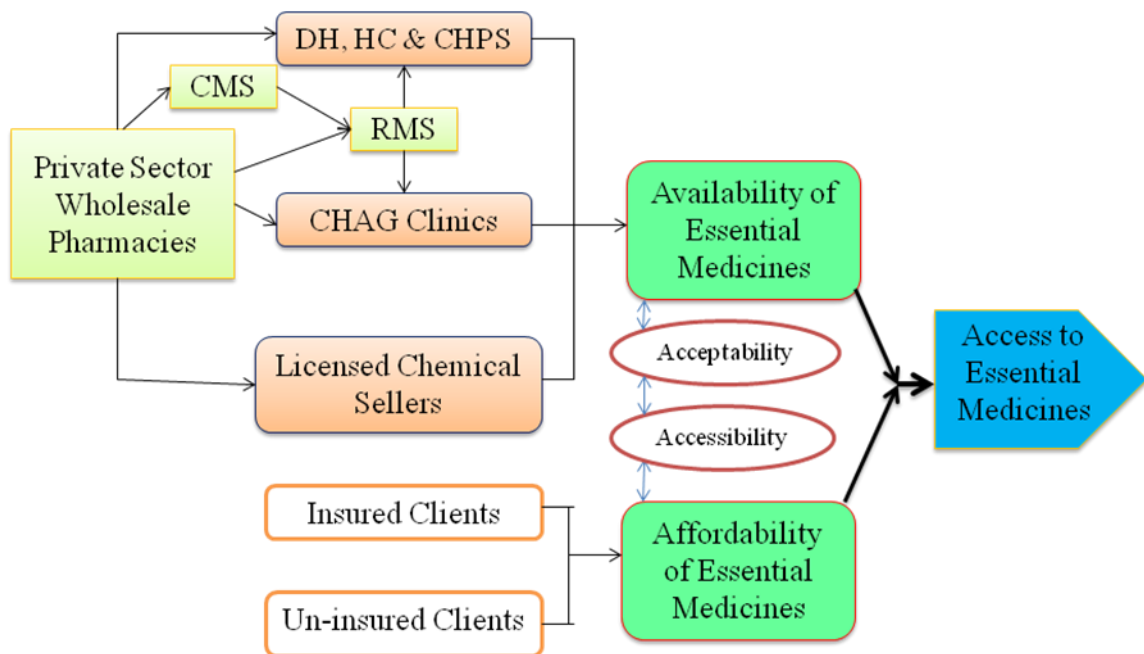
Figure 1: Some factors leading to Access to Essential Medicines

Access to essential medicines (Figure 1) depends on their availability at the public health service delivery points (SDP) and Licensed Chemical Sellers (LCS), that get their supplies from the Regional Medical Stores (RMS) and Private Pharmacies; and their affordability to the populace through the National Health Insurance Scheme or out of pocket payment. Access to essential medicines could be limited due to the non-availability of medicines at the public health service delivery points and un-affordability due to uninsured client status or lack of money for out of pocket payment.

1.4 Justification

Access to medicines to combat HIV/AIDS, malaria and tuberculosis has improved worldwide. However, the availability of affordable essential medicines is still inadequate in both public and private sectors for the poor (Lufesi et al., 2007).

Currently, there are large gaps in the availability of medicines in both public and private sectors, as well as a wide variation in prices which render essential medicines unaffordable to poor people. In the public sector, generic medicines are only available in 38.1% of facilities, and the average cost is 250% more than the international reference price. Similarly, these medicines are available in 63.3% of private sector facilities and cost on average about 610% more than the international reference price (WHO, 2009).

This study assessed the access to essential medicines relevant to inhabitants of the Builsa district, and factors that affect the availability of these medicines in the district. This will also serve as a baseline for future evaluation of the impact of the scheduled delivery of medicines from the Regional Medical Stores to the district.

Findings from this study would sensitize health managers on access to essential medicines in primary health care. It will also help to prioritize and target areas of work in medicines policy implementation for consumers.

1.5.1 General Objectives

The general objective of the study is to determine the availability and affordability of essential medicines used in the treatment of the top ten registered diseases in Builsa District in the year 2009.

1.5.2 Specific Objectives

The specific objectives of the survey are to:

1. Assess the availability of essential medicines for the treatment of the top ten diseases in health facilities of Builsa district.
2. Determine the level of affordability of essential medicines to the clients who visit the health facilities.
3. Identify some factors which affect the availability of essential medicines in the health facilities.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Every year infectious diseases kill about 13 million people; about 30,000 deaths a day, most in developing countries (Rojo, 2001). Most of the premature deaths and the incapacity cases associated with infectious diseases could be avoided if the poor had access to medicines. In 2008, malaria, a curable illness, continued to be the disease claiming the highest number of victims, "followed by HIV/AIDS, diarrhoeal diseases, lower respiratory infections, and perinatal conditions. These five diseases account for 50% of all deaths in Ghana, and 68% of deaths among children under 14 years old" (WRI, 2008). Similarly in Builsa district, Malaria, Pneumonia and Anaemia, were the leading causes of death in 2008 and contributed 45% of all deaths (DHMT, 2009). These deaths could be averted if promptly attended to with the right essential medicines.

Essential Medicines are a limited range of medicines selected to meet priority health-care needs that contribute to better health care, better drug management, better use of financial resources, and thereby greater access to care (Quick, 2003(b), Robertson and Hill, 2007).

2.2 Access to Essential Medicines

Equitable access to safe and affordable medicines is crucial to the health and wellbeing of people, especially in developing countries. In spite of developments made in the areas of public health, medicines still remain the single most vital factor in the maintenance of health and the treatment of diseases in many parts of the world (Santhosh and Anni, 2009).

Access to essential medicines is a key determinant of health outcomes in developing countries, where economic constraints lead to low affordability of essential medicines. Very definite estimates of these phenomenon are difficult to compile, but it is estimated that between 1.7 and 2 billion people worldwide have inadequate or no access to life-saving essential medicines (Rojo, 2001). Majority of these people live in developing countries, where after the presence of trained health professionals, medicines are the single most critical element in the maintenance of health and the successful treatment of disease and illness. Lack of essential medicines undermine the ability of healthcare professionals to respond appropriately to patient needs and this often erodes the confidence and trust patients and their families have in local health systems. The lack of access to life-saving and health-supporting medicines for an estimated two (2) billion poor people stands as a direct contradiction to the fundamental principle of health as a human right, as poverty and illness create a vicious cycle in the access of essential medicines (Leach et al., 2005). Therefore, one way to create access to essential medicines is to make sure they are always available and affordable to all.

2.3 Availability of Essential Medicines

Essential medicines are those that satisfy the priority health care needs of the population. They are selected with regard to public health relevance, evidence on efficacy and safety and comparative cost effectiveness. They are intended to be available within the context of functioning health systems at all times in the appropriate dosage forms and at a price the individual and the community can afford (WHO, 2004a). To enable a high level availability of essential medicines, they have to be procured continuously, so that they do not get out of stock. The following categories have been used to describe availability (Gelders et al., 2006):

- < 30%   very low
- 30 - 49%   low
- 50 - 80%   fairly high
- > 80%   high

In comparing different surveys, percentage availability should not be overemphasized because other medicines, strengths or dosage forms may have been used (Gelders et al., 2006). Comparisons could only be made if the survey areas were in the same WHO Region, and the complete WHO/ HAI methodology list of medicines was used.

2.4 Procurement of Essential Medicines

The effectiveness of medicine supply systems in achieving a reliable supply of essential medicines needs to be continually and objectively assessed. The medicines management cycle involves four basic functions: selection, procurement, distribution and use (Quick, 2003(a), Lufesi et al., 2007). The selection of the medicines depends on the main disease conditions prevailing at the area, and their inclusion in the National Essential Medicines List. In Ghana, the Regional Medical Stores receive their supplies from the Central Medical Store, and distribute the medicines to the public health service delivery points; from where the clients get them to use. Since it is a full cost recovery system, a secured source of funding is required to sustain the procurement system.

2.5 Bamako Initiative of Revolving Drug Fund

One of the major indices of the performance of the primary healthcare delivery remains improved access to essential drugs. The more commonly used mechanisms to address inequities in rural access to medicines was the establishment of revolving drug funds, whereby a capital investment allows for the initial purchase of medicines and revenues from medicine sales or user fees are used to replenish stock. Sustainable and successful schemes have been described across Africa (Waning et al., 2009, Ali, 2009, Umenai and Narula, 1999). The Bamako Initiative (BI) was introduced by WHO/UNICEF in 1987 through a strategic adoption by African Ministers of Health to improve access to essential

drugs for the most vulnerable in the society and thus improve their health outcomes (Chukwuani et al., 2006)

About 20 years post-inception, the outcomes and/or impact of the Bamako Initiative on the health indices of many implementing African countries remains varied, with not so significant improvement in health status being registered in a majority of countries. However, a review of literature suggests that the poor outcomes may be attributable to issues more fundamental than just the absence of adequate funding (Chukwuani et al., 2006)

A study was undertaken in 21 Primary Health Care centres with Bamako Initiative drug revolving funds and 12 Primary Health Care centres without Bamako Initiative drug revolving funds, all in Enugu State of Nigeria. It was observed that the Bamako Initiative facilities had a better availability of essential drugs with an average of 35.4%, than the non-Bamako Initiative (Uzochukwu et al., 2002).

In Ghana, the Bamako Initiative is being implemented with a Revolving Drug Fund in order to make medicines available. But as illustrated earlier on, the medicines have to be affordable to achieve access to them.

2.6 Affordability of Essential Medicines

A large portion of the population is denied access to medicines; especially due to a lack of purchasing power (Santhosh and Anni, 2009). About 10 million people, most of them in low- and middle-income countries - die needlessly every year because they do not have access to existing medicines and vaccines (Leach et al., 2005). The price of medicine is considered one of the most important obstacles to the access (HAI, 2003). The purchase of medicines contributes significantly to the health care budget of developing countries, and drug expenditures may amount to 50%–90% of non-personnel costs (Quick et al., 1997). Measuring and understanding the reasons for the price of medicines is the first stage in developing medicine pricing policies that would ensure the affordability of medicines (Babar et al., 2007).

To enable discussion in this work, we have used the following cut-off points of MPRs to represent acceptable local price ratios:

- public sector - patient price: $MPR \leq 1.5$
- private sector retail - patient price: $MPR \leq 2.5$

MPRs above these values are considered excessive local prices (Gelders et al., 2006). One of the best ways of illustrating the impact of medicine prices on the cost of health care for an individual is to compare the cost of treatment with people's actual income.

The National Health Insurance Act 650 was passed in 2003 in Ghana, and was intended to replace the out of pocket payment system which had made health care costs prohibitive

for a large portion of Ghana's poor. It had a goal of providing universal coverage of affordable high quality healthcare and ultimately to improve the overall health status (WHO and HAI, 2008b). As at May 2010, 78,452 people had registered with the National Health Insurance Scheme in the Builsa District with a population of 81,624 representing 96.1%; although the number of people with valid cards could not be ascertained.

2.7 Measuring Medicines Availability and Affordability

Affordability is measured by comparing the medicine prices against international reference prices (IRP), which are the average prices offered, by not-for-profit drug companies to developing countries. Comparison of treatment costs with the salary of the lowest-paid government worker (LPGW) is recommended by World Health Organization and Health Action International as a means of estimating medicine affordability (WHO and HAI, 2008a, Mendis et al., 2007, Cameron et al., 2009). The daily wage of the lowest paid unskilled government worker is used to gauge the affordability of medicines (Babar et al., 2007), with the current minimum wage in Ghana being GH¢ 3.11 a day.

Availability is measured by finding the percentage of the tracer medicines available at the time of survey, which is used to compare facilities of the same sector. Where inter-sectoral comparison is conducted, the availability is measured by the percentage of medicines outlets in a sector that has a particular tracer medicine.

2.8 Essential Medicines Management in the Ghana Health Service

Essential medicines in the Ghana Health Service have been grouped into the following categories: (GNDP, 2004a)

- Level A   - Community
- Level B1   - Health Centre without Doctor
- Level B2   - Health Centre with Doctor
- Level C   - District Hospital
- Level D   - Regional / Teaching Hospital
- Level SD   - Specialist Medicines
- Level PD   - Programme Medicines

Programme Medicines are those used in Public Health Programmes of the Ghana Health Service or Ministry of Health and as such used within the guidelines of the specific programmes that ran in the district. Apart from that, the district is limited to medicines below the level of Regional Hospital, since the referral facility is a District Hospital.

Essential medicines are those that satisfy the priority health care needs of the population. They are selected with due regard to public health relevance, evidence on efficacy and safety, and comparative cost-effectiveness (UN, 2009).

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2.9 List of Tracer Medicines

The Chief Pharmacist's Office of the Ministry of Health/ Ghana Health Service focusing on the medicines usually used for the management of the top ten causes of out-patient attendances, selected fifty-nine (59) and forty-one (41) tracer medicines for the regional/district and the health centre levels respectively (Yellu, 2009).

Out of these essential medicines list, twenty (20) commonly used for the treatment of the top ten recorded causes of out-patient attendances in the Builsa district in 2009 were selected for the study in the District Hospital, Health Centres and ten (10) medicines for Community-based Health Planning and Services (CHPS) Centres.

2.10 Top Ten Registered Causes of Health Facility Attendances in Builsa district

Table 1 below is the list of the leading ten causes of health facility attendances according to the outpatient department visits for 2009 in the Builsa district (DHMT, 2010).

Table 1: Top Ten Registered Attendances for 2009 in Builsa district

Cause of Attendance	Cases	%
Malaria	52,700	51.21
Other Acute Respiratory Infections	13,282	12.91
Rheumatism & joint pains	6,000	5.83
Pneumonia	4,822	4.69
Diarrheal diseases	2,522	2.45
Skin disease & ulcers	2,341	2.27
Acute eye infections	1,377	1.34
Hypertension	1,226	1.19
Anaemia	831	0.81
Enteric Fever	473	0.46
All other causes	17,342	16.85

This table did not differ much from the Regional burden of diseases that only had Pregnancy related complications (0.9%) in place of Anaemia (0.8%) in the district (GHS, 2010).

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CHAPTER THREE

3.0 METHODS

3.1 Study Design

The study was a cross-sectional descriptive survey of medicines outlets that assessed the availability of tracer essential medicines and their prices. It applied the standardized World Health Organization and Health Action International methodology (WHO and HAI, 2008a), which uses data collected on the availability and price of a selection of important medicines from a sample of medicine outlets in the public, private and any other sectors in different survey areas. It requires at least four (4) medicines outlets for a sector of the survey. In this case, the public health service delivery points (SDP) represent the public sector and the Licensed Chemical Sellers (LCS) represent the private sector; in six sub-districts of the Builsa district as survey areas.

In-depth Interviews with managers of health facilities as key informants was conducted qualitatively to identify the factors that affect the availability of medicines.

3.2 Study Area

The Builsa District (Figure 2) was curved out of the Kassena-Nankana district in 1975. It is one of the nine districts in the Upper East Region of Ghana. The district is situated on the south-western part of the region, lying between longitudes 1^0 05" West and 1^0 35" West and latitudes 10^0 20" North and 10^0 50" North. It shares boundaries with the Kassena-Nankana West District to the north, the Kassena-Nankana East District to the east, the Sissala East district of the Upper West Region to the west, and to the south with the West Mamprusi District of the Northern Region. It covers an area of 2,220 square kilometres that constitutes about 25.1 % of the total land area of the Upper East Region. The capital of the district is Sandema.
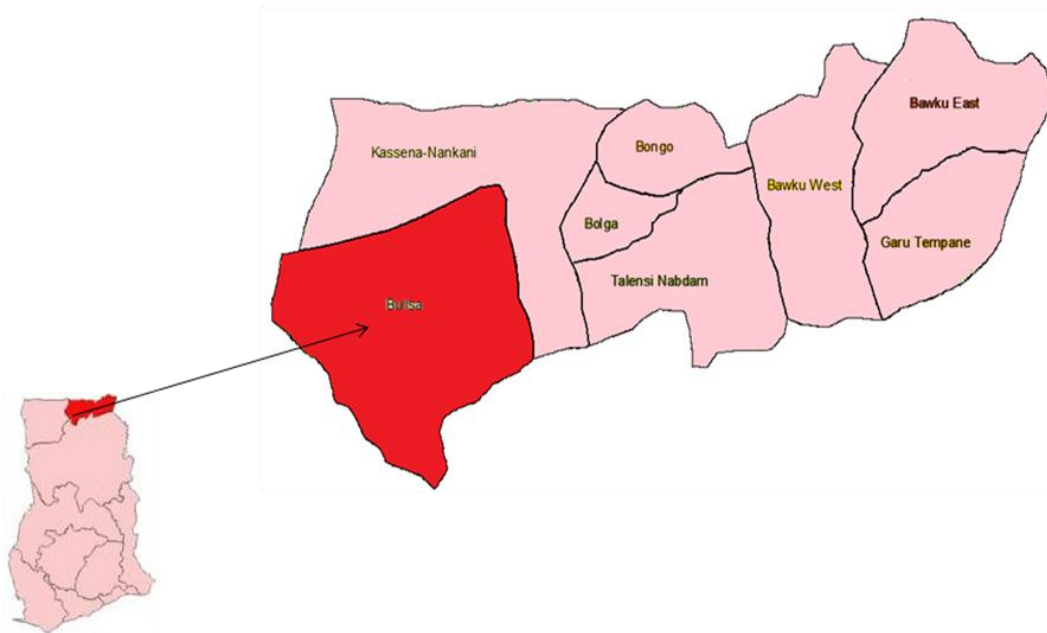
Figure 2: Map of Upper East Region of Ghana showing Builsa district

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Builsa District currently has an estimated population of 81,624 people, extrapolated from the 2000 population census, with an approximate annual growth rate of 0.7% (GSS, 2005). The District has mean monthly temperatures ranging between 21.9^0 C and 34.1^0 C, and can rise to 45^0 C in March, while the lowest are recorded in January. Rainfalls are very torrential and range between 85 mm and 1150 mm per annum (GSS, 2002). Between July and October in particular most rivers and streams overflow their banks and cutting off settlements; and thereby, hindering distribution of essential medicines. The dry season is long with dry harmattan winds, and similar to other districts in northern Ghana, it is largely rural with highly dispersed settlements (Binka et al., 1996).

Public Health Facilities

H - District Hospital
H - Health Centres
H - CHAG Clinics
H - CHPS Centres
∿ - Boundaries
∿ - Roads
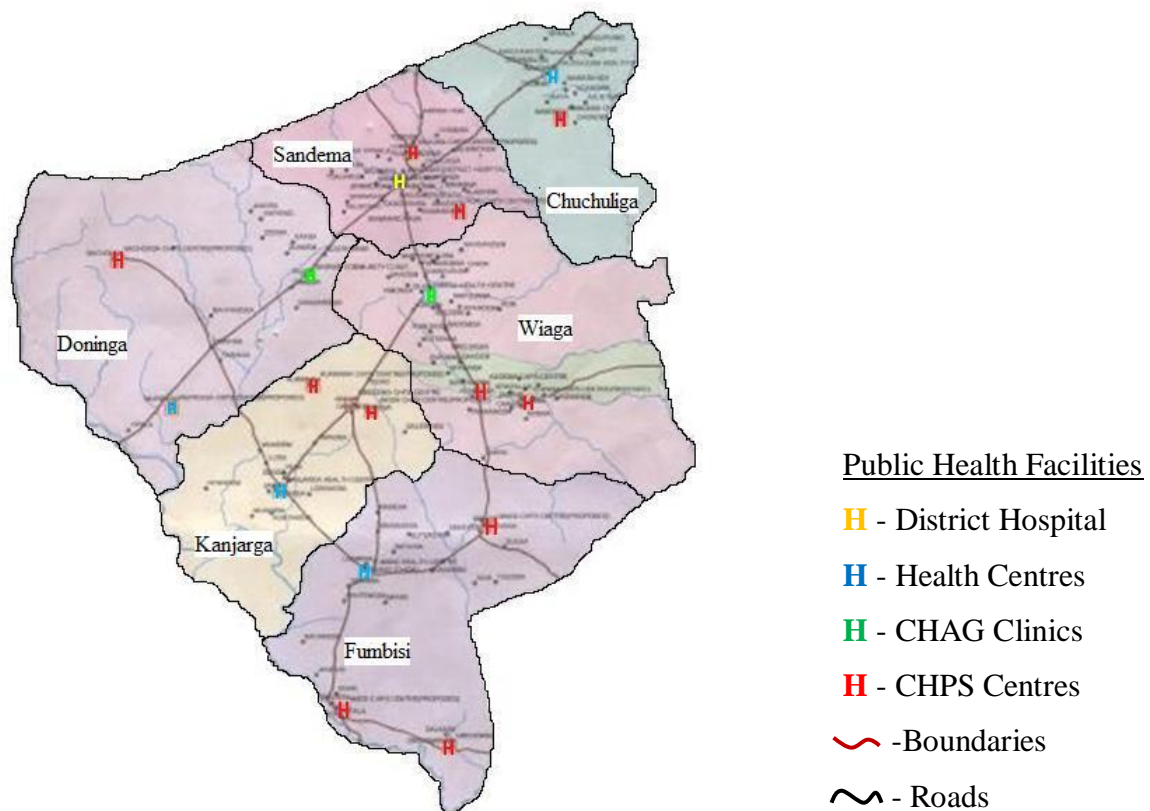
Figure 3: Map of Builsa district showing health facilities

Builsa district (Figure 3) is divided into six (6) Sub-Districts. They are Sandema, with the district hospital; Chuchuliga, Doninga, Fumbisi, Kanjarga, with a health centre each; and Wiaga, that has a Catholic Community Clinic. In the Doninga sub-district, Siniensi also has a Presbyterian Community Clinic.

The district has eleven (11) functional Community-based Health Planning and Services compounds (CHPS) located at Bachongsa, Chansa, Gbedema, Gbedembilisi, Kadema, Kalijisa, Kori, Kunkwak, Mutiensa, Muzidema and Namonsa. Three (3) are yet to be furnished and two (2) are still under construction (Appendix 6).

There are eight (8) Licensed Chemical Stores in the district; three (3) located in Sandema, three (3) in Fumbisi and two (2) in Wiaga which also contribute greatly to meeting the health needs of the people.

There are a total of eighty-eight (88) outreach points where basic health services are rendered to the people at the community level. In the hundred and forty (140) communities of the district, there are 280 Community Based Agents (CBA), who volunteer to assist in preventive and social medicine by selling some medicines to members of the communities.

Among other health personnel, Builsa district has one (1) medical doctor, four (4) medical assistants, one (1) pharmacist and two (2) pharmacy technicians (DHMT, 2010).

3.3 Study Population

The study populations were categorized as follows:

Medicine outlets: One (1) District Hospital, four (4) Health Centres, two (2) Christian Health Association of Ghana Clinics (CHAG), eleven (11) Community-based Health Planning and Services compounds (CHPS) as public health service delivery points (SDP); and eight (8) Licensed Chemical Sellers Stores (LCS);

Essential medicines: Twenty (20) selected tracer essential medicines used for the treatment of the top ten diseases in the Builsa district (Appendix 2); and

In-depth interviews: Fifteen (15) managers of the medicine outlets of all the health facilities or their representatives.

3.4 Sample Size and Sampling Method

The sample size was fifteen (15) medicines outlets. That comprised of one (1) District Hospital, four (4) Health Centres, two (2) CHAG clinics, four (4) CHPS compounds and four (4) private licensed chemical sellers.

The district hospital, all four (4) health centres and the two (2) clinics in the district were selected purposively because they are the main point of call for the sick in the district.

A simple random sampling technique was used to select four (4) of the eleven (11) functioning CHPS compounds and four (4) of the eight (8) licensed chemical sellers' stores.

All managers of the medicines outlets of the selected medicines outlets or their representative were also selected purposively as well, for the in-depth interviews.

3.5 Study Variables

The study variables were: access to essential medicines, (i.e. the availability of the key tracer essential medicines at the medicines outlets and the selling prices of those medicines to the clients). Other variables were: the type of outlet, the distance of the outlet from the district hospital and the profession of the manager.

3.6 Data Collection Techniques/ Methods & Tools

Quantitative data was collected by observation of a list of twenty (20) tracer essential medicines (Appendix 2), and their prices collated on a data compilation sheet (Appendix 3) according to the standardized World Health Organization/ Health Action International (WHO/HAI) methodology (WHO and HAI, 2008a). Of the tracer essential medicines included in the survey, nine (9) belonged to the list of core medicines included by WHO/HAI, and eleven (11) were selected as supplementary medicines (Appendix 2).

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The medicines were selected on the basis of being the basic ones used for treatment of the top ten diseases of 2009 (Table 1), with inputs from practicing pharmacists, pharmacy technicians, a medical assistant and a medical doctor. For each medicine, information was collected on the availability and price of the lowest-priced generic equivalent (LPG) found at each medicines outlet.

There were fifteen (15) in-depth-interviews conducted with the managers of the medicine outlets at the time of data collection. The interview covered areas of making medicines available and how their prices are determined. An interview guide was used to gather the appropriate data (Appendix 4).

3.7 Quality Control

The research technique and tools were pre-tested in the War Memorial Hospital, (i.e. the district hospital of the Kassena-Nankana East District) and the Chiana Health Centre which is in the Kassena-Nankana West district and close to Sandema. The pre-test was done to ensure its suitability and adjustments were made to suite the environment of the study settings. All members of the research team were involved in pre-testing of the questionnaire that ensured its suitability, and adjustments were made to suite the environment of the study settings.

All data were collected in June 2010 (2nd and 3rd), to minimize possible bias of one facility receiving new stock of what others already surveyed do not have. Two data

collectors with the requisite skills and competence were recruited and trained in a two-day workshop to ensure the reliability and reproducibility of the survey. Data was always checked on the field to ensure that all information had been properly collected and recorded.

Risk of multiple entries was minimized by coding the medicine outlets and entering the questionnaire in ascending order, identifying records that have been entered more than once and removing the duplicated records. Attempt was also made to enter all data at the end of the day of collection. Data on price of available medicines were entered into the pre-programmed electronic survey Microsoft Excel workbook as part of the WHO/HAI methodology using the double entry technique. Data was validated and crosschecked to highlight erroneous entries and outliers which were verified and corrected as necessary. Filled questionnaires were kept under key and lock to prevent unauthorized people from gaining access to them.

3.8 Data Processing and Analysis

The WHO-HAI 2007 International Medicines Price Workbook version 5 part I of 2009 was used to enter, edit and analyse quantitative data from the medicine outlets. Descriptive statistics including frequency, mean and standard deviation were used. Availability was noted in all medicines outlets surveyed, and expressed as the percentage

of medicines outlets in a sector in which the medicine concerned was available at the time of survey.

Data analysis was based on a total of eleven health service delivery points and four private licensed chemical sellers' stores.

Medicine prices were compared with international reference prices (IRPs) (MSH and WHO, 2009) to obtain a median price ratio of at least four outlets in a sector, where the daily wage of the lowest paid unskilled government worker was used to gauge the affordability of medicines for the treatment of the top ten registered diseases (WHO and HAI, 2008a). The international reference prices used were the median prices of high quality multi-source medicines offered to developing and middle-income countries by different suppliers (MSH and WHO, 2009). International reference prices were converted to local currency using the exchange rate (buying rate) on 2nd June 2010, the first day of data collection, at a rate of 1.4315 Ghana Cedis per one United States Dollars (www.xe.com, 2010).

The QSR Nvivo programme (version 8 of 2009) was used to analyse the qualitative data on factors affecting the availability of essential medicines. The interviews were transcribed in Microsoft word by medicines outlets as coded and imported into the Nvivo. The analysis was done by the themes in the checklist of appendix 4.

3.9 Ethical Considerations/ Issues

The Ghana Health Service Ethical Review Committee on Research Involving Human Subjects (GHS-ERC: 3, 27th May 2010) granted ethical clearance for the study. The consent of the Regional Director of Health Service, the District Director of Health Service and the managers of the sampled medicine outlets were sought (Appendix 1).

There were minimal ethical issues of clients' clinical confidentiality since it dealt with medicines in the health facilities and their managers. Data collected was stored and managed to ensure that neither the health facilities nor the managers are identifiable in the research documents or reported to the authorities.

The managers had the option to decline participation, but all participated and were invited for the dissemination of results.

I hereby declare that there is no conflict of interest, apart from the academic and public health importance of this survey; although I am a staff of the District Health Services.

3.10 Limitations

The minimum wage used for calculation of affordability is that of the formal sector, where many people in Builsa district do not belong to.

The list of medicines is not exhaustive, but the medicines selected were representative for treating the ten top recorded disease conditions for 2009 in the Builsa district. Availability of medicines at the time of data collection may not be the same all year long.

CHAPTER FOUR

4.0 RESULTS

4.1 Characteristics of the Study Population

The eleven (11) health service delivery points sampled for the survey comprised of a district hospital, four (4) public health centres, two (2) Christian Health Association of Ghana (CHAG) clinics and four (4) of the eleven (11) functional Community-based Health Planning and Services (CHPS) compounds (Table 2). Nine (9) of the interviewed persons were the substantive managers of their respective health service delivery point. Six (6) out of the eleven (11) of respondents were females. The managers of the facilities were made up of two (2) Medical Assistants (MA), two (2) Midwives (M), two (2) Nurses (N), one (1) Pharmacy Technician, four (4) Community Health Officers (CHO) and four (4) Medicines Counter Assistants (MCA).

The four (4) private licensed chemical sellers (LCS) stores sampled were all managed by males, and two (2) of them were the proprietors of the stores.

As shown in Table 2, the farthest medicine outlet of the study was the Fumbisi Health Centre, situated about 33.5 km from the district hospital at Sandema.

Table 2: General characteristics of the medicine outlets

Facility Type	No of Outlets	Sub-district	Distance from DH	Profession of Respondent	Sex of Respondent
District Hospital	1	Sandema	-	Pharm. Technician	Male
Health Centre & CHAG	6	Chuchuliga	16.0 Km	Medical Assistant	Male
		Doninga	21.5 Km	Nurse	Male
		Kanjarga	28.8 Km	Midwife	Female
		Fumbisi	33.0 Km	Medical Assistant	Female
		Wiaga	9.2 Km	Nurse	Female
		Doninga	11.5 Km	Midwife	Female
CHPS	4	Sandema	5.1 Km	Com. Health Officer	Female
		Kanjarga	16.2 Km	Com. Health Officer	Male
		Wiaga	16.9 Km	Com. Health Officer	Male
		Kanjarga	19.5 Km	Com. Health Officer	Female
LCS	4	Sandema	0.9 Km	Med. Counter Asst.	Male
		Wiaga	8.1 Km	Med. Counter Asst.	Male
		Fumbisi	32.0 Km	Med. Counter Asst.	Male
		Fumbisi	32.5 Km	Med. Counter Asst.	Male

4.2 Availability of Essential Medicines

Figure 4 below, shows the percentage availability of twenty (20) essential medicines for the Clinic and Health Centre levels of care. The CHAG clinics and the Health Centres had 85% (SD±17) of availability of the medicines surveyed, in comparison with 71.3% (SD±35.6) for the Licensed Chemical Sellers.
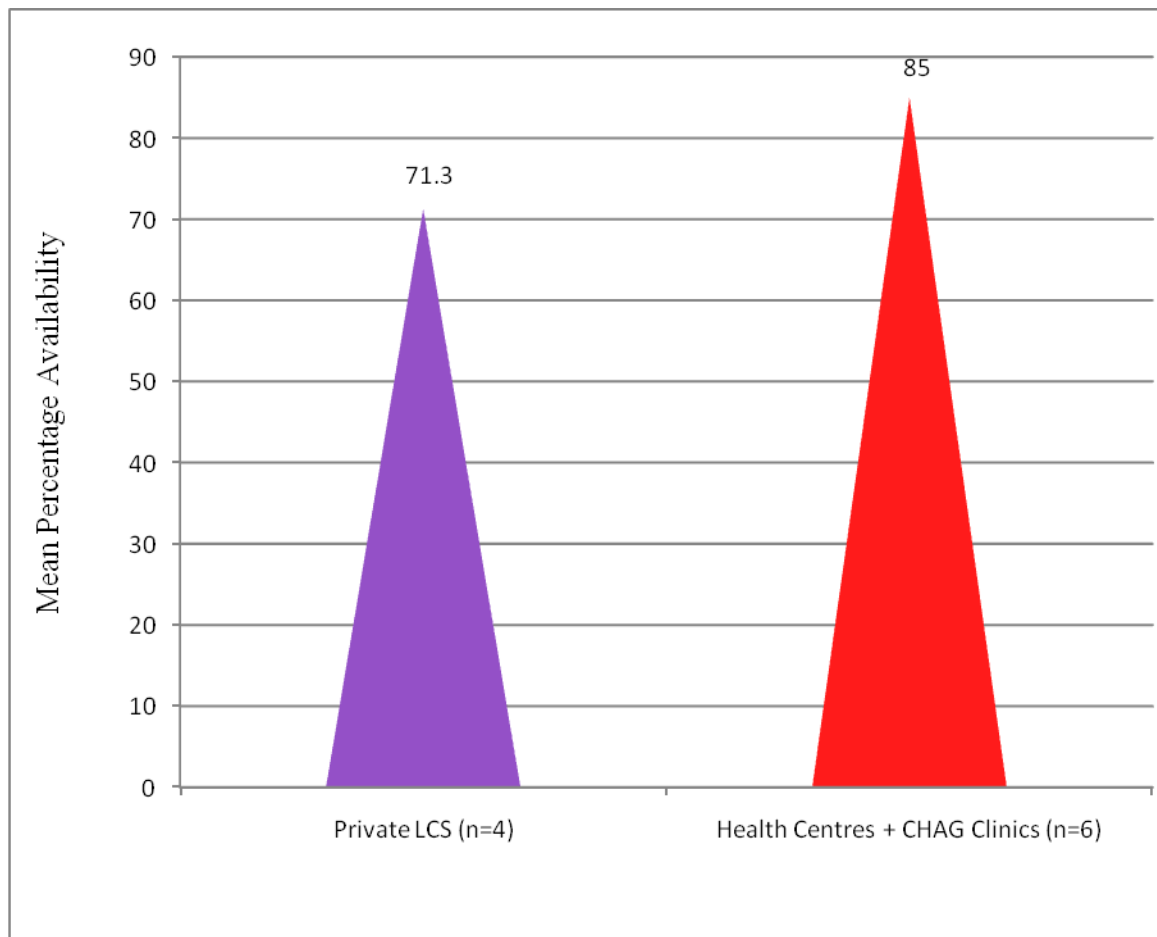
Figure 4: Percentage Availability of 20 medicines of Health Centre Level

Figure 5 below, shows the percentage availability of ten (10) essential medicines for Community level. The CHPS compounds had 62.5% (SD±41.1) of availability of the medicines surveyed in comparison with 77.5% (SD±32.2) of the Licensed Chemical Sellers for the ten medicines.
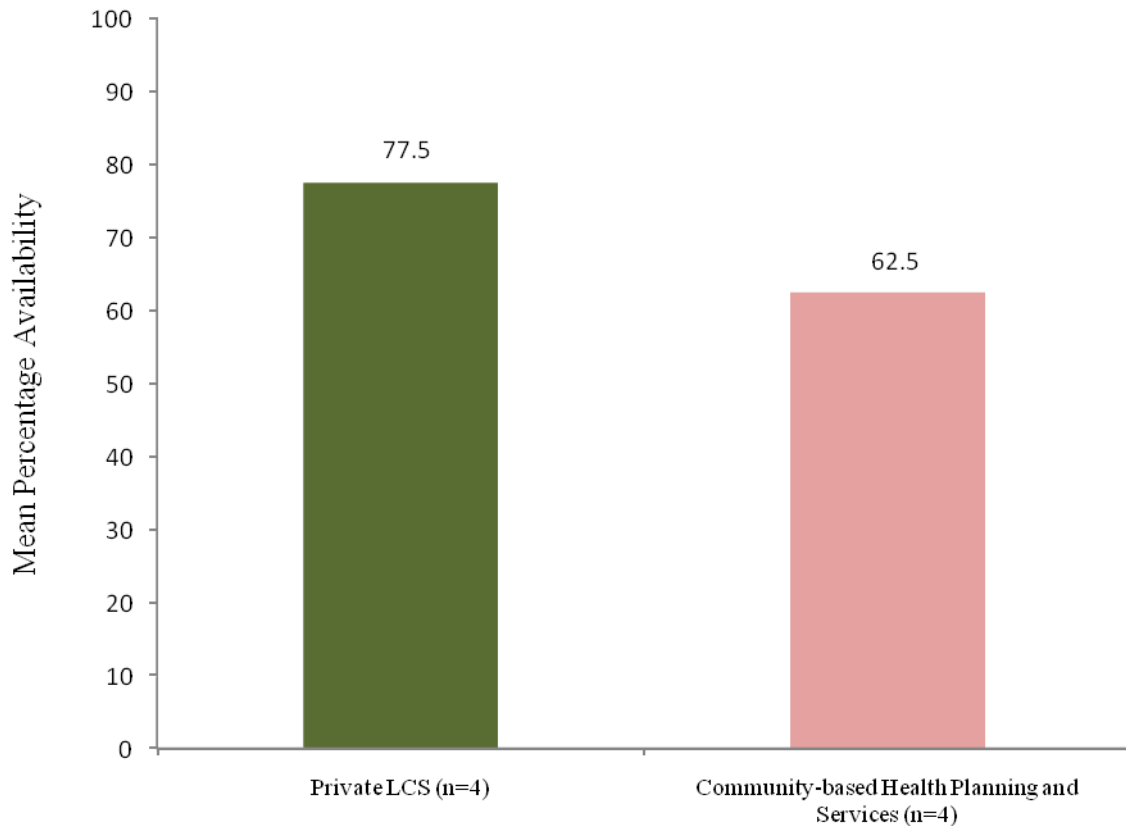
Figure 5: Percentage Availability of 10 medicines of Community Level

The study found that the overall percentage availability of the twenty (20) selected essential medicines in all fifteen (15) surveyed outlets in the district was 73% (SD±19.3). It was only the District Hospital that had all twenty (20) medicines at the time of the survey.

4.3 Availability of Anti-Malaria Medicines

The most common cause of health facility attendance was malaria (51.21%) as shown in Table 1. None of the four (4) medicines surveyed for malaria was present in all the facilities as shown in Figure 6 below.
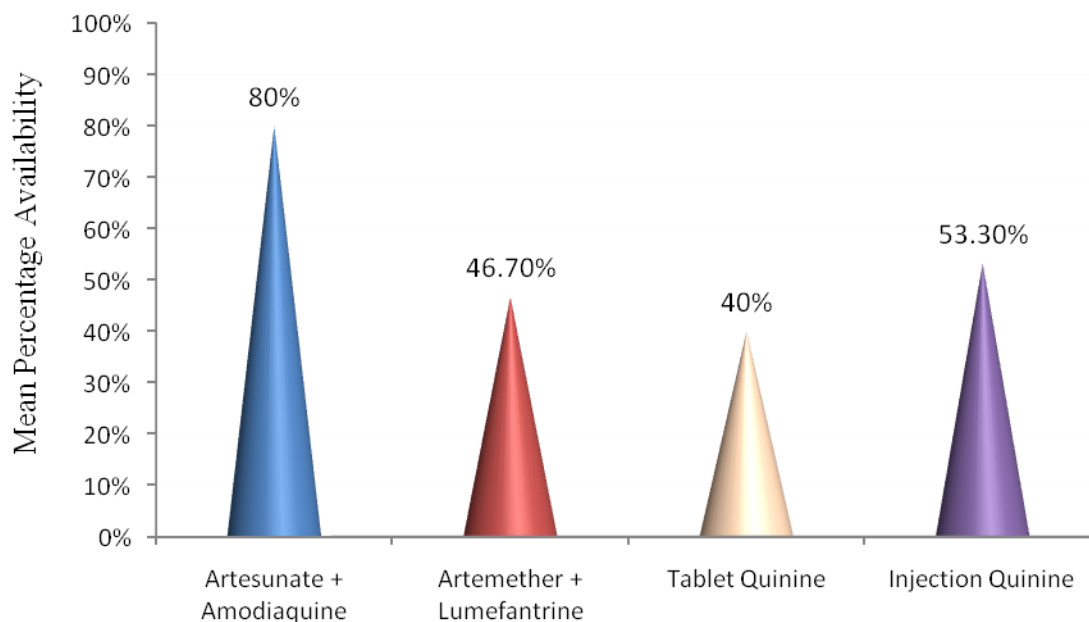
Figure 6: Percentage of medicines outlets with Anti-Malarial Medicines available

One Licensed Chemical Store did not have any anti-malarial medicine surveyed, and one clinic did not have Artesunate + Amodiaquine nor Artemether + Lumefantrine.

4.4 Affordability of Essential Medicines

All the health service delivery points in the district use the National Health Insurance Medicines Prices for their clients. Table 3 below, shows the median price ratio (MPR) of selected medicines that were present in at least four outlets of a sector. The public health services delivery points (SDP) and the Licensed Chemical Sellers (LCS) Stores had MPR of 1.84 and 2.05 respectively.

Table 3: Median Price Ratio of individual Medicines found in four or more outlets

No	Medicine Name	IRP 2009 (GH¢)	SDP price (GH¢)	LCS price (GH¢)		(SDP) MPR	(LCS) MPR
1	Albendazole	0.0376	1.2000	1.0000		42.34	35.28
2	Amoxicillin suspension	0.0064	0.0140	0.0150		2.17	2.33
3	Amoxycillin	0.0298	0.0500	0.0291		1.68	0.98
4	Co-trimoxazole	0.0145	0.0200	0.0200		1.38	1.38
5	Co-trimoxazole suspension	0.0060	0.0130	0.0150		2.16	2.49
6	Metronidazole	0.0073	0.0200	0.0150		2.74	2.05
7	Metronidazole suspension	0.0079	0.0130	0.0150		1.65	1.91
8	Paracetamol	0.0054	0.0100	0.0200		1.84	3.68
9	Paracetamol suspension	0.0056	0.0080	0.0100		1.43	1.79
	Median	**0.0073**	**0.0140**	**0.0150**		**1.84**	**2.05**

Table 4 shows the median treatment prices of the commonly registered disease conditions in an adult. Artesunate+Amodiaquine is the official first line medicine for treatment of malaria in Ghana. The price is highly subsidized by government for the public sector outlets. Quinine is the approved anti-malarial medicine in the first trimester of pregnancy.

Table 4: Affordability of Treatment of Diseases in the Adult.

Conditions	Medicine name & strength	Rx Duration (Days)	Total # of units per Rx	Median treatment price (GH¢)	Days' wages
Malaria	Tab. Amodiaquine + Artesunate; 150+50mg	3	24	4.00	1.3
Malaria in Pregnancy	Tab. Quinine; 300mg	7	42	8.40	**2.7**
Other ARI	Tab. Cotrimoxazole; 80+400mg	7	28	0.56	0.2
Pneumonia	Cap. Amoxycillin; 250mg	7	42	2.10	0.7
	Tab. Erythromycin; 250mg	7	56	4.48	1.0
Diarrheal diseases	Tab. Metronidazole; 200mg	7	42	0.84	0.3
Acute eye inf.	Tetracycline Eye Oint; 1%	7	1	1.00	0.3
Hypertension	Tab. Nifedipine; 20mg	30	60	5.40	1.7
Hypertension in Pregnancy	Tab. Methyldopa; 250mg	30	180	27.00	8.7
Anaemia	Tab. Fersolate; 200mg	90	360	3.60	1.2
	Tab. Folic Acid; 5mg	90	90	0.90	0.3
Enteric Fever	Tab. Ciprofloxacin; 500mg	14	28	8.40	2.7

Similarly, Table 5 shows the median treatment prices commonly registered disease conditions that occur in children. It is only enteric fever and anaemia that use a day's wage for their treatment.

Table 5: Affordability of Treatment for Paediatric Disease Conditions

Conditions	Medicine name & strength	Rx Duration (Days)	Total # of units per Rx	Median treatment price (GH¢)	Days' wages
Malaria	Tab. Amodiaquine + Artesunate; 150+50mg	3	12	2.00	0.6
Other ARI	Susp. Cotrimoxazole; 8+40mg/ml	7	100	1.30	0.4
Pneumonia	Susp. Amoxycillin; 25mg/ml	7	100	1.40	0.5
Diarrheal diseases	Pulv. ORS	3	6	1.8	0.6
Skin disease & ulcers	Povidone Iodine Tinc. 10%	14	100	2.30	0.7
Anaemia	Susp. Ferrous Salt; 15mg/ml	30	400	3.60	1.2
	Tab. Albendazole; 400mg	1	1	1.20	0.4
Enteric Fever	Susp. Chloramphenicol; 25mg/ml	14	300	3.00	1.0

4.5 Factors Affecting Availability of Essential Medicines

The public health service delivery points (SDP) procure medicines from the Regional Medical Store (RMS). This means that the availability of medicines in the SDPs depend on that of the RMS. All the Licensed Chemical Sellers (LCS) stores purchase their medicines from private pharmaceutical companies. One manager of a Health Centre complained about the reasons why his outlet did not have some medicines:

"...The Regional Medical Stores sometimes don't have the medicines we need; and other times they are close to expiry. You bring it and it gets expired on you. Procurement procedures for unavailable medicines are cumbersome with the certificate of non-availability, so we wait till the medical stores get them. Sometimes we make requisition through the District Health Administration to the Regional Medical Stores, but it delays at the DHA and so we ran out of stock completely. Other times, some of the medicines meant for our centre are given to some other place and you have to start tracing to get them back."

Another manager of a Health Centre said:

"...You can see the store here. The storage facilities and conditions here are poor. A small store room and there is no air-conditioner available."

A manager of a CHPS compound said:

"...You know that CHPS compounds are not allowed to stock some types of medicines, so those medicines are usually not supplied to us. We (CHOs) do not also know the use of some of the medicines, but diseases that require those drugs are normally referred to the hospital."

A proprietor of a LCS gave these reasons for not having some of the essential medicines:

"...The pattern of prescriptions from the hospital prevents us from stocking other drugs that may expire because nobody comes to buy them. Also some of the medicines are costly and the people usually don't buy them. But the main reason is that the Pharmacy Council people prevent us from selling many types of medicines."

CHAPTER FIVE

5.0 DISCUSSIONS

5.1 Introduction

This chapter discusses the findings of the research as related to the objectives. It is an evaluation of access to essential medicines in the Builsa District; and it is intended to provide information relevant for planning effective primary health care for the community. In particular, the study sought to determine the availability and affordability of essential medicines, so as to make information available for health managers to make informed decisions on the factors that affect pharmaceutical care provisions.

5.2 Availability of Essential Medicines

Although availability of essential medicines is one of the most important objectives of the national medicines' policies, the unavailability of essential medicines remains a major problem (WHO and HAI, 2008a, Elamin et al., 2010, GNDP, 2004b). Availability of the twenty (20) essential medicines in all surveyed medicines outlets in the Builsa district was fairly high at 73% (SD $\pm$ 19.3). This was lower than recent surveys conducted in Sudan (Elamin et al., 2010) where the mean in all sectors was 88% and 82% by (Cheraghali and Idries, 2009).

The Community-based Health and Planning Services (CHPS) compounds, assessed with the ten (10) essential medicines they can stock, also had a fairly high 62.5% availability of the medicine (Appendix 4). It was however lower than the LCS 77.5% availability for the same ten (10) medicines. The percentage availability of medicines in the CHPS compounds was higher than the global public sector figure of 34.9% (WHO and HAI, 2008b, WHO, 2010).

The percentage availability of the twenty (20) surveyed essential medicines for the Health Centres and Clinics was 85%; higher than the LCS 71.3% for the same medicines. These figures are similar, compared to 82.2% and 73.9% respectively in a national survey conducted in 2002 which sampled the district hospital in Builsa (GNDP, 2002) as part of the public sector facilities. In that survey, only fourteen (14) medicines were assessed. The percentage availability of medicines in the LCS is higher than the global survey for the private sector which is 63.2% (WHO, 2010).

Low availability of medicine increases disease burden and reduces confidence in the use of public health services; a major source of care for the poor (Loewenson, 2000). The high availability of medicines in Builsa district could have been as a result of the enhanced scheduled delivery of medicines by the Regional Medical Store, which is responsible for ensuring that quality medicines are available and at affordable prices.

5.3 Prices of Essential Medicines

Prices of medicines at public health service delivery points are lower than those at private stores (Asenso-Okyere et al., 1998), such that, affordability of medicines is consistently lower there than in private sector (WHO and HAI, 2008b). The findings from this study show that the patient prices for the lowest priced generic medicines in the public health service delivery point was 1.84 times higher than international reference prices (Table 5). This figure is lower than that of the private medicine outlets (2.05) and consistent with findings in previous surveys (GNDP, 2006, GNDP, 2004b, Kotwani et al., 2009). The private sector MPR is acceptable, but the public health service delivery point MPR is higher than it should be (Gelders et al., 2006). This may be explained by the fact that public health service delivery points use National Health Insurance Medicines Prices that were set in October 2009 for the clients. These prices are higher than the International Reference Prices of the Management Sciences for Health (MSH and WHO, 2009). In contrast, the private chemical sellers determine their selling prices from the amount they buy them.

5.4 Affordability of Essential Medicines

High cost of medicines are major barriers to accessing medicines and achieving better health outcomes (GNDP, 2002, Everard, 2003). Affordability in this work is calculated in terms of the number of days the lowest paid unskilled government worker would have to work to pay for one treatment course for an acute condition or one month's treatment for a chronic condition. At the time of the survey, the lowest paid unskilled government worker earned 3.11 Ghana Cedis (US$ 2.17).

The lowest paid government worker needed a 2.7 days' wages to treat malaria in a pregnant women with Quinine. Methyldopa for Hypertension requires 8.7 days' wages for a month's supply (Tables 4). As illustrated in Table 5, the treatment of various diseases in children takes less than a day's wage. A previous survey in Ghana had an average of 1.16 days' wage for an adult's disease condition and 1.06 days' for a child's disease condition (GNDP, 2002).

A complete course of treatment of malaria, the cause of about 51% of all cause of hospital attendance, was 1.3 days' wage for an adult; much higher than a survey conducted in Sudan which had 0.62 days' wage (Cheraghali and Idries, 2009). It was noted in this study that, medicines were found to be unaffordable to the un-insured population and those without valid insurance cards.

5.5 Factors Contributing to Non-availability of Essential Medicines

Lack of access to medicines is known to be symptomatic of wider problems relating to how health services are organized, financed and delivered (WHO, 2004b). A major factor identified as contributing to unavailability of essential medicines in service delivery facilities is the unavailability of medicines in the Regional Medical Stores (GNDP, 2002).

Some of the facilities lack adequate space in their stores to be able to stock sufficiently and not ran out of stock frequently. The continuous increase in outpatient attendance has led to an increase in the maximum stock levels for the facility stores, and the small stores cannot take the required quantities of medicines.

The classification of essential medicines (GNDP, 2004b) is a contributing factor to the unavailability of medicines in the community facilities. These facilities, as part of the Integrated Management of Neonatal and Childhood Illnesses (IMNCI), are capacitated in providing early and pre-referral treatment, but are not allowed to stock some key medicines.

None of the respondents in the survey attributed unavailability of medicines to the lack of pharmacy professionals. But the only facility that had trained pharmacy personnel had all the surveyed medicines available which brings to bare the need to equip Health Centres with Pharmacy Technicians.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The availability of essential medicines for the treatment of the top ten diseases of 2009 in the Builsa district is fairly high and acceptable. Thus the mean percentage availability for twenty (20) essential medicines surveyed was 85.0% for Health Centres and Clinics; and 71.3% for the Licensed Chemical Sellers (LCS). For the ten (10) essential medicines used at community levels, the percentage availability was low for the CHPS compounds at 62.5% as compared to 77.5% for the LCS.

Although the public health delivery points had a high median price ratio of 1.84 times international reference prices (IRP), the median price ratio for the private retail medicine outlets of 2.05 times the IRP is acceptable to the community. It is catastrophic for an individual to use a whole days' wage to pay for the treatment of a commonly occurring disease condition like malaria.

6.2 Recommendations

The study recommends that:

1. Health Managers in the Builsa district should make essential medicines for the treatment of the commonly occurring disease conditions available at all times.

2. There is the need to establish a community pharmacy in the district, because the nearest pharmacy to the Builsa district is located 28.9 kilometres from the district hospital and 62 kilometres from Fumbisi health centre.

3. Another survey should be conducted with all the essential medicines of the WHO/HAI core and global list of medicines and the supplementary for the treatment of the top five registered diseases in the Builsa district.

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APPENDICES

Appendix 1: Informed Consent Form

Project Title: Essential Medicines Availability and Affordability: A Case Study of the Top Ten Registered Diseases in Builsa District.

I am Edmund Mohammed Nyanwura, a student from the Department of Health Policy, Planning and Management, School of Public Health, College of Health Sciences, University of Ghana. I am in this facility together with my assistants to carry out a survey to assess essential medicines in Builsa district. It is purely an academic research which forms part of my work for the award of a Master of Public Health Degree. We are pleased to invite you to be part of the study. We would be very happy if you could read this consent so that you may decide if you wish to part of this study.

Accepting to take part in this study will take about 30 minutes of your time to answer some questions. You are allowed to stop answering it whenever you wish and you are also allowed to skip answering any of the questions that you are not comfortable with. The study does not involve any risks. However, your information would be treated strictly as confidential. Apart from the research team and members of the ethics committee nobody will have access to the information since it shall be under lock and key. If you agree, we will record our conversation so that we can finish early and dispose of the record as soon as we finish analysing the information. We assure you that your

name shall not appear or be mentioned in any report that might come out from this study.

The information you provide will contribute to knowledge and help the district keep in stock the relevant medicines needed. Findings and recommendations would be made available for your facility to help improve on quality of care to patients. If you have any questions, you may contact Mr. Aleka Anthony, D. D. H. S., Builsa District, on Telephone Number: 024-4780972.

Respondent's Consent

I have read all the necessary information that I need to know concerning this study and have fully understood it. I have decided on my own accord without any coercion to take part in this study. However by deciding to participate in this study, I am not waiving any of my personal rights by signing this consent form.

Signature of respondent:_____Date: _____/_____/_____

Appendix 2: List of Twenty (20) Medicines Surveyed and Classification

No	Generic name, dosage form, strength	WHO core list	EML	MSH 2009 ($US)
1	Albendazole; 400 mg; cap/tab	Yes	Yes	0.0198
2	Amodiaquine+Artesunate; 150+50 mg; cap/tab	No	Yes	0.0417
3	Amoxicillin suspension; 25 mg; millilitre	No	Yes	0.0045
4	Amoxicillin; 250 mg; cap/tab	No	Yes	0.0208
5	Artemether+lumefantrine; 20+120 mg; cap/tab	Yes	Yes	0.1983
6	Ciprofloxacin; 500 mg; cap/tab	Yes	Yes	0.0331
7	Co-trimoxazole suspension; 8+40 mg/ml; millilitre	Yes	Yes	0.0045
8	Co-trimoxazole; 80+400 mg; cap/tab	Yes	Yes	0.0101
9	Ferrous salt; 200 mg; cap/tab	No	Yes	0.0019
10	Ferrous salt; millilitre	No	Yes	0.0061
11	Folic Acid; 5 mg; cap/tab	No	Yes	0.0024
12	Metronidazole suspension; 20 mg/ml; millilitre	No	Yes	0.0055
13	Metronidazole; 200 mg; cap/tab	Yes	Yes	0.0051
14	Oral rehydration salts; powder sachet (1L)	Yes	Yes	0.0814
15	Paracetamol suspension; 24 mg/ml; milliliter	Yes	Yes	0.0039
16	Paracetamol; 500 mg; cap/tab	No	Yes	0.0038
17	Povidone Iodine Tincture; millilitre	No	Yes	0.0060
18	Quinine Tablet; 300 mg; cap/tab	No	Yes	0.0521
19	Quinine Injection; 300 mg; millilitre	No	Yes	0.1036
20	Tetracycline eye ointment; 1%; gram	Yes	Yes	0.0313

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Appendix 3: Medicine and Price Data Collection Form

Use a separate form for each medicine outlet.					
Date : _____Survey area number : _____					
Name of town/village:					
Name of medicine outlet (optional):					
Medicine outlet unique survey ID (mandatory):					
Distance in km from district capital:					
Type of medicine outlet :					
☐ Public sector facility (specify level of care below):					
☐ Primary care facility					
☐ Secondary care facility					
☐ Private sector medicine outlet					
☐ Other sector medicine outlet (please specify): _____					
Type of price :					
☐ Procurement price ☐ Price the patient pays					
Type of data:					
☐ Sample outlet ☐ back-up outlet ☐ validation visit					
Name of manager of the medicine outlet:					
Name of person(s) who provided information on medicine (if different from manager):					
Name of data collectors :					
Verification					
To be completed by the area supervisor at the end of the day					
Signed:_____Date:_____					
Lowest priced generic equivalent product: determined at facility					
Generic name, dosage form, strength	Available? yes/no	Pack size found	Price of pack found	Unit price (4 decimal places)	Comments

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Albendazole; 400 mg; cap/tab					
Amodiaquine+Artesunate; 150+50 mg; cap/tab					
Amoxicillin suspension; 25 mg; milliliter					
Amoxicillin; 250 mg; cap/tab					
Artemether+lumefantrine; 20+120 mg; cap/tab					
Ceftriaxone injection; 1 g/vial; vial					
Chloramphenicol suspension; 25 mg/ml; millilitre					
Ciprofloxacin; 500 mg; cap/tab					
Clotrimazole cream; 1%; gram					
Co-trimoxazole suspension; 8+40 mg/ml; millilitre					
Co-trimoxazole; 80+400 mg; cap/tab					
Diazepam; 5 mg; cap/tab					
Diclofenac; 50 mg; cap/tab					
Erythromycin; 250 mg; cap/tab					
Ferrous salt; 200 mg; cap/tab					
Ferrous salt; millilitre					
Folic Acid; 5 mg; cap/tab					
Methyldopa; 250 mg; cap/tab					
Metronidazole suspension; 20 mg/ml; millilitre					
Metronidazole; 200 mg; cap/tab					
Nifedipine; 20 mg; cap/tab					
Oral rehydration salts; WHO					

formulation; powder sachet (1L)					
Paracetamol suspension; 24 mg/ml; milliliter					
Paracetamol; 500 mg; cap/tab					
Povidone Iodine Tincture; millilitre					
Quinine Injection; 300 mg; milliliter					
Quinine Tablet; 300 mg; cap/tab					
Salbutamol inhaler; 100 mcg/dose					
Tetracycline eye ointment; 1%; gram					

Appendix 4: Checklist of Topics for the Survey

What is your profession?

Why do you have the medicines you currently have in stock?

Why don't you have the medicines that are not available?

Why do you stock the brands of medicines you have?

How do you get medicines for your clients?

How do you decide on the selling price of your medicines?

Do some of your medicines expire?

What do you do to the expired medicines?

Appendix 5: List of Surveyed Medicines Permitted at CHPS Compounds

Medicine	EML Classification
Paracetamol Syrup, 120 mg/5m1	Level 'A'
Paracetamol Tablet, 500 mg	Level 'A'
Ferric Ammonium Citrate (FAC)	Level 'A'
Iodine + Potassium Iodide Solution, 2% +2.4%	Level 'A'
Oral Rehydration Salts Powder	Level 'A'
Ceftriazone Injection, 250 mg vial	Programmed Drug
Ciprofloxacin Tablet, 500 mg	Programmed Drug
Amodiaquine Tablet, 150 mg + Artesunate Tablet, 50 mg	Programmed Drug
Quinine Injection, 300 mg/m1 in 2mls	Programmed Drug
Quinine Tablet, 300 mg	Programmed Drug

Appendix 6: List of CHPS Compounds and their Status

SUB DISTRICT	COMPOUND	COMMUNITIES	POPULATION	STATUS
Chuchuliga	Namonsa	4	2,713	Functional
	Yipaala	3	1,251	Proposed
	Achanyeri-Goayie	1	382	To be furnished
Sandema	Kalijisa	2	1,370	Functional
	Balansa No. 2	4	1,805	Proposed
	Kori	5	2,135	Functional
Doninga/ Siniensi	Bachonsa	2	741	Functional
	Wupiensa	2	670	To be furnished
	Zundema	4	2,234	Proposed
Fumbisi	Gbedembilisi	2	701	Functional
	Wiesi	2	1,151	To be furnished
	Uwasi	4	2,022	Not completed
Wiaga	Kadema	6	3,585	Functional
	Zamsa	2	1,332	Not completed
	Chansa	4	2,667	Functional
	Mutiensa	6	4,470	Functional
Gbedema/ Kanjarga	Gbedema	3	2,063	Functional
	Kunkwak	1	622	Functional
	Jagsa	3	2,108	Proposed
	Musidema	3	1,192	Functional
TOTAL	**20**	**63**	**35,214**	