SURVEY ON RETAIL PRICES OF PRESCRIPTION DRUGS IN UGANDA; AN INTER-REGIONAL COMPARISION

BY

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Declaration

I declare that this thesis is my original work and that apart from the normal assistance from my supervisor, this work has been produced by my own efforts. I further declare that this has not been, and will not be, presented to any other University, or elsewhere. for the purposes of obtaining a degree. All sources of information have been fully acknowledged and credited.

Seru Morries

Date

This thesis has been submitted for examination to the university with my full permission

Professor Clas Rehnberg

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Acronyms

CMS:	Central medical stores
DANIDA:	The Danish agency for development assistance
DAP:	Action programme on essential drugs
EDL	Essential Drug List
GOU	Government of Uganda
HSSP	Health Sector Strategic Plan
JMS:	Joint medical stores
NDA:	National Drug Authority
NDP:	National Drug Policy
NGO	Non-Governmental Organisation
NHA	National Health Accounts
NMS:	National Medical Stores
OECD:	Organisation for economic cooperation and development
PMPRB	Patented medicine price review board
PNHFPS	Private not for profit
SHD	Sub-Health District
STGI	Standard treatment guidelines
USH:	Uganda shillings
WHO:	World Health Organisation.

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Dedication.

I dedicate this thesis to my mother for her support and encouragement to see me successful in life.

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Abstract

In Uganda retail prices of prescription drugs differ from region to region. They also varies in different out-lets in the same region. However factors that are responsible for these disparities differ from setting to setting. The main concern of this study was to determine factors that are responsible for disparities in retail prices of prescription drugs in Uganda. The study also came out with methods that can be used to minimise these disparities and to control retail prices of prescription drugs in Uganda. To give the reader an insight of the health sector in Uganda the study dedicated one chapter on organisation, management and financing of health care system in Uganda in general and the pharmaceutical sector in particular.

Data collected from drug out-lets, and key informant interviews was analysed using STATA statistical package. The study findings indicate that turnover, and overhead expenditures have direct influence on retail price of prescription drugs in Uganda. The study further indicates that out-lets, especially those in rural areas, are reluctant to stock drugs with high wholesale prices and that availability of some essential drugs is a problem in these areas. When they stock them there is a tendency to put high retail mark-up on them. This raises concern about affordability and availability of these drugs in rural areas. Other findings indicate that prices differ from region to region, and that drugs with low turnover and high wholesale prices are more expensive in rural areas.

The study revealed that drug shops and clinics stock a wider range of drugs than they are authorised to handle. The findings further show that there is uneven distribution of pharmacies in Uganda. All pharmacies are found in urban areas and yet the majority of the country's population lives in rural areas. These rural areas are served by drug shops, which by law are supposed to handle a narrow range of drugs.

The study proposes to policy makers, mechanisms that can be used to control retail prices of prescription drugs. It recommends the involvement of National Medical

Stores in improving availability of drugs in the private sector, and that research should be done to assess the feasibility of introducing financing schemes to partially tackle the problem of affordability.

CHAPTER ONE

BACKGROUND TO THE STUDY

1.1 Introduction

Drug supply should be seen in the context of the national health system and adapted to the general socio-economic situation and development of the country. A health system only functions well with sustained availability of essential drugs. Essential drugs must also be affordable by low-income members of the population, and there must be mechanisms ensuring that even the poorest people have uninterrupted access to essential drugs, as they tend to do without, if they cannot afford them.

In Uganda, public health facilities frequently fail to supply medicines to patients, making private drug purchases a major source of drugs for the population. However, private drug suppliers like, other business people tend to operate in places where there is a chance of making high profits. This has led to concentration of private drug outlets in urban areas, living most of the rural poorly served, which has resulted to high prices of drugs in rural areas compared to urban. This is characteristic of perfect competition as argued under neo-classical economic theory. Where by, economic commodities are exchanged for value in a market setting, and demand and supply forces are the regulators of market mechanisms including price. However, drugs supply, as a component of health care should not be left at the mercy perfect competition, because as a commodity they do not comply with principals of perfect competition. There are imperfections that lead to failure in this market (McGuire, et al 1987). Usually there is limited competition between sellers in this market because entry is restricted. Secondly, the existing information asymmetry between the buyers and sellers in this market may lead to supplier-induced demand. Thirdly, drugs also possess both positive and negative externalities. An example of positive externality is treatment of infectious diseases e.g. pneumonia and tuberculosis, which not only benefits the patient but have the additional positive value of reducing the spread of the infection to other people in the community (Gray and Matsebula, 2000). An example of a negative externality is the ability of some drugs taken by expectant mothers producing abnormalities

in unborn children). The above factors and many others make drug market, worthy of government intervention.

This study identifies some of the factors that are responsible for disparities in retail prices of prescription drugs and geographical distribution of drug outlets, and factors that influence the availability and affordability of drugs in the different regions of Uganda. It observes and explores factors like overhead expenditure, turnover, wholesale prices, and the use of generic and branded drugs. The study focuses on the pharmaceutical system in Uganda with the aim of identifying the above-mentioned factors. Then it proposes some interventions that can be used to improve availability and affordability of prescription drugs, and recommends ways of minimising price disparities in different regions of Uganda.

1.2 Uganda' s socio- economic demographic profile.

Uganda 's projected population in 2000 was 20.9 million of which 51% were female and 49% were male. The population growth rate was estimated at 2.5 % and the fertility rate at 6.9 (Uganda Demographic and health Survey, 1995). The life expectancy in 1991 was 45.7 years (males) and 50.5 years for females, the average being 48 years at birth (Population and Housing Census, 1991). According to the Uganda Demographic and Health Survey of 1995, the overall life expectancy was put at 52 years. Mainly as a result of AIDS Life Expectancy is now projected to be 43 years (WHO 2001)

The country achieved marked economic growth of an average of 6.5 % per annum between 1992 and 1997 and inflation rate was maintained below 10 %. The Gross Domestic Product (GDP nominal) per capita grew at a rate of 3.4 % per annum and per capita was estimated at US$ 300 over that period (Poverty Eradication Action Plan 1997).

Government health expenditure was estimated to be 8% of the total government expenditure, which represents about 0.8% of GNP. Per capita total health expenditure was

estimated at US$ 12. Only US$ 3.95 was attributed to government and donor spending, the balance coming from private spending (Household Budget Survey, 1996).

Despite these economic achievements, household incomes have remained low, though there has been a reduction in level of absolute poverty from 66.3% in 1994/95 to 46 % in 1996/97 with the North and Eastern regions showing lower levels of poverty reduction (Poverty Monitoring Survey, 1998). This economic situation has contributed to the poor health status of the population.

1.3 Statement of the problem

There is a big disparity in wholesale and retail drug prices between different drugs out-lets. Prices are generally higher in rural than urban areas. They are also higher in clinics than in drug shops and pharmacies. Secondly in some regions some drugs are perpetually out of stock. This is mostly common for vital and very essential drugs. These are drugs that are not used frequently but their absence when needed may lead to death or permanent disability. Therefore it is necessary to find the root causes of these scenarios

1.4 Study objectives

1.4.1 General objective

To identify factors that influence retail prices and compare price differences of prescription drugs in different regions of Uganda in order to generate information that may guide policy in ways of minimising price disparities, regulate drug prices and improve availability.

1.4.2 Specific objectives

- Compare drug prices in drug shop, clinics, and pharmacies.
  Explore the influence of wholesale prices, overhead expenditures, turnover and distance from Kampala on drug retail prices.
- Explore the impact of turn over on drug availability.
- Compare prices for generic and branded drugs.

1.5 Justification and significance of the study

In Uganda little information exists on factors that influence retail prices of prescription drugs, let alone factors that are responsible for inter-regional disparities. Therefore it is important to conduct a study to identify factors responsible for these price disparities and find ways of minimising inter-region price disparities, lowering drug prices and improving availability. Data on differential pricing and on factors that influence retail prices is necessary if any programme to minimise price disparities and regulate drug prices in Uganda is to be developed.

1.6 Scope and limitations of the study

This study was conducted in four districts of Uganda namely Lira, Kampala, Jinja and Kabarole. The study was limited to supply factors that affect retail prices. It looked at wholesale prices, distances from main importers and distributors, overhead expenditure and turnover. Other factors like socio-demographic characteristics of the catchments areas, infrastructure, and heterogeneity of drug outlets were not considered in the study. Also not studied were demand factors like household income, educational level and disease profile.

Geographically the study limits itself to four districts, one from each region of Uganda, because of differences in socio–economics characteristics in a region, the chosen districts may not give a general representation of the region.

The study employed therapeutic classification of drugs, but drugs are classified in many different ways e.g. they can be classified based on route of administration, i.e. injectables, oral medications, and inhalers. The study is unable to tell what would have happened if another form of classification was used.

Also the study only examined drug supply in the private sector, and only where the mode of payment was out of pocket, so the study does not show the influence third party payers and public financing have on availability and affordability of prescription drugs in retail

drug out-lets. Lastly a cross-sectional survey was used to collect data for this study. This type of study does not capture the change in price disparities over time

CHAPTER TWO

REVIEW OF LITERATURE

2.1 Introduction

This chapter describes the theoretical underpinnings that guided this study, and then discusses other studies done in the area of drug price comparisons, regulations and price controls. It also looks at literature that was useful in drawing up the methodology, and literature that enabled the researcher to make informed discussions and recommendations. Work done in comparing prices among developed countries, e.g. USA, Canada and some European countries was reviewed. The chapter includes drug price comparisons between developed and developing countries and intra country. Existing drug price regulatory mechanisms that are in place, and evidences supporting the usefulness of these mechanisms were also reviewed.

2.2 Theoretical perspectives and conceptual framework of the study on determinants of retail prices of prescription drugs.

After World War II, many new powerful drugs were discovered " the so called wonder drugs"(Dowling, 1977). In just over a decade, practitioners and the public had at their disposal many drugs, which they were demanding and willing to pay for. In the middle of the 20th century many books were written about the revolution in medical care that modern drugs had made possible. However, in many developed countries two problems existed side by side, no drugs at all in the countryside, but hundreds of drugs competing for customer's attention in the cities (Dukes and Ronald, 1997).

With many suppliers and purchasers, markets are described as "competitive". Through the use of price signals, competitive markets are able to allocate resources efficiently, making sure that resources get to the people who value them most. Suppliers enter the market when they see an opportunity to make profit (McGuire et al., 1987). However, pharmaceuticals

like other health care products do not fit in the above neo-classical theory of perfect competition. Market failure in health sector may result from equity considerations, failure of competition, lack of information and externalities (Hanson et al., 1997). The relatively high cost of drugs compared with other goods suggests that without government involvement the poor would be denied access to life-saving pharmaceuticals. This is especially true in remote areas, where cash income is usually lower and delivery costs higher (Hanson et al., 1997). In the pharmaceutical sector, suppliers (manufacturer and wholesalers) are usually few and the costs of entry are high, both of which tend to limit competition. This can enable suppliers to form cartels, setting prices collectively so as to achieve higher profits (Labelles et al., 1994). Some health services such as treatments for contagious diseases have benefits both for the individuals who receive treatment and for others who are consequently protected from exposure to illness (positive externality). If the government does not ensure availability, these public goods may be under supplied by the private sector (Gray and Matsebula, 2000). Internationally entrance to health care market unlike other markets is restricted. There are professional standards required before one can be allowed to practice in this business. These restrictions may result into less competition, which may lead to development of monopoly power that enables sellers to charge higher prices than they would in a situation of perfect competition. Unlike the overall health care sector, monopoly power in the pharmaceutical sector is enhanced by patent protection that exists in order to encourage research and development. Through marketing techniques brand loyalty is created, which continue generating market power even after patent has expired (Woodward, 2001).

In this study, it is assumed that retail prices of drugs like for any other internationally traded goods are determined by differences in border prices, price difference in import tariffs and non tariff barriers and differences in in-country cost, wholesaling and retailing mark-ups, turnover, domestic taxation, etc (Woodward, 2001). It is further assumed that the way these factors affect drug retail prices has direct bearing on availability and affordability of drugs in different regions of Uganda. The study examines how these factors common in a normal competitive market affect availability and affordability of drugs in Uganda. The study focuses on factors like turnover, wholesale price, and distance from main suppliers, and overhead expenditure. It is assumed that factors peculiar to

pharmaceutical sector (patent protection, brand loyalty, market segmentation, etc) and factors that are due to inter-country differences (import tariff and non-tariff barriers) are captured in wholesale prices. This study is also interested in regulatory interventions that try to control drug expenditures while improving availability, lowering retail drug prices, and minimising inter-regional retail drug price disparities in Uganda.

In this study concepts such as wholesalers, wholesale price, retailers, retail price turnover, overhead expenditure and distance from metropolitan areas, were frequently used. Operationally, they mean the following:

Wholesaler: This refers to outlets that purchase drugs from manufacturers and importers in big quantities which they later break down into less bulky quantity that they sell to retailers. The price at which they sell to retail outlets is what is referred to as wholesale price in this study.

Retailers: These are outlets that sell drugs to the end user usually patients and the price at which they sell is what is referred to as retail price. It was in these outlets, where a semi-structured questionnaire was administered in order to generate information on wholesale prices, overhead expenditures, distance from metropolitan areas and turnover.

Turnover: Turnover of a drug refers to the quantity of the drug sold in a specified period of time.

Overhead expenditure: For the purpose of this study overhead expenditure refers to all other recurrent expenditure excluding finances used to replenish drug stock. Examples of such expenditures are salaries, rent, taxes, water, bills for utilities, maintenance of vehicles and other equipments.

Distance from metropolitan areas: These are big commercial centres where most importers, distributors, and major wholesalers have their warehouses and head offices. This study assumes that the distance where importers and distributors are situated relative to the location of retail drug outlet, is likely to affect drug retail prices in different region of a low income country

Generic substitution: This entails allowing dispensers to issue generic drugs even when branded drugs are prescribed. Generic drugs are identical, or bio equivalent to a branded name drugs in dosage form, safety, strength, rout of administration, quality, performance characteristics and intended use, but are usually sold at a substantial discount from the branded price.

Price regulation: refers to either putting a ceiling on drug prices, or quoting prices at which particular drugs should be sold.

Profit regulation: Refers to determining mark-ups that wholesalers and retailers can add to their purchase price.

Dispensing doctors: These are doctors who do both prescribing and dispensing.

Hypotheses of the study:

Discussions of results were guided by the hypotheses that:

(i) Retail drug outlets with a high turnover rate are likely to have low retail prices.

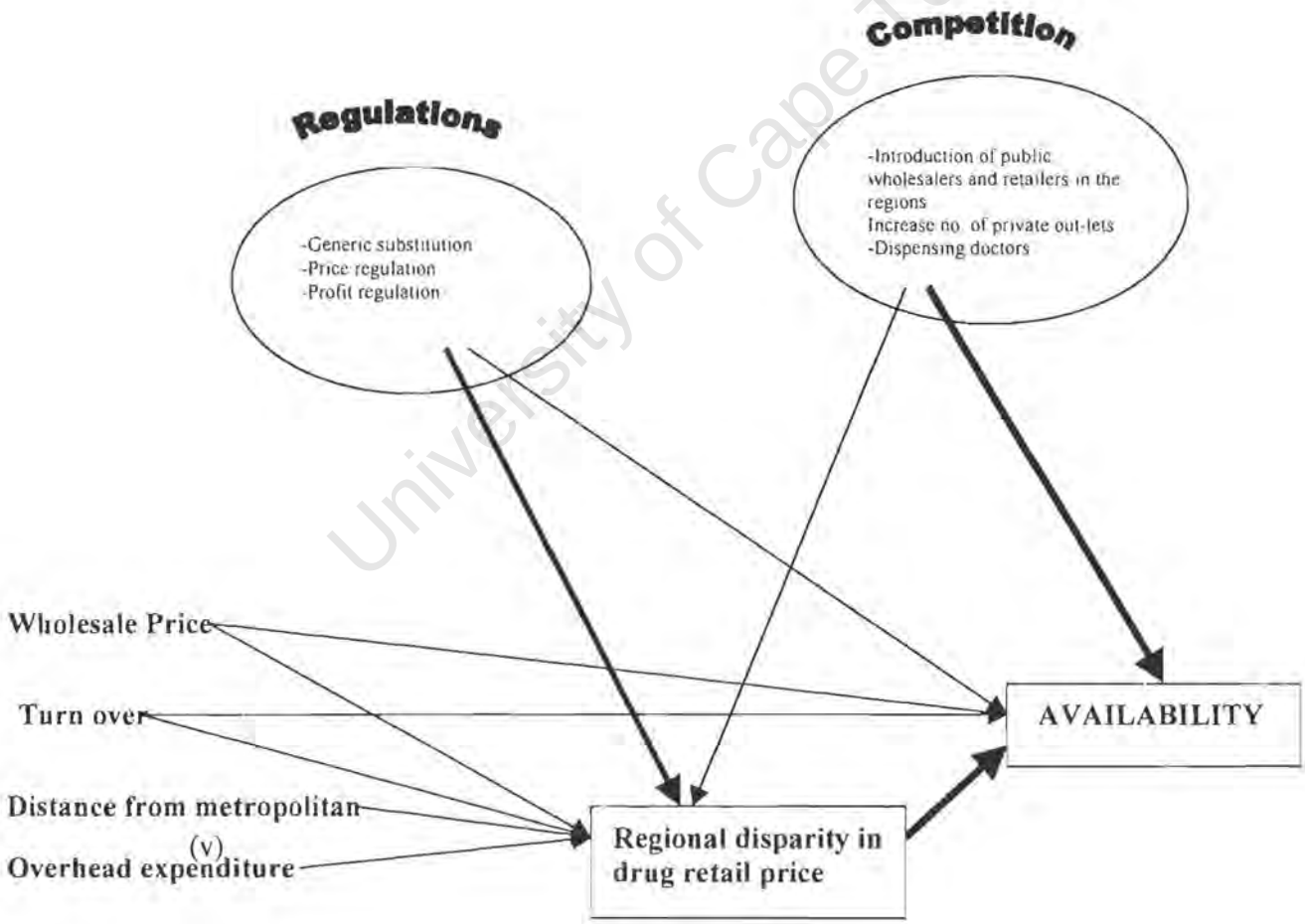
(ii) Retail drug outlets with high overhead expenditures are likely to have high retail prices.

(iii) The further the drug out let is from metropolitan areas, the more likely it will have high retail prices.

(iv) The higher the wholesale price of a drug, the higher its retail price.

The framework discussed in the preceding section is diagrammatically presented in figure-1 below.

Figure 1



Empirical evidences

2.3.1 WHO/DAP[1] suggestions on how to improve availability and affordability of prescription drugs

WHO/DAP suggests the following measures that can be taken to promote availability and affordability of drugs;

The availability of drugs can be improved by licensing importers, wholesalers and retailers with conditions. For example the wholesaler may be required to distribute to drug outlets in all geographical areas, and provide the full range of a specified list of essential drugs. Licensing conditions may also aim at encouraging better geographical distribution of retail pharmacies by specifying minimum distances between an existing pharmacy and a proposed new one. An alternative to licensing restrictions is giving financial incentives to wholesalers and retailers operating in remote and underserved areas. For example, in Norway high taxes are levied on pharmacies in more profitable areas to cross-subsidize those operating in less economically viable areas. Other countries that have tried financial incentives are Cameroon and Australia where tax credit or refunds are given for transport cost to rural areas, and tax reductions for providing services in specified areas. Experiences in these countries appear to have achieved positive results. Drug availability can also be improved by allowing clinics in remote areas underserved by pharmacies to dispense. In United Kingdom, The Netherlands and Zimbabwe, physicians may dispense in rural areas where there are no pharmacies. In Denmark, physicians may dispense during off-hour visits to a patient where treatment might be required. However, to make sure that dispensing doctors do not exploit patients, the amount physicians charge is limited. For example in Australia the clinician is not expected to make profit from dispensing drugs (WHO/DAP, 1997).

[1] DAP stands for Action Programme on essential drugs

To improve affordability, WHO/DAP proposes generic substitution, where the prescription and dispensing of generic drugs is encouraged since they are often 50% or less the price of the leading brand. Affordability can also be improved by the direct control of prices, by regulating producer and distribution prices, and regulation of retail price margins. In Colombia, to safe guard against monopoly and to make sure that vital drugs are affordable, essential drugs with fewer than five suppliers and vital drugs, were subjected to monitoring, where by the importers and producers of these drugs could only change the prices to the public after informing the ministry of such developments in advance. They would be required to present cost analysis in support of price increases. If the department was not satisfied with the analysis it could override the producer/importer and impose the price it deemed fit. In 1994 due to lack of capacity to follow up price changes under monitored freedom, the government dropped the requirement and instead directed that consumer prices for monitored drugs should be less than 3.4 times the production cost of the drug (WHO/DAP, 1997). The problem with the above requirement is that manufacturers may be relactant to reveal the actual production cost.

Since sickness is unpredictable, it is difficult to budget for drug needs. This can be overcome by introducing community drug schemes and health insurance schemes. An example of this is Germany's comprehensive health insurance that ensures access to medication and is used to contain expenditure on drugs by setting reference prices for drugs (WHO/DAP, 1997). Reference pricing means setting or limiting the price of individual drug by comparison with the price of other drugs with similar therapeutic effect, already on the market.

Drugs like other health care products require government intervention to regulate the costs society pays for them. However the Colombian experience of monitored freedom failed due to government's inability to manage it properly. Secondly, evidence in the USA, South Africa and the United Kingdom shows that dispensing doctors prescribe more drugs but fewer generic drugs than non-dispensing doctors (WHO/DAP, 1997). Therefore it is important to develop the capacity to manage the implementation of any regulatory system a country may choose. The outcomes of these regulations are likely to be as effective as the administrative system that oversees them.

2.3.2 Comparisons of retail prices for prescription drugs between East African countries and developed world

Myhr in 2000 examined the retail prices of medicines in the three East African countries and compared them with prices in Norway. One example from this study is the cost of ciprofloxacin, which was found to be twice as expensive in Uganda compared to off shelf price in Norway. Mefloquine was also twice as expensive in Tanzania where malaria is endemic. However, the article Myhr does not mention that the apparent low price, Europeans pay for essential drugs in Europe may be as a result of subsidies by their governments.

Operators in the East African pharmaceutical market explain that the high drug prices are driven by high producer or import price, strong patent protection in some countries, tariffs, taxes and high wholesale and retail mark ups. However, Myhr notes that tariff, mark-ups and other fees, constitute about 44% the total cost of drugs in Norway 40% in Kenya, therefore, drugs should be cheaper in Kenya if other factors were constant. However, this is not the case meaning that there is some thing else accounting for higher cost in East Africa.

Myhr's choice of drugs i.e. mefloquine and ciprofloxacin does not give a good picture of what goes on in East Africa. Mefloquine is not a drug of choice for treatment of malaria in East Africa, so importers and distributors are not likely to aggressively look for cheap version of Mefloquine on world market. They should have examined prices for anti malaria drugs like Chloroquine, Pyrimethamine/Sulfadoxine, and Quinine, which are commonly used in East Africa. These drugs would show a better picture of what people in East Africa pay for their malaria medication, because importers of these drugs are likely to shop aggressively for cheap version that are affordable in East Africa. Secondly Myhr;s article did not indicate whether the price of ciprofloxacin was average price for different version of ciprofloxacin. If it only observed the type sold in Norway then it missed the point

because in East Africa there are many different version of generic ciprofloxacin whose retail prices vary widely depending on country of origin.

Myhr's article would have benefited much if it had examined prices for drugs that are on treatment guidelines of East African countries and based on average prices of different versions of each drug.

2.3.3 Comparison of retail prices for prescription drugs between U S A, Canada and Mexico

There is paucity of literature regarding studies on retail drugs in Uganda in particular and studies on local factors that may explain differential in retail prices within a country in general. However there are some studies that were done in this field comparing retail prices in USA, Canada and Mexico. In 1998 a study to compare the prices senior citizens (without drug coverage or subsidies) in Vermont (USA) pay for their prescription drugs and what their counter parts in Canada and Mexico pay reported that Americans were paying 81% and 112% higher than the average price than the Canadians and Mexicans respectively. They also reported that the cost of production and distribution make up a small share of the cost of any drug, and that differences in the regulatory systems between the three countries resulted in the large price differential. In Canada patient medicine review board (PMPRB) established under the ministry of health by law in 1987, regulates the maximum prices at which manufacturers can sell patented medicines. Should the board find the price of a patented drug excessive, it may order the manufacturer to lower the price and may also take measures to offset any revenue the manufacturer may have received from excessive pricing. Secondly each pharmacy presents its usual and customary dispensing fee and must register this fee with provincial authorities.

Under the Mexican law manufacturers and the government engage in negotiations to determine the nation-wide maximum prices for prescription drugs. Pharmaceutical products are pre-packed and stamped with the maximum sale price guaranteeing consistent prices throughout the country (Prescription drug pricing in Vermont, 1998).

This study did not give a good picture of the overall price differential in the three countries because it dealt only with what senior citizens without insurance coverage were paying, but a substantial percentage of American population is on medical insurance (Daniel, 1998) Secondly results got from what senior citizens pay for drugs are not representative, because most senior citizens are likely to be on drugs for chronic diseases, yet the majority of the people buying drugs are likely to be young or middle aged and not buying drugs for chronic diseases. However it did show that prices of similar drugs may differ from country to country and that regulatory mechanisms in different countries account for some of these disparities.

2.3.4 Comparison of retail prices for prescription drugs between U S A and Europe.

Another retail drug comparison was conducted by the minority staff investigation division committee on government reforms in California (USA) where drug retail prices were compared with Canada, Japan and Europe, like in the Vermont case they found California drug prices were substantially higher than in Canada, Europe and Japan. One of the reasons for the differences was, unlike in the USA, in Canada and Europe purchasers are protected from price discrimination and therefore purchasers pay significantly less for prescription drugs than consumers in the USA. (Price discrimination occurs when manufacturers or distributors charges different prices to different customers.) Americans without insurance coverage pay almost twice as much for prescription drugs compared to large insurance companies. In Canada, PMPRB requires that the price of new brand name drug not exceed the average price of the same drug in seven other industrialised countries. In Italy the government can refuse to reimburse drug manufacturers if the price exceeds a twelve country European average price. In France, Germany and Japan, maximum prices for each drug are based on therapeutic value of the drug. Prices for new drug in these countries are determined by comparing them with prices of similar drugs that are already on the market. In UK, the maximum profit that a drug manufacturer can earn on sales is limited to 17% production cost (Minority staff reports, 2001).

2.3.5 Retail price disparities within one country

Most studies on drug prices have focused on comparisons of prices between countries, but pharmacies do not charge a uniform national price for a drug within a country. In 2000, a survey carried out by Fraser institutes in the USA found the following; Customers could save up to 39% ($52) on a single prescription by shopping three branded drugs in 201 pharmacies in Florida, Georgia and Alabama. They found a 30% lower price for Atenolol and 27% lower price for Xalaten in some drug store in Denver and Colorado. They also found that in New York City, prices of 20 drugs vary greatly among 70 pharmacies sampled, e.g. the highest price for the anti-inflammatory drug, Daypro was 45% greater than the lowest price. Alan T Sorensen in 2000 conducted a study on price dispersion where he examined prices of 428 prescriptions at 19 pharmacies, 5 minutes drive from each other in New York. He reported the highest posted price for a given prescription as over 50% higher than the lowest available price. The heterogeneity of pharmacies accounted for one third the observed prices dispersion. Pharmacies that charged a high price for one drug often charged a low price for another drug. Prices at different pharmacies for drugs used frequently were closer together than prices of drugs that were used less.

Fraser institute (2001) did a study (using telephonic interviews) comparing prices of drugs in different pharmacies in Manitoba, British Colombia, New York and Ontario. Using regression analysis they found out that prices of drugs were influenced by whether the pharmacy offered free delivery or not, which accounted for one fifth of the higher prices between pharmacies. The weakness of this study was that only three drugs were included in the study, despite the existence of many prescription products. Secondly they did not take into account other characteristics of individual pharmacies that might have been responsible for higher prices. These two problems could have been overcome by using multiple regression models.

United State General Accounting Office (GAO) in 1993 used multiple regression models to identify factors that affected the size of price differential for 120 widely prescribed drugs that are sold in Canada and the United States. They used the natural logarithm of the

ratio between the price per package (US dollars) of prescription drug in USA and Canada and found out that regulatory mechanisms in place was one of the factors that accounted for variation in US- Canada price differential among drugs sold in the population. In Canada increase in drug prices is subjected to guidelines set by patented medicine prices review board (GAO 1993).

Studies from South Africa found out significant differences between prices in private sector and public sector, which were almost 10 times higher in private compared to public sector, they attributed this difference to discriminatory practice between different prices offered to the private and public sector. The study also highlighted the following difficulties encountered while trying to do price comparisons. It found out that often pack sizes vary considerably, and direct comparison between bulk and patient- ready packs cannot be made on the basis of unit dose price. It also found that determining the relative weight to give to consumption patterns in different settings is very difficult. (Gray and Matsebula, 2000).

In Uganda there are price disparities between regions, in the rural areas prices are higher than urban areas. The fact that 50-90% of drugs in developing countries are obtained in private sector, and that the poor household in developing countries account for the largest health expenditure amounting to 60-80% and most of these people live in rural areas, and that in some unrecorded instances patients have died simply because of inability to pay for medicine makes price disparities an equity issue (Laing, 2001).

2.4 Summary of literature review

Literatures indicate that both developing and developed countries have a problem of increasing drug expenditure, and increase in prices of prescription drugs. Countries with sound drug regulatory mechanisms are likely to have low prices than those without, e.g. In Canada PMPRB regulates the maximum prices at which manufacturers can sell patented drugs or in Germany where reference pricing is used, drug prices are relatively low compared to USA which has weak laws as regards to drug pricing. This is true for both developed and developing countries. While in developed countries increased drug

expenditure may be due to; demographic shifts towards an older population shift of existing medication towards more costly agents and increasing quantities of medicine used per patient. In developing countries it is due to increased prevalence of preventable infectious diseases, and low economic growth which makes expenditure on drug big as a percentage of GDP and yet in absolute terms the amount is very small compared to what developed countries spend on drugs. Lastly both developed and developing countries implement price regulation but the motives are different. While in developed countries price controls are used as part of cost containment strategy, in developing countries they are viewed as a mean to increase affordability. Literature also indicate that availability of drugs especially to rural areas can be improved by offering financial incentives as it is done in Norway, Cameroon and Australia, or by allowing physician in rural areas to dispense like in the UK, The Netherlands and Zimbabwe.

CHAPTER THREE

PRESENTATION OF PHARMACEUTICAL SECTOR IN UGANDA

3.1 Introduction

This chapter provides a general overview of organisation and health financing of the health sector in Uganda, particularly the pharmaceutical one as contained in the Health Sector Strategic Plan (HSSP 2000.01-2004/5). However, to get a clear picture of what is happening on the ground an evaluation of HSSP is necessary.

HSSP describes the major technical health programmes, support services and their outputs. The technical health programmes arise from the minimum health care package described in the policy, while the support services include human resources, policy and planning, quality assurance, information management system, research and development, health infrastructure, procurement of drugs, equipment, supplies and logistics, health care financing and legal and regulatory framework.

3.2 Financing and organisation of the Health Sector in Uganda.

3.2.1 Health service infrastructure

Geographical access to health care facilities in Uganda is limited to only 49% of the households. The rural population, where the majority of the poor live, is further constrained in terms of access to health care by distance and geographical physical features such as rivers, marshes and hills. Only 42.7% of parishes in the country had any form of health facility by 2000, (Inventory of health, 2000). Even where the facilities exist, access to basic elements of the health care package is far from optimal. As a result of many years of civil strife and neglect, there is a massive backlog of dilapidated infrastructure which compromises efficiency and discourage utilisation. In addition, the quality and range of care that is provided at the existing health facilities still requires a lot of improvement (Health Sector Strategic Plan, 2000/01-2004/05).

Health services in Uganda are divided in six functional units. Namely, Health centre 2, (HC2) which is found at parish level, serves a population of about 5000 and offers out patient services only. Health centres 3, (HC3) located at sub-county level, serves a population of about 20000 and offers outpatient, maternity, inpatient and laboratory services. It acts as a referral centre for health centre 2. Health centre 4s (HC4) is found at county level. According to their infrastructure they should be able to offer blood transfusion and intermediate surgery like caesarean section. They employ one or two doctors, serves a population of about 100,000 and acts as referral for lower level health units. General hospitals are found at district level offer services in the major heath disciplines e.g. obstetrics and gynaecology, internal medicine, paediatrics, surgery and dentistry. They serve a population of between 100,000-1,000,000, and act as referral units for the lower level of care. Regional referral hospitals (RRH) are supposed to be well equipped and offer specialised services in the major medical disciplines mentioned above. They serve a population of between 1-2 millions, and act as referral unit for about 3-5 district hospitals. National referral hospital (NRH) offers advanced tertiary health care and acts as a referral point for RRH.

Table 1 shows the infrastructure in comparison to the minimum recommended infrastructure requirement by the year 2000.

Table 1 Status of the health infrastructure

Health Unit	Physical structure	Location	Population (000)	INFR needed	INFR existing	Gap
H/C 1	None	Village	1	0	0	0
H/C 2	Out-patient services only	Parish	5	3625	746	2878
H/C 3	Out-patient services, maternity, General ward, laboratory	Sub-County	20	679	679	0
H/C 4	Out patient services, Wards, Theatre, laboratory, blood transfusion	County	100	127	127	0
GH	Hospital, Laboratory, X-ray.	District	100-1000	87	87	0
RRH	Specialists Services	Region (3-5 district)	1000-2000	12	10	2
NRH	Advanced tertiary care	National	>2000	2	2	0

Source: HSSP, Ministry of Health, Uganda

Abrr. INFR- Information

The infrastructure above includes both Government and Non-Governmental organisations (NGO) health facilities that have been designated as responsible for the respective levels.

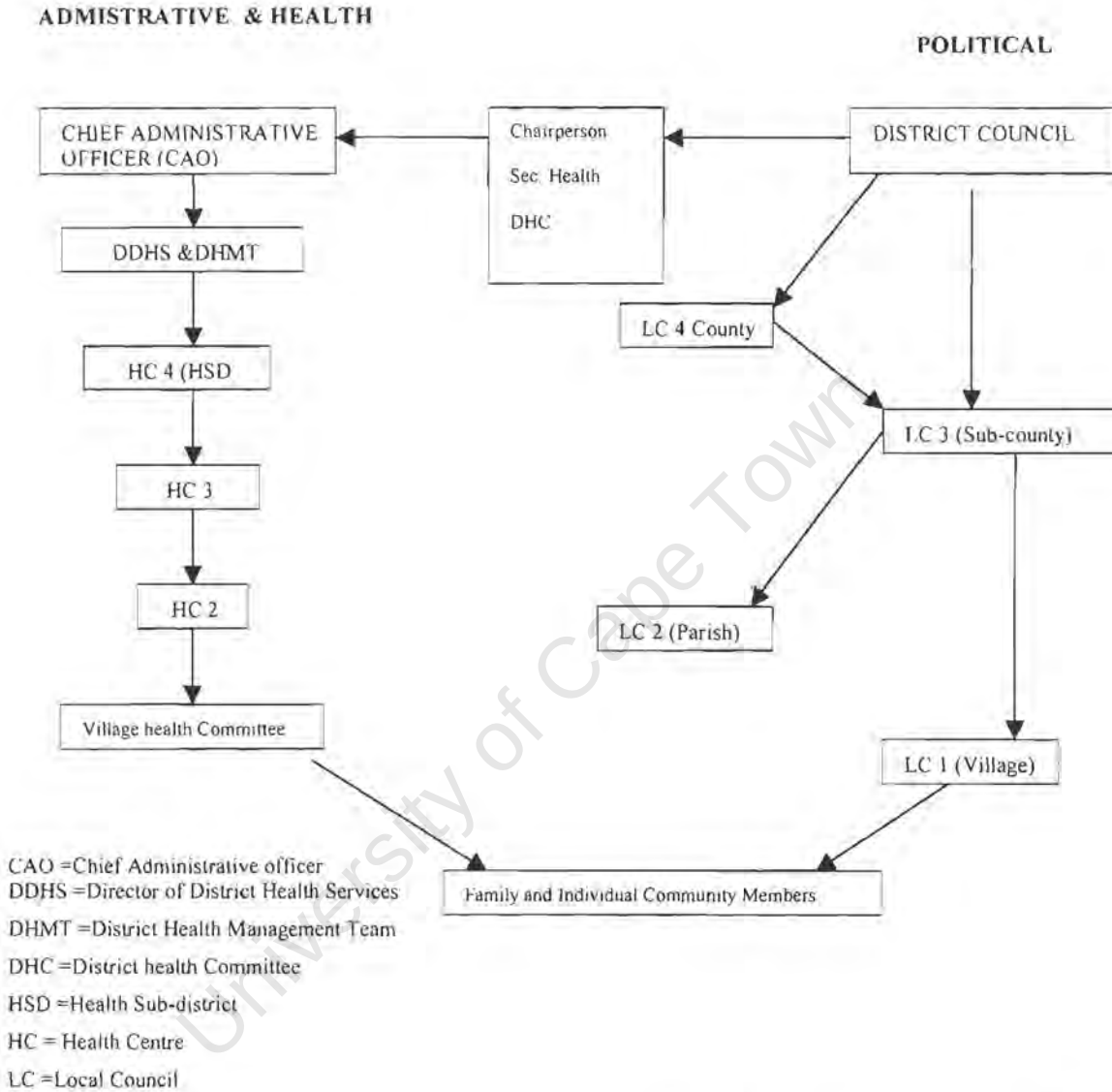
Where a higher-level facility (e.g. hospital or health centre) exists, it assumes responsibility for the lower levels.

3.2.2 Organisation and Management of Health Services

The health care delivery in Uganda under went re-organisation and restructuring to improve performance at all levels. The main aim was to create an efficient and effective system that will cope with the current reforms that government is undertaking. This section presents what was done and how the Central Ministry of Health and Districts execute their respective roles. Health service delivery is decentralised to the district and sub-district levels. Districts and sub districts prepare their own annual work plans, with support from the centre. The district council through the district health committee leads management of health services in the district. The district health management team is headed by the director of health services and composed of the head of Health Sub- Districts (HSD) and section heads.

Figure 2 shows the structure for district health services delivery. The HSD with an approx. population of 100,000 consists of lower health centres 3, 2 and village health committee. Each HSD headquarter is located at health centre 4. It takes a higher level of health services nearer to the population, including the management of obstetric emergencies. It also improves the level of technical support and supervision to lower level health services. The leadership of HSD may be based at government, NGO or private health facility and its head is a designated member of District Health Management Team (DHMT).

Figure 2 District structure for health delivery



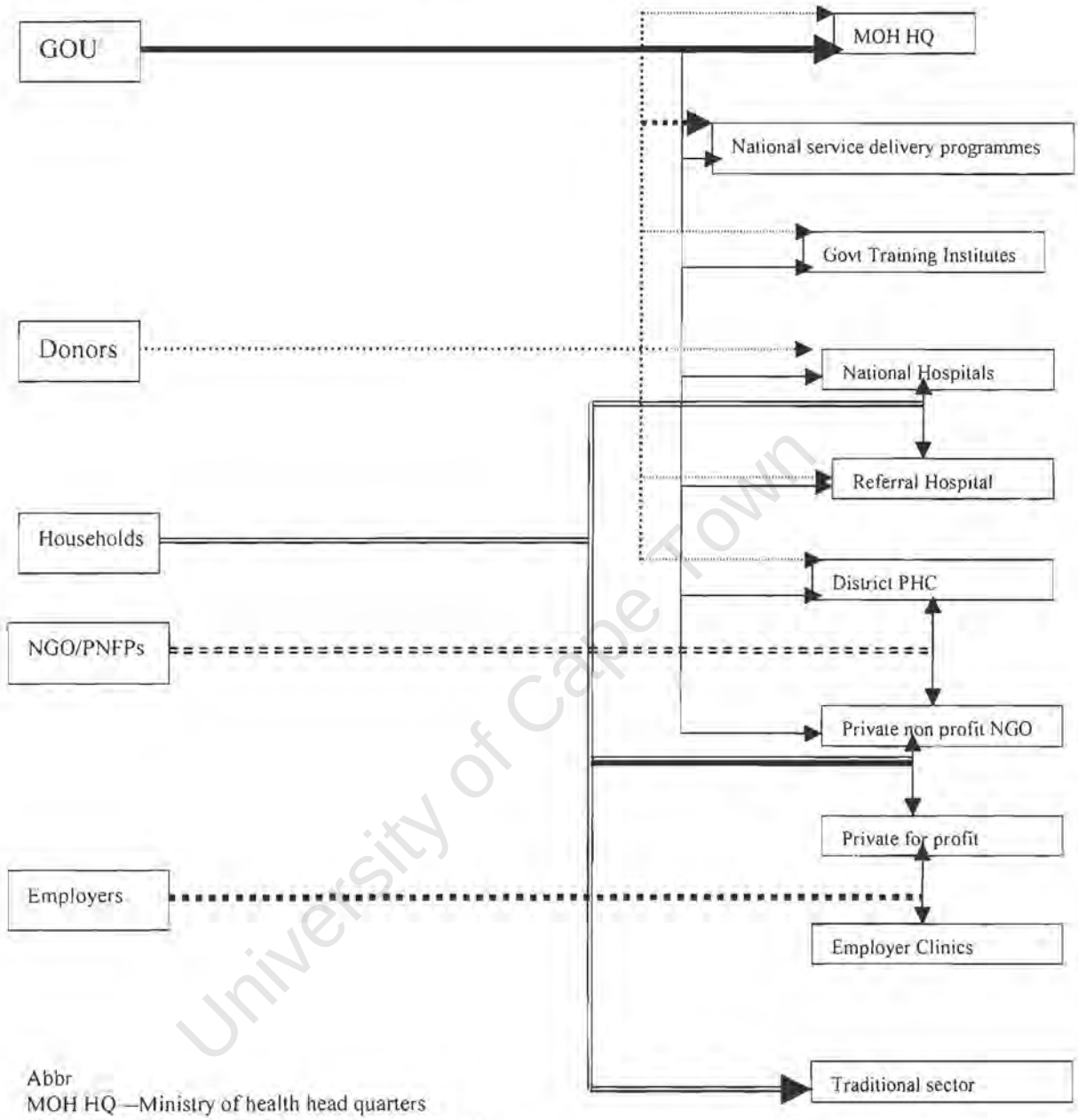
Adopted from Health Sector Strategic Plan 2000/01-2004/5 Ministry of Health, Uganda. Page 56

Under the new constitution and the 1997 Local Government Act, the Central Ministry of Health was restructured in line with the new mandate and core functions it was expected to take on. The core functions of the Ministry of health are policy formulation, standard setting and quality assurance, resource mobilisation, capacity development and technical support, provision of nationally co-ordinated services, e.g. Epidemic control and monitoring and evaluation of the overall health sector performance.

3.2.3 Financing of Health Care

Health Care Delivery in Uganda is financed through several stakeholders namely, Government, donors, private sector and the community. There is no National Health Accounts (NHA) in Uganda, but at the moment the exercise of developing NHA is going on. Figure 2 illustrates the main finance flows from sources of health care funds to where health care services are utilised. Each arrow shows a flow of funds

Figure 3 Source of finances for the Health Sector in Uganda



Abbr
MOH HQ –Ministry of health head quarters
Note; Size of the arrow indicates major consumers

Adopted from Health Sector Strategic Plan 2000/1-2004/5

Government of Uganda (GOU)

Funding to the Health Sector by GOU is provided through recurrent budgets, unconditional grants to the districts and local tax revenues. At present the funding provided through unconditional grants and local tax revenues is not well known. Reasonable estimates of these sums must be calculated if total magnitude of the amount spent on health care is to be determined.

Donors

Donor funds go to financing recurrent budget and projects. However, at the moment project funding consumes the largest portion of donor funds but it is anticipated that with time donor support will be channelled towards budget support.

NGO/PNFP

NGOs mainly receive funding from Donors/GOU and households to carry out health care activities. However, in addition they may act as a source of resources through monetary contributions and donations in kind.

Employers

Employers are increasingly providing health care benefits to their employees and their dependants. Most of the health care services are offered in employer's clinics and private for profit health facilities and therefore presently hard to quantify.

Households

Household studies have indicated that private household expenditures on health care services represent the largest element of funding to the health sector (House hold budget survey, 1996). However, an accurate estimate of the household contribution and its allocation to the sub-sectors of health is not available. It is hoped that the ongoing NHA work and household survey data will be used to understand the allocation of household expenditure in the health sector (HSSP, 2000/1-2004/5).

Medium term expenditure framework for the ministry of health 2000/2001

All amounts in billion of UGS

All amounts in billion of UGS	Recurrent		Development		Total Resource envelope
	GOU		GOU	Donors	
Budget Heading	**Wages**	**Non-wages**			
MOH headquarters	2.64	8.03	0.10	1.41	12.18
Health projects			11.07	124.80	135.88
Service delivery programmes		6.95			6.95
National hospitals	6.04	6.4	0.75	5.8	19.01
NGO Health units		5.94			5.94
Primary health care	8.90	17.58			26.48
District hospitals		6.16			6.16
Referral hospitals	8.83	4.56			13.39
Lunch allowances	9.18				9.18
TOTAL	**35.61**	**55.62**	**11.92**	**132.01**	**235.16**

Adopted (and modified) from HSSP 2000/01-2004/05

Note 1) Contributions from households, employers and NGO/PNFP are not reflected in the table.

2) The framework does not include GOU funds provided through unconditional grants to the districts

3.3 Overview of the Pharmaceutical Sector in Uganda

3.3.1 National Drug Policy

Overall goal. The National drug policy (NDP) in Uganda aims to contribute to the attainment of a good standard of health by the population of Uganda through ensuring the availability, accessibility and affordability at all times of essential drugs of appropriate quality, safety and efficacy, and by their rational use. The main objective of NDP are to make essential drugs accessible to all those who need them by ensuring that they are affordable and always available in all parts of the country, that all drugs available to the public are of appropriate quality, safety and efficacy. Other objectives of NDP are to

ensure the availability of sufficient, suitable, trained pharmaceutical and other relevant staff to enable effective implementation of NDP, and to optimise use of available resources, knowledge and expertise in implementation of NDP through the establishment of an active partnership between the community, government bodies and private health providers involved in the pharmaceutical sector and through co-operation with regional and international agencies. (NDP 2001)

The National Drug Policy and Authority Statute, 1993 identifies the following as the major components of the national drug policy

-Pharmaceutical legislation and regulation: The aim of this is to provide a comprehensive, appropriate legislative framework for effective implementation of the NDP.

Drug selection: This process involve studying the health problem profile of the country, identifying drugs that can treat these diseases, and choosing drugs of choice for different diseases basing on their safety, efficacy, and whether they are affordable or not. After identifying drugs of choice they are compiled in to a list called Essential Drug List (EDL) From EDL Standard Treatment Guidelines (STGL) are developed. EDL and STGL are revised from time to time to meet the changing disease pattern.

Drug supply: With this NDP aims at establishing and maintaining a secure, cost effective drug supply system, in order to ensure that required essential drugs are available and accessible to the population, and that quality is maintained up to the point of use. This is achieved through timely quantification of the country's drug requirements, by maintaining constant availability at all levels of adequate quantities of the required essential drugs, by ensuring that all drugs are appropriately, cost effectively and safely stored at all levels in order to maintain quality and minimise storage –related costs and drug losses from whatever cause, and lastly to establish and maintain a distribution system which ensures equity of access to, and constant availability of, required essential drugs throughout the country.

Rational drug use: The concept of rational drug use requires that patients receive medicines appropriate to their diagnosis, in doses that meet their own individual

requirement, for an adequate period of time and at the lowest cost to them and their community.

Drug financing and pricing: With this NDP aims at ensuring that sufficient funds are available to maintain a regular and adequate supply of the required essential drugs and equitable access to them by the population. Some of the strategies used to realise this are, identifying and establishing incentives to promote private sector involvement and investment in the cost-effective and equitable provision of pharmaceutical services as well as in the local manufacture of essential drugs, and designing, establishing and maintaining a system for the monitoring of world market, local retail, wholesale prices of essential drugs, setting of indicator prices and regular and effective dissemination of these to suppliers and consumers.

Traditional medicine: The goal of this component is to maximise the benefit and minimise the hazards associated with the use of traditional medicines.

Other objectives of NDP are: To promote all forms of research relevant to identified needs and especially research which contributes to the effective implementation of NDP.

Develop and maintain an adequate human resource base for NDP implementation at all levels.

Establish, maintain and effectively utilise all available forms of technical co-operation, which will support the successful implementation of NDP.

Monitor and evaluate the implementation of NDP on a continuous basis.

Despite what is written in the National Drug Policy Document of 1993 the situation in the country does not show much success of NDP.Despite emphasis on rational drug use poly pharmacy, self-medication and giving of inappropriate doses are still major concerns in both public and private health services. The issue of inadequate finances in public health sector is still not resolved and the contribution by private drug suppliers has never been quantified. There are no price control mechanisms in Uganda.Lasty despite bringing traditional healers on board hazards associated with traditional medicines have gone up. e.g. reports on sacrificing of people and use of human body parts by traditional healers have increased in the press.

3.3.2 Financing of drug supply in Uganda

In1998, expenditure on health was estimated to be about US $14 per capita, of which the government contributed US $2.11 and the remaining US $ 11. 89 was attributed to donors and out of pocket payments, a substantial amount of the health care cost was born by the patients themselves (Push-pull study, 2001).

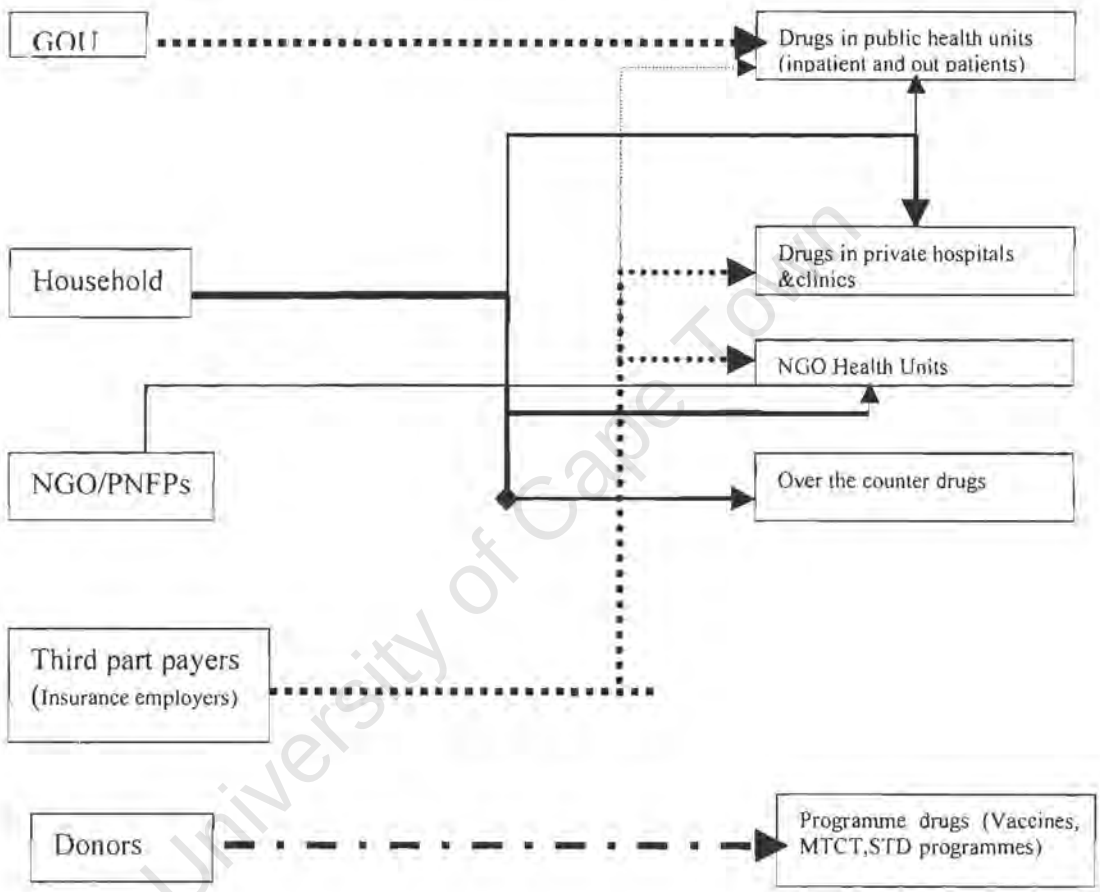
In 1997/1998 financial years, the total out of pocket expenditure on drugs was US $2.79 per capita (Euro Health Group, 1999). Studies have shown that the majority of Ugandans barely live above the poverty line, had an out of pocket expenditure of US $4.3 per head for drugs while the more affluent population contributed about US $1.43per capita (Jeppsson, 2000).

In Uganda the bulk of donor funds is used to secure drugs meant for the treatment of diseases with greater public health concern, e.g. tuberculosis, leprosy, measles and vaccines. Donors are usually interested in specific programmes i.e. sexually transmitted diseases, prevention of mother to child transmission of HIV. This leaves the bulk of drugs to be funded through public financing, various medical schemes, and out of pocket expenditure.

However, a big proportion of public funds earmarked for drugs is spent on drugs used in tertiary hospitals, mostly surgical and diagnostic, that are not used by a single patient, e.g. Ketamine, Lignocaine, X-ray fixers, ultra sound gel, laboratory reagents. After catering for the above-mentioned drugs, public funds left for prescription drugs like the ones this study is interested in, are very limited. Therefore in most public health facilities there is inadequate supply of prescription drugs, and many of them resort to rationing. Rationing affect the poor segment of society does more than civil servants and the affluent members of society. These are people with no medical schemes. The middle class especially civil servants somehow access these limited drugs in public health units through their peers and buddies working in the public health sector. The more affluent members of the Ugandan society are on medical schemes provided by their employers, so they do not have to pay out of their pockets for their medication. This scenario leaves the poor to pay out of pocket for most of their prescription drugs. This status quo is very regressive since the poor are

contributing more for their medication than the rich. Figure 4 summarises sources of finance for drugs in Uganda.

Figure 4 Source of finance for drugs in Uganda



Abbreviations
MTCT—Mother to child transmissions of HIV

STD—Sexually transmitted diseases

Note The thickness of the arrows indicate major consumers.

3.3.3 Management and regulation of the pharmaceutical sector in Uganda

Management and regulation of pharmaceutical sector in Uganda is embedded in the National Drug Policy which is both a commitment to a goal and a guide for action. It expresses and prioritises the goals set by government for the pharmaceutical sector and identifies the main strategies for attaining them. All drugs sold in Uganda must be registered with the national drug authority. Applications for registration must be sent to NDA with supporting dossiers of required information and samples, and then they are meticulously examined and assessed to ensure that they are complete and comply with all requirements. Once requirements are satisfied, the drug is added to the register. It provides a framework within which the activities of the pharmaceutical sector can be co-ordinated. It includes both public and private sector and other main actors in the pharmaceutical area (National drug policy, 2001).

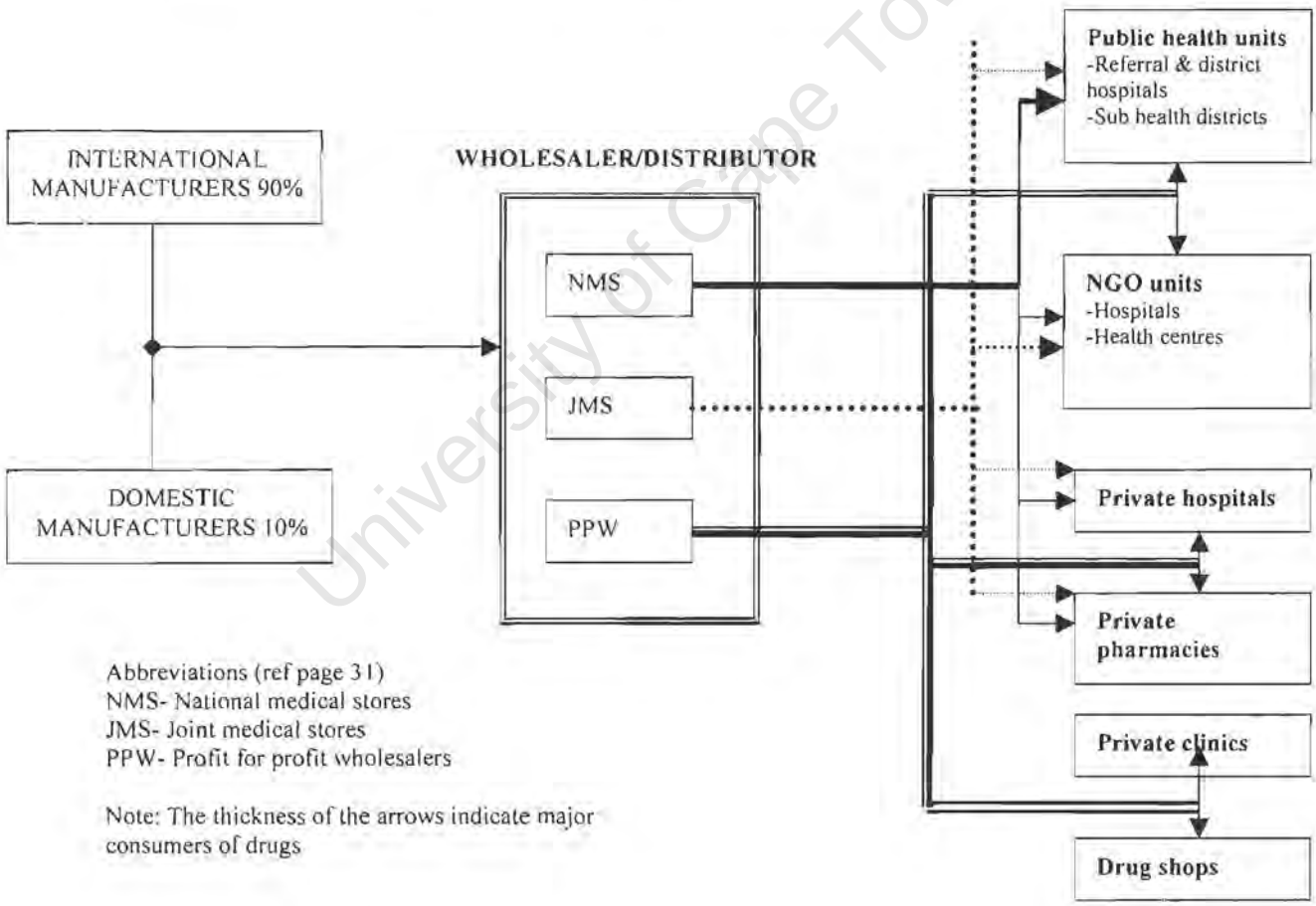
There are three main categories of pharmaceutical out-lets namely: manufactures, distributors/wholesalers and retailer. Manufacturers fall in two main categories, large scale, with multi-million dollar operations scale and medium manufacturers, producing a small range of mixtures and medicines. Uganda has five active large-scale manufacturers and six small /medium scale manufacturers. The local industry produces less than 10% of the country's drug requirement, the remaining 90% is imported. Most of drugs used in Uganda are imported from India, Pakistan, Kenya and of late China .[2]

Wholesalers sell to retailers in the amount requested. There are three major drug wholesalers namely NMS, JMS and private for profit wholesalers. The major customers of NMS are public health units but they also sell to private pharmacies, private hospitals and NGO units. JMS like NMS also supply drugs to private pharmacies, private hospitals and government units but their major customer are NGO units. Private for profit drug wholesalers supply to public health units, NGO units, private pharmacies, private hospitals, drug shops and private clinics. However it is common to find pharmacies doing both retail and wholesale business especially in rural towns and pre-urban areas. All the above three

[2] Personal communication with registrar national drug authority

out-lets are required by law to employ a pharmacist among their staff. Lastly there are retail out lets that are the point of contact with the end users namely retail pharmacies who deal in all classes of drugs, drug shops which are owned by people with formal medical knowledge (nurses, clinical officers), lastly we have clinics and maternity homes. Clinics are supposed to have a doctor and maternity homes can be run by a doctor or a registered midwife. Apart from retail pharmacies the rest of the retail out lets are authorised to deal in a limited number of drugs though this is not always the case because of weak regulatory mechanisms. By 2000 there were 232 registered pharmacies and 2495 registered drug shops in the country.

Fig 5 Diagrammatic representation of drug distribution channel in Uganda



Abbreviations (ref page 31)
NMS- National medical stores
JMS- Joint medical stores
PPW- Profit for profit wholesalers

Note: The thickness of the arrows indicate major consumers of drugs

3.3.4 To realise the objectives of NDP two autonomous bodies were created namely; National Drug Authority and National Medical Stores

National Drug Authority (NDA)

The National Drug Policy and Authority Statute 1993 gives the NDA power to regulation of the pharmaceutical sector.

NDA is charged with the implementation of national drug policy, and in particular it deals with the development and regulation of pharmacies and drugs in the country.

- It approves the national list of essential drugs and supervises the revisions of the list in a manner provided by the minister.
- Estimates drug needs to ensure that the needs are met as economically as possible.
- Control the importation, exportation and sale of pharmaceuticals.
- Control the quality of drugs.
- Provides advice and guidance to the minister and bodies concerned with drugs on the implementation of national drug policy, and performs any other function that is connected with the above or that may be accorded to it by law. (NDP and Authority Statute 1993).

At the moment the functions of National Drug Authority are being reviewed. Over time it was realised that it was beyond the capacity of NDA to satisfactorily implement the policy in addition to its primary and increasingly demanding drug regulatory role (NDP 2001).

3.3.5 National medical store

Government in attempt to roll out the national drug policy, through the 1993 National Medical Store (NMS) statute delegated drug supply function of NDP to National Medical Stores. This gave birth to an autonomous institution (NMS), which replaced the former Central Medical Stores (CMS) that was a department of the ministry of health.

National Medial Store is responsible for ensuring continuous distribution of pharmaceutical products in a financially viable and sustainable manner. (NMS statute 1993)

The major objectives of NMS are;

- Efficient and economic procurement of medicines and certain other medical supplies of good quality primarily to the public sector. However over time they

opened their doors to the private sector. They opened an outlet in Kampala (The Capital) to serve the private sector. The presence of NMS in the private health sector has contributed to stable drug prices (wholesale prices) in Kampala.

- Secure safe and efficient storage, administration, distribution and supply of drugs in accordance to national Drug Policy.
- Estimate current and future needs as a basis for procurement, planning and budgeting by the corporation it self and the concerned ministry. (About NMS)

Being an autonomous centralized drug supplier enjoying government support NMS is expected to have the following advantages

- Cost effectiveness; Central procurement of essential drugs, which is the most effective method. Because of their ability to negotiate for high discount enabling them to offer affordable prices to end-user.
- Country coverage; the well-developed facilities and bulk operations can ensure serving remote markets with limited commercial appeal.
- Financing; there was an initial one time capital investment by government and DANIDA after which the system became self-sustaining. With such financial base NMS is able offer the widest range of essential and vital drugs at one shopping centre.

Despite the advantages NMS has over private drug suppliers, quite often stocks of essential drugs run out, and at times it delays to process customers orders. In fact at the moment there is a debate going on whether it should be privatised or not.

3.3.6 Strength and weakness of the pharmaceutical sector in Uganda

Because of the tight registration system by NDA, the majority of drugs imported in the country are of generic origin and acceptable quality internationally.

The commissioning of NMS helped in ensuring that essential and vital drugs that may not appeal to private distributors are available to the population.

Since NMS is a government owned autonomous body, it can be used to prevent the private health sector from exploiting the population.

Despite the good intensions of the national drug policy, there are some weaknesses. For example if one wanted to import a vital drug that is not on the register, there is a lot of bureaucratic procedure to follow to an extent that by the time the drug arrives the patient could be dead. Because of the high drug registration cost, some multinational drug companies with quality drugs but not sure of prospects in the country are reluctant to do business in Uganda. Due to bureaucratic procedures in procurement at times NMS sells expensively than other wholesalers in the country.

NDA has failed to enforce regulations, e.g. failure to control the sell of drugs by unauthorised dealers, and make out-lets comply with conditions stipulated in their licenses as regard to the range of drugs they are supposed to stock. The reasons for this failure could be due to political interference in NDA's work by both national and local politicians. Another reason could be poor work ethics and low integrity in some of the NDA staff. All these need to be investigated if NDA is to rise to the occasion.

Despite the above weakness, the establishment of NDA and NMS has helped to improve the quality and availability of drugs in Uganda by playing an active role in the development of EDL and STGL, and ensuring that all drugs entering the country comply with registration guidelines.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

This chapter provides a description of how data was generated e.g. study design and data collection etc. It explains the steps that were taken to ensure reliability and validity, and discusses the constraints encountered while collecting data.

4.2 Study design

A descriptive cross-sectional survey was used to address the aims of this study. Data was collected at one point in time and tried to describe the situation as at that particular time. Descriptive cross-sectional survey was preferred because it provides a rich source of information in a short period of time.

4.3 Study population and sampling

4.3.1 Introduction

For proper representation of the country, the study was conducted in four districts, one from each of the four regions, Kampala in the central, Lira in the north, Kabarole in the west and Jinja in the east. Kampala was studied because it is the capital and all the other districts do most of their purchases from there. Lira and Kabarole lie at the extreme ends and enabled us to compare the two extremes, Jinja was preferred because it is only 80 kilometres from Kampala and yet has many similarities with Lira and Kabarole in terms social demographic characteristics and other factors like overhead expenditures. So it enabled us to study the influence distance from the source has on pricing patterns. The population of this study consisted of all pharmacies, drug shops and dispensing doctors in the four districts. Apart from Kampala, all pharmacies were in other districts were included. In Kampala, drug shops and dispensing clinics were conveniently sampled using

stratified simple random sampling method. At times it was difficult to classify a drug out let as a drug shop or a clinic because some were operating as both. Such out-let were classified according to the license they held.

Table 3 showing number of drug outlets in each district by type

	LIRA			KABAROLE			KAMPALA			JINJA		
	Tot	*Sample*	*Used*	*Tot*	*Sample*	*Used*	*Tot*	*Sample*	*Used*	*Tot*	*Sample*	*Used*
Pharmacies	3	3	3	5	5	5	76	10	10	13	10	7
Drug shops	85	15	10	38	10	10	215	20	10	43	10	10
Dispensing clinics	62	10	9	47	10	8	304	15	0	55	10	5

4 .3 .2 Selection of drugs for the survey

Because of time and financial constraints five therapeutic groups of prescription drugs and some over the counter remedies were included in the survey. Therapeutic groups were chosen according to the disease morbidity profile in Uganda and other special characteristics. The background information indicated that the major diseases in Uganda are malaria and preventable infectious diseases like pneumonia, measles etc. On this basis, drugs of choice were anti malarial, antibacterial and analgesics representing drugs used in treatment of communicable diseases. Analgesics were included because most of the known diseases are associated with pain at one stage or another. Antihypertensives and hypoglycaemic were studied as representative of drugs used in treatment of non-communicable diseases. They were chosen because hypertension and diabetes are the most prevalent in this category. While Antihypertensives and hypoglycaemic do not fall in the treatment of the first ten disease ranking, (i.e. malaria, ARI-not pneumonia, intestinal worms, trauma, ARI-pneumonia, diarrhoea diseases, skin diseases, eye diseases, anaemia, and ear diseases) they are expensive, and in most cases used in life long treatment. Despite the unproven efficacy of most over the counter drugs they are included because they account for a relatively good percentage of drug sold in the country. The study mainly dealt with generic drugs, since most drugs used in the country are of generic version. For comparison purposes, five branded drugs were included in the study.

Apart from over the counter and branded drugs, only drugs in standard treatment guideline were included in the study. In therapeutic groups where the recommended drugs are less or equal to ten all were included in the study. Where they are more than ten convenient simple random sampling was used to sample ten drugs. Fifteen antibacterial drugs were sampled because it is a large and widely used group. Some drugs selected for the study especially branded drugs were found in very few out-lets, and therefore were not used in the analysis.

4.3 3 Selection of drug dosage;

In comparing drug prices the study used same drug dosage form and package size. Where the dosage form chosen was not available, prices of equivalent quantities were used. Retail prices for a full adult dose were used where possible. Where this was not possible like in non-communicable diseases the cost of on month's supply was used.

4.4 Data collection

Two different questionnaires, one for the drug retailers and the other for key informants were administered. A questionnaire was administered to the in-charge of the pharmacy, drug shop and to dispensing doctors in order to gather the following information. (See appendix 1)

a) Source of drugs
b) Distance from the main suppliers
c) Overhead costs (salaries, rents, rates and others)
d) Problems, constraints and possible solutions
e) Conformity with regulations and guidelines

A modified questionnaire (see Appendix 2) was used for key informants which was designed to yield information on sale of drugs by unlicensed dealers, ability of national medical store to open out lets in the regions and districts, possibility of government to regulate retail drug prices, drug shops and clinics stocking drugs above their authorised limit and the impact of drug registration fees and verification fees on drug prices.

The study targeted the following key informants: Executive Secretary NDA, general manager NMS, head of pharmaceutical department Ministry of Health, registrar Pharmaceutical Council, chairman Pharmaceutical Society of Uganda, district directors of Medical Services, and Regional Inspectors of Drugs.

4.5 Quality control

Questionnaires were written in English since people who are licensed to sell drugs in Uganda are literate, English being the official language.

A pilot study was conducted prior to data collection to test reliability and validity of the questionnaires. Two pharmacies, four drug shops and three dispensing doctors were randomly selected.

Reliability (ability to produce consistent results) was determined by re-administering the questionnaire to each pilot premise using different interviewers and cross checking with official statistics.

Validity (ability to produce sound results) was evaluated by checking whether pilot study participants understood the questions and gave appropriate answers. The interviewer recorded questions that were not understood, or required further prompting or explanation, and noted reactions to sensitive questions. Participants were invited to comment on the questionnaire. Based on feedback received from the pilot study, the questionnaire was modified to improve its validity and reliability. Items in the questionnaire were re-worded or additional categories included. Where necessary, the revised questionnaire was re-piloted. During pre-test it was found out that collecting data on turnover was taking a lot of time because of poor records in the units. To be able to collect enough data within the given time frame data for one month was collected as opposed to three that were proposed earlier. Secondly, a question about criteria used to determine retail prices was added.

4.6 Quality of data in the research

As much as all steps were taken to ensure reliability and validity of data, some inconsistence could have occurred due to the following;

a) Guess estimates were used to determine turnover in outlets where data on turnover was not available and where it was meaningless. This was done by asking dispensers to estimate how much of each item they sell in a week or month.
b) In some places overhead expenditure could have been under estimated because some respondents apart from salaries, rent, and taxes could not quantify other expenditures like stationary, transport, meals and telephone bills. (Especially where cellular phones were used to conduct official business).
c) Some outlets did not have price lists or price tags on containers prompting us to rely on salesperson(s).
d) Some outlets did not give meaningful information and were not included in the results. Most of the clinics especially in the urban areas refused to participate in the study.

4.7 Field management

Two interviewers were hired for data collection that had the same education level. These interviewers were thoroughly trained to ensure maximum reliability, and do not deviate from the set objectives. To ensure quality and reliability, data from every fourth premise was verified by the field officer, by re-administering the same questionnaire at a later date. All questionnaires were checked at the end of each day by the principal investigator to ensure that they were correctly filled.

4.8 Data management

Information on retail and wholesale prices, monthly turnover, and distance from Kampala was collected on 51 drugs from 85 drug outlets (see Appendix 1).
The data was analysed using STATA to obtain descriptive and analytical statistics. Regression analysis was applied determine to what extent these factors influence retail prices of prescription drugs.

Qualitative data was collected using a questionnaire (see Appendix 2) then triangulated to get popular themes.

4.9 Model specification;

Retail =constant+(β1 wholesale + β2 distance+ β3 overhead- β4 turnover)

(+) (+) (+) (-)

The model is based on the theoretical framework discussed in the literature review. It shows the variables used in regression analysis. In the model it is assumed that wholesale price, overhead expenditure, and distance from Kampala have positive influence on drug retail prices. If they have a high value, retail price is likely to be high. It is also assumed that turnover has a negative influence on drug retail prices.

CHAPTER FIVE

PRESENTATION AND INTERPRETATION OF RESULTS

5.1 Introduction

The findings of this study are based on two sources, quantitative data from drug out-lets and qualitative data from key informants and drug outlet owners. The results obtained are presented in the following sequence, qualitative from key informants and drug out-let owners, and quantitative from drug outlets.

5.2 Findings from key informants

The following people took part in the key informant interview; Executive Secretary NDA, general manager NMS, head of pharmaceutical department Ministry of Health, registrar Pharmaceutical Council, chairman Pharmaceutical Society of Uganda, district directors of Medical Services, and Regional Inspectors of Drugs.

All the key informants interviewed were against the sell of drugs by unlicensed dealers. The main reason advanced was that these people have no knowledge of drugs or little if any, secondly it is very difficult for NDA to monitor the quality and storage of drugs in these outlets.

Asked whether drug shops and clinics should stock drugs above their authorised limits. Some thought that they should only stock according to their authorised limits, but the popular opinion was that this should be allowed in rural areas and other places poorly served by pharmacies. However, most of the informants concurred that the drug shops to handle drugs above the authorised limit for drug shops should be selected by NDA with the help of district directorate of medical services. They indicated that the selection should be based on the training and experience of the person selling the drugs.

On whether government should regulate and control retail drug prices, the key informant thought this was an absolute necessity, but none of them had any idea how this can be done. In fact most feared that liberalisation and market policies pursued by the government of Uganda might make controlling retail prices of drugs difficult. When asked whether the NMS should open out-lets outside Kampala and how feasible this was. Most of the key informant felt it long over due. They said this would improve the availability of essential and vital drugs to areas poorly served by pharmacies. Secondly, it would help reduce exploitation of the people by private pharmacies that are purely profit minded. However, the branch manager of NMS in Kampala and the head of marketing and operations at the head office in Entebbe felt that as much as it is necessary, NMS does not have the capacity to open regional or district outlets at the moment. They thought that it could serve as a long-term strategy. When put to them that they do not necessarily have to open outlets but could make authorised dealers in the districts their agents, through whom they can influence the prices at which the drugs are sold and at the same time ensure availability of drugs in these areas. They seemed to agree that this was possible.

Asked about their opinion on the impact of registration and verification fees on drug prices. The majority indicated that the prices were affected upwards but not substantively compared to the improvement in quality of drugs imported and supplied in the country that followed as a result of registration and verification policy.

In general there was agreement among key informants that NMS should decentralise, drug prices should be controlled, and that sell of drugs by unlicensed out-lets be prohibited. However, there were mixed feelings on whether the limit drug shops and clinics are authorised to handle should be increased.

5.3 Finding from owners of drug out-lets

All drug outlets visited had valid registration certificates and licenses. In pharmacies, drugs are handled by pharmacists, dispensers, and trained nurses. In the three pharmacies visited in Lira no pharmacist was found at his/her place of work. In Kabarole out of the five pharmacies, three pharmacists were found at their place of work, the other two could be seen short notice. In Jinja, out of the seven pharmacies visited, a pharmacist was only

found in one, and it was possible only in two of the remaining pharmacies to see the pharmacists at short notice. While in Kampala out of the 10 pharmacies we visited pharmacists were found in two and in the rest we were told that it is possible to see them in the evenings. These findings indicate that pharmacists are most of the time not at their place of work, and that dispensers or nurses and pharmacy owners handle most activities. Since pharmacist's salaries on average accounts for about 35% of the total overhead expenditure (Table 4), they should spend more time at their place of work.

Table 4 showing pharmacist's salary as percentage of total expenditure.

District	Average monthly overhead expenditure (Ush)	Average monthly pharmacist's salary (Ush)	Pharmacist's salary (% total expenditure)
Kabarole	2,516,000	810,000	35.0
Jinja	2,092,857	758,300	36.2
Lira	2,050,000	850,000	41.1
Kampala	2,810,000	734,000	26.0

In drug shops and clinics, trained nurses, dispensers, clinical officers and doctors handle drugs. In some few incidences, drugs are handled by nursing aids and pharmacy orderlies. (These are people without formal training in medicine but are trained on the job.)
In rural and pre-urban areas, most drug shops and clinics are practising both selling of drugs and treating of patients. The difference is in the name outside the premises and the license under which they operate.

When asked how they decide what type of drugs to stock. Most respondents said that they base on demand, turnover and purchase price. They said some of the drugs especially antihypertensives and hypoglycaemics are very expensive and have a low turn over hence tie their capital, which could be used to buy other first moving drugs. Secondly some items expire on the shelves causing losses, and therefore they are reluctant to stock them.

On how they determine their retail prices, in Kampala most said that they consider wholesale price, overhead expenditure, then come up with a percentage to add on wholesale price. In rural districts, they depended on the prices of their competitors in the

same vicinity. It seems competition is the most determinant factor in rural and pre-urban areas.

About problems they were facing, most pharmacies pointed out unfair competition from drug shops and clinics. They claim that drug shops sell the same range of drugs as pharmacies in disregard of the limited range they are allowed to handle, and yet they have very low operating costs compared to pharmacies, because the standard set for them by national drug authority is very low. A drug shop can operate in one room with only one trained nurse, but a pharmacy needs at least four times the space of a drug shop, a dispenser or a nurse and a pharmacist. The fees pharmacies pay for a license is almost thrice higher than what is paid by drug shop (see table 5).

Table 5 showing the fees paid in (UGS) by pharmacies and drug shops for operating license

	OUTLETS	
	Pharmacies	**Drug shops**
City	333,000	162,000
Municipality	310,000	112,000
Rural areas	-	92,000

1US$=1870 UGS

In fact some of the pharmacy owners in rural towns indicated that if the situation is not controlled they might resort to drug shops. They also complained that that clinics stock all the drugs that would have other wise been bought from pharmacies. On the other hand clinics claimed that the only way they can be sure that patients get full doses of drugs is by combining the drug cost with consultation fees. Major concerns of drug shop owners were that they pay a lot of money to regulatory bodies and yet the range of drugs they are allowed to stock are of very low economic value that cannot make them break even. They said that the government should formally increase the range of drugs they are handling. This is in agreement with what is proposed in the Allied health professional statute, which is not yet passed into law (Allied health professionals statute, 1996).

In summary during interaction with out-let owners it was observed that pharmacists are not always at their work place, and that most of the work was done by nurses and dispensers. It

was also clear that there is little demarcation between clinics and drug shops in rural areas, since they both diagnosed and sold drugs. Pharmacies cited unfair competition from drug shops and clinics as one of their major problem. On the other hand drug shops and clinics felt that the range of drugs they are authorised to stock are of very low economic value.

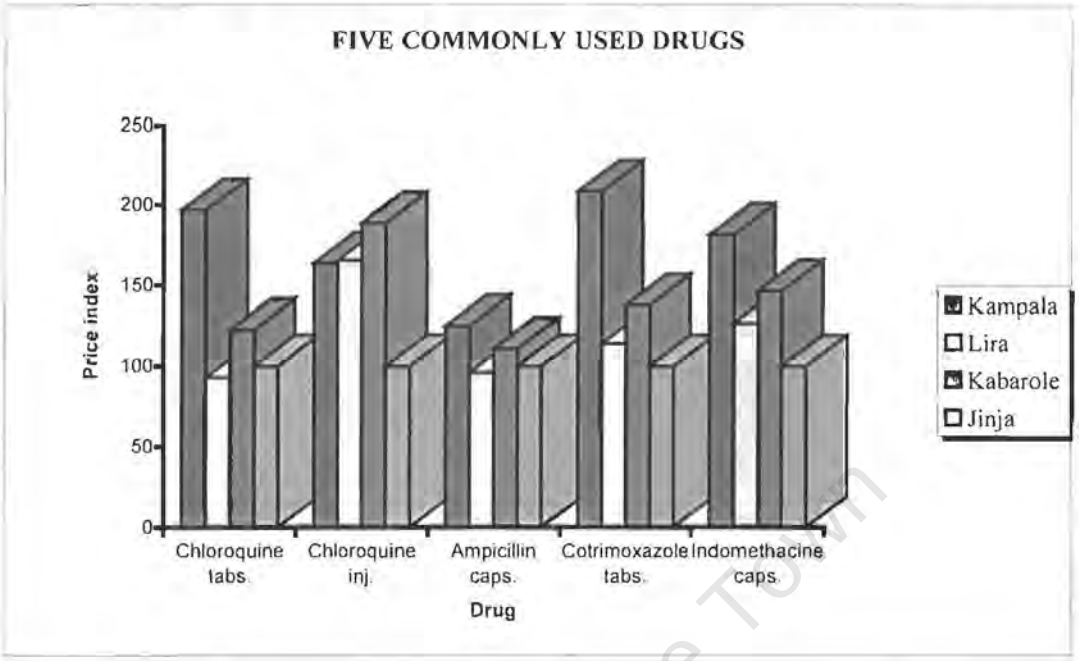
5.4 Descriptive statistics

5.4.1 Average retail price differentials.

Price differentials were computed using Jinja as the baseline, because it has an overhead expenditure that is relatively the same as most rural districts and is only 80 kilometres from Kampala. At the same time the wholesale prices for most drugs in Jinja are similar to those in Kampala. Table 12 (see appendix 3) indicates that the average retail prices patients pay in Jinja are 26% lower than Kampala, 31% lower than Kabarole and 13.6 % lower than Lira. When medians were used the pattern was 16% lower than Kampala, 13.9% lower than Kabarole and 8.5 % lower than Lira. Kruskal-Wallis[3] test on medians of price differentials revealed a chi-squared value of 49990, with a 0.0825 probability (not significant). Although the results are not statistically significant, they do demonstrate that the average prices patients pay for drugs vary from region to region. The lack of statistical significance in price differentials can be attributed to disparity in retail prices within one region, which makes the range almost the same in all regions.

[3] Kruskal-wallis test is a non parametric technique for comparing more than two groups when the data are non-normal

5.4.2 Figure 6 Graph showing retail price indices for five commonly used drugs.



The graph above indicates a high difference in average prices for common drugs between different regions of the country. This could be due to differences in overhead expenditures and turnover between different regions. This is consistent with what was observed in the qualitative part of the study, which showed turnover as one of the major determinants of retail price.

Figure 7 Showing retail price indices for five uncommonly used but vital drugs

Like commonly used drugs, price indices of rarely used drugs indicate that prices differ from region to region (figure 6). However, in Lira district, drugs like ceftriaxon hydralazine and augmentin could not be found.

5.4.2 When overhead expenditures drug outlets incur in different regions were compared, finding indicated that the further you go from Kampala overhead expenditure decreases (table 6 below). This could be due to the low standard of living in rural district. To verify this, a household survey would be necessary, which was beyond the scope of this study

Table 6 showing average overhead expenditures in the four districts, and their average distances from Kampala.

DISTRICT	AVE MONTHLY OVERHEAD (USH)	AVE DISTANCE (KM)
Kabarole	935,667	317
Lira	805,076	347
Jinja	1,013,059	80
Kampala	1,519,444	0

5.4.3 Comparison of wholesale prices in different regions of Uganda with prices at National Medical Store (Appendix 4)

Table 13 (see appendix 4) indicates that for some drugs, wholesale prices in the districts (especially Kampala and Jinja) are lower than prices wholesale at NMS, but it offers better prices for drugs that are mainly used in inpatient especially injectables e.g. benzlypenicillin,hydrallazine, etc. It also has lower prices for specialised drugs that that are vital but less demanded e.g. Insulin, ceftriaxone, glimbeclamide etc. However, for the majority of prescription drugs that are widely sold by all drug out lets eg paracetamol, cotrimoxazole, ampicillin and chloroquine tablets, wholesalers in Kampala and Jinja have better prices.

5.4.4 Availability and cost of very essential and vital drugs

Vital drugs are those whose absence when needed leads to death or permanent disability e.g. insulin, adrenaline etc. While very essential drugs, for the purpose of this study refers to drugs used in treatment of serious diseases that have failed to respond to commonly used drugs e.g. augmentin, lisnopril etc. Table 7 below show s the availability and cost of these drugs in the four districts visited.

Table 7 Availability and costs (UGS) of some life saving and very essential drugs

Name of drug	District	Ave monthly turnover	Outlets	Ave retail price	Ave wholesale price	
					District	NMS
CEFTRIAXONE (1gm/vial)	Kampala	25	10	13,200	11,000	
	Jinja	7	7	13,458	11,800	9,873
	Lira	-	-	-		
	Kabarole	N/A	2	16,600	15,000	
INSULIN-soluble (10ml 40 IU ml)	Kampala	21	10	5,000	4,000	
	Jinja	5	6	5,000	4,500	3,150
	Lira	N/A	2	7,000	-	
	Kabarole	N/A	1	4,500	-	
AUGUMENTIN (250/125 mg) (20 Tabs)	Kampala	60	10	35,000	27,000	24,865
	Jinja	N/A	6	30,000	27,000	
	Lira	-	-	-		
	Kabarole	N/A	2	42,875		
LISNOPRIL (10mg, 30 Tabs)	Kampala	96	14	14,500	12,000	
	Jinja	51	7	13,530	12,000	7,800
	Lira	N/A	1	24,000		
	Kabarole	N/A	5	17,125		

1 US $ = 1870 UGS

The table shows that in Lira District, ceftraixone (a third generation cephalosporine used in life threatening bacterial infection), and augmentin another potent antibiotic used in resistant bacterial infection were not found in any of the out-lets. Soluble insulin used in diabetic comma and other forms of diabetes was only found in two outlets in Lira and one outlet in Kabarole, which cost relatively higher compared to Jinja and Kampala.

Though ceftraixone and augumentin were available in Kabarole, their retail prices were higher compared to Kampala and Jinja. It was not possible to establish the turnover for all drugs in the above table in Kabarole and Lira. The table suggests some association between turnover, retail price and drug availability.

The table also indicates that NMS offers better prices for this drug than most wholesalers for these drugs.

5.4.5 Comparison of average price for selected generic drugs and their branded counter parts

When prices for generic and branded drugs were compared generic drugs were found to be cheaper than their branded counter parts. The results are summarised in table 8 below.

TABLE 8 COMPARISION OF AVERAGE PRICES (IN UGANDA SHILLINGS) FOR SELECTED GENERIC DRUGS AND THEIR BRANDED COUNTERPARTS

DRUG	AVE COST OF GENERIC	AVE COST OF BRAND	DISTRIBUTION RANGE	RATIO
S/P Fansidar	878	1,958	580-1,071 1,750-2,225	1:2.2
Ceftrioxone 1gm 5 vails Rocephine 1gm 5 vails	72,047	215,416	66,000-83,000 207,500-223,330	1:3
Diclofenac 15 tabs Olfen15 tabs	4,018	10,217	3,600-4600 8930-12000	1:2.5
Linopril 10 mg 30 tabs Zestril 10 mg 30tabs	17,288	47,636	13,530-24,000 40,000-60,000	1:3
Parcetamol 0.5 gms 30 tabs Panadol 0.5 gm 30 tabs	438	3,000	340-630 3,000-4500	1:8

One US Dollar is equivalent to 1870 Uganda shillings (UGS)

Table 8 shows that average retail prices of branded drugs ranges from 2 to 9 times that of generic. This demonstrates that there is a saving and increased affordability if generic prescription is encouraged. For this reason, most drugs used in Uganda are labelled, known and prescribed by their International Non-proprietary Names (Uganda national drug policy and authority statute, 1993). Never the less branded drugs do find their way into the country.

5.5 Analytical statistics

5.5.1 Introduction

In this section we present analytical results of the study. For the purpose of determining whether wholesale prices, distance from Kampala, turnover, and overhead expenditure have significant influence on retail of prescription drugs, multi linear regression analysis was run on data from four drugs namely; Gentamycin injection, Co-trimoxazole, Chloroquine and Paracetamol tablets.

To determine whether the effect of the above factors on drug retail prices differs according to the type of out-lets, multi-linear regression was done for the same drugs, but this time separately for drug shops and pharmacies. It was not possible to do the same for clinics because very few were visited to achieve a meaningful result.

5.5.2 Regressions results

Table 9 below shows regression results of prices for four selected drugs irrespective of the type of out-let.

The independent variables used in this study are overhead expenditure, wholesale price, distance, and turnover. The dependent variable is retail price of the drug. The results of regression indicated that on average about 40% of the variability in retail prices is explained by the model.

Table 9 Multi- linear regression results (all out lets)

	Chloroquine tabs.		Gentamycin inj.		Cotrimoxazole tabs.		Paracetamol tabs.	
Variables	ß	p-value	ß	p-value	ß	p-value	ß	p-value
Overhead	0.361	0.0001	3.94	0.047	1.71	0.042	7.89	0.04
W/ price	-0.013	0.29	1.17	0.53	0.009	0.283	0.101	0.508
Distance	0.07	0.555	0.83	0.689	4.16	0.357	1.49	0.005
Turnover	-3.851	0.0001	-11.34	0.001	-7.29	0.0001	-17.39	0.0001
n	68		66		72		74	
R-squared	0.4995		0.3087		0.378		0.2935	
P associated with f	0.0001		0.0009		0.0001		0.0001	

From the above table, only overhead and turn over indicated statistically significant relationship in all the four drugs. The results show that for every one unit increase in overhead expenditure there is 3.34 increase in retail price (adult dose), and for one unit increase in turnover there is 9.97 decrease in retail prices (adult dose) on average.

Distance was significant only in Paracetamol though it is expected to be statistically significant in all. The reason for this could have been that the influence of distance was compensated by overhead expenditure because the further from Kampala the lower the overhead expenditure (See table 6). The results further indicate that wholesale prices seem not to have an influence. The reason could be because retail mark-ups are generally high in all the four districts (See tables 13 and 14, appendices 4 & 5). Secondly wholesalers tend to offer relatively similar prices because of competition since retailers are likely to shop around in search for cheaper wholesale prices. Lastly, like distance it is also masked by overhead expenditure, which is relatively low in rural areas. However, further research including other possible factors like social demographic characteristics and homogeneity of outlets is necessary to exactly know the extent these factors influence retail prices.

Table 10 and 11 showing regression results according to types of out-lets.

Clinics are not represented because the numbers visited were too few to get meaningful results.

Table 10: Multi linear regression results based on data from pharmacies only

	Chloroquine tabs.		Gentamycin inj.		Cotrimoxazole tabs.		Paracetamol tabs.	
Variables	ß	p-value	ß	p-value	ß	p-value	ß	p-value
Overhead	8.27	0.013	5.4	0.029	14.7	0.048	0.72	0.02
W/ price	0.202	0.382	1.1	0.390	0.97	0.955	0.101	0.345
Distance	1.9	0.934	1.29	0.394	1.853	0.304	14.33	0.59
Turnover	-35.01	0.005	-48	0.03	-27.91	0.0001	-33.27	0.0001
n	25		25		25		25	
R-squared	0.719		0.3495		0.5709		0.6533	
P associated with f	0.0001		0.047		0.002		0.002	

Table 11 Showing multi-linear regression results based on data from drug shops.

	Chloroquine tabs		Gentamycin inj.		Cotrimoxazole tabs		Paracetamol tabs	
Variables	ß	p-value	ß	p-value	ß	p-value	ß	p-value
Overhead	6.38	0.0001	2.7	0.186	1.210	0.34	0.014	0.02
W/ price	3.6	0.022	12.50	0.06	0.183	0.081	1.706	0.333
Distance	1.5	0.0372	7.2	0.029	4.3	0.013	12.24	0.0001
Turnover	-34	0.003	-7.4	0.024	-19.45	0.0001	-9.09	0.043
N	40		40		40		40	
R-squared	0.6099		0.6002		0.631.		.0.4068	
P associated with f	0.0001		0.0001		0.0004		0.0002	

According to the results the model explains more than 50% of the variability of retail prices is on average.

Tables 10 and 11 also[4] show that distance became significant for retail prices in drug shops, with an average increase of 6.3 in retail price per one unit increase in distance. Reason being, most drug shops are in rural area, with poor road network and the transport costs are high. Secondly these areas are inhabited by poor people, the majority of which cannot afford to pay for drugs leading to low turnover that might be responsible for the high retail price. However, to confirm this, further research is needed on social economic characteristics of the study area.

Overhead expenditure and turnover remained significant in both drug shops and pharmacies. For overhead expenditure, the tables indicate an average increase of 7.27 and 2.576 Uganda shillings in drug retail price (adult dose) per one unit increase in overhead expenditure in pharmacies and drug shops respectively.

In the case of turnover, the tables indicate an average decrease of 36.05 and 17.48 shillings in retail prices (adult dose) per unit increase in turnover in pharmacies and drug shops respectively.

From the tables it can be seen that the influence of overhead expenditure and turnover on retail prices is more pronounced in pharmacies than drug shops, since most drug shops

[4] Simple correlations were conducted all the variable had coefficients of lees than 0.4 except between wholesale and distance which had 0.7 Hence it assumed that no mult correlation except for wholesale with distance

apart from selling drugs do some clinical work, which help them cover some of their overhead expenditure and increase their profit base.

CHAPTER 6

Discussion of results, policy consideration and conclusion

6.1 Summary of the results

This study aimed to achieve several objectives. First it sought to identify factors that influence retail prices of prescription drugs. The findings in chapter five have indicated that turnover and overhead expenditure have direct influence on retail prices. It also showed that turnover has an impact on availability of drugs. This is in agreement with work done by Woodward in 2001, where it was observed that retail drug prices are affected by turnover, domestic taxation, wholesaling and retailing mark-up, among other factors. The study has also shown that outlets are reluctant to stock drugs with high wholesale prices, especially those with low turnover. When they stock them there is a tendency to put high retail mark-ups. This is more pronounced in rural areas, where the population is poor which raises concern for affordability and availability of these drugs.
Other specific objectives were to compare drug prices in four regions of Uganda. The study indicates that prices differ from region to region, and that drugs with low turnover are more expensive in rural areas than in urban areas. This is consistent with the study done by Fraser institute 2000, which found differences between drug retail prices in Florida, Georgia and Alabama all in United States.

On comparison of prices for generic and branded drugs, the study confirms that branded drugs are more expensive than their generic counter parts. The study also sought to explore how turnover, overhead expenditure, distance from Kampala and wholesale prices influence drug retail prices in clinics, drug shops and pharmacies. On this, the study results showed that overhead expenditure and turnover have significant influence on retail prices of drugs, both in drug shops and pharmacies. However, this influence is more pronounced in pharmacies than drug shops. It was not possible to get meaningful results in clinics because most of them did not give their turnover, and were reluctant to reveal their retail prices. Most of them claimed that it was against policy to report drug prices separate from the total cost charged for treatment.

The study also revealed that distance from main supplies was an issue for drug shops but not pharmacies. The reason for this could have been due to the fact that most rural drug shops buy their drugs from wholesalers in near by towns, but most pharmacies are located in big towns with good road network connecting them to Kampala where they do their purchases (most importers and big wholesalers are found in Kampala). Secondly the distributors deliver some of the drugs to them, which is not the case with drug shops in rural areas.

One of the reasons clinics gave for stocking drugs above their authorised limit was that it helps them to serve their clients at one spot rather than only prescribing and sending them to pharmacies for the drugs. This may sound convincing, but this may tempt them to over prescribe for financial gains as observed by Kapril, 1998 and Morton et-al, 1993.

Results in chapter 5 further indicate that for the majority of the drugs wholesale prices at NMS are higher than prices offered by some wholesaler in Kampala and Jinja. When asked why some of their drugs are more expensive than wholesale prices in Kampala? The head of marketing and operations at NMS explained that for them their offer the same prices to all their customers irrespective of the geographical location of the customer. Therefore when setting prices they factor in transport cost to distant customers. However, considering its economy of scale, which gives NMS high bargaining power to negotiate low prices from manufacturer and distributors, the explanation is not convincing. It cannot explain some differences like the difference in the wholesale prices of quinine injection, ampicillin capsules, cotrimoxazole tablets, and propranolol tablets etc as compared to wholesale prices in Kampala and Jinja.

As indicated in chapter one, the study would have shown better results if clinics especially in urban areas cooperated in giving information. Also if other factors like social-demographic characteristics of the catchments areas, infrastructure and heterogeneity of drug out-lets were considered.

Most studies done on factors affecting retail drug prices used descriptive statistics to back their findings, but in this study we used some analytical analysis (multi linear regression) to determine the significance of factors like turnover, overhead expenditure, wholesale, and distance on drug retail prices.

Most studies on factors responsible for disparity in retail drug prices within one country have been done in developed countries, but this study shows what one would expect in Sub Saharan Africa in general and Uganda in particular. It is hoped that it will be useful for those who want to do similar studies in other developing countries.

6.2 **Policy recommendation.**

As seen from the study findings, most factors that influence retail prices of prescription drugs are characteristic of market forces, which work under perfect competition, but as observed in chapter 2, drugs do not comply with perfect competition, therefore policy makers should find ways of intervening to prevent drug supply from playing to the whims of market forces. The NDP has some regulations that are aimed at controlling retail drug prices directly or indirectly and improve availability, but these need to be strengthened.

6.2.1 Increase in use of generics

Generic drugs are cheaper than branded drugs, the NDP realises this and tries to improve affordability by promoting and insisting that all drugs imported in the country are of generic origin unless no satisfactory non-proprietary alternative exists (NDP, 1993). However, some prescribers and consumers still think that generic drugs are inferior to branded drugs, so in order to remove this negative attitude this supportive legislation needs to be strengthened using other methods that can increase the use of generic drugs. WHO/ DAP in 1997 suggested the following methods.

a) Quality assurance capacity, which involves: Development of substitution, and non-substitution list, procedures to demonstrate bio-equivalence and improve in national quality assurance capacity.
b) Public and professional acceptance: This method suggests that professional associations should be involved in policy development generic names should be used in clinical manuals, drug bulletins, and publications. It further suggests that use of generic names should be mandatory in all educational and training of health professionals, and there should be widespread promotional campaigns on use of generics targeting consumers and professionals.

c) Economic factors: Government should institute price controls that favour generic dispensing, give incentives for generic industry development, and seek support from private health organisations.

6.2.2 Improving availability

Another positive aspect of NDP that is aimed at improving availability is allowing other medical personnel to run drug shops in areas poorly covered by pharmacies but limited to class C drugs[5] (National drug policy and authority statute, 1993). The study revealed that the problem facing areas poorly covered by pharmacies is availability of essential and vital drugs that fall mainly in class B[6] and A[7] drugs. In regard to this it is recommended that the range handled by drug shops be increased to include some of class B drugs. From the few clinics visited and from literature elsewhere (Morton et-al., 1993), it is clear that clinics do dispense. This paper recommends that the range of drugs and the amount clinics are authorised to handle be increased. Especially for those clinics in places poorly served by pharmacies. However, it has been documented that clinicians dispense to their patients partly as a service, but also because they have learned that patients are often much more willing to pay for drugs than simply for consultation. In some countries, general practitioners derive 60% of their income from the drug they dispense. This creates an obvious and measurable incentive to over prescribe (Kapril, 1988; Mortin et-al, 1993). Dispensing clinicians should sell drugs at cost price and not for profit. The author also recommends that dispensing doctors and be registered, trained and must be inspected once in a while and should be transparent in their pricing structure (South African national drug policy 1996).

Although increasing the range of drugs handled by drug shops may improve availability, it has a disadvantage of putting restricted drugs in hands of less trained persons, unless the

[5] Class C drugs are drugs that can be sold without a prescription. (Over the counter drugs)
[6] Class B drugs, Are drugs that can be supplied by retail only on the prescription of a duly qualified medical practitioner, dentist or veterinary surgeon.
[7] Class A drugs These are drugs that are imported or exported manufactured or used under authority, they may be sold only on the prescription of a duly qualified medical practitioner, dental or veterinary surgeon but only for medical, dental or veterinary purposes and may be supplied only by a registered pharmacist or licensed pharmacy

decision of which drug shop to up grade is done honestly and professionally. Allowing clinicians to dispense may encourage poly pharmacy, since it is the clinicians who decide how many types of drugs and how much of each to give to the patient, and because of the financial incentive involved they may prescribe many drugs than necessary. This can only be minimised if clinicians adhere to professional ethics and if NDA and Uganda medical council are very vigilant in making sure that clinicians keep within accepted norms. In order to improve availability (geographical access) licensing conditions should aim at encouraging better geographical distribution of pharmacies by specifying minimum distances between pharmacies. Though in the National drug authority (certificate of suitability premises) regulation (1995), it is stipulated that the distance between two drug out lets should not be less than one and half kilometres, this is not enough to improve geographical access, because most drug stores are concentrated in urban areas, serving a small segment of the population leaving rural areas with the highest number of inhabitants being served by few drug stores. This can be overcome by considering the population to be served while issuing licenses. Other methods that can be used to improve geographical distribution of drug stores are tax reductions for providing services in specified areas of the country and other financial incentives (WHO/DAP/97.12).

6.2.3 Direct control of distribution, wholesale, and retail prices

Direct control is another way that can be used to regulate retail prices. This can be done in various ways.

-Price information;

The government should endeavour to give complete, accurate and up to date information on drug prices to policy makers, health professionals, people in the drug distribution chain and consumers. When consumers have information about drug prices more so generic drugs, they can exert pressure on prescribers and dispensers to control price (WHO/DAP/97.12).

Price information can be communicated to stake holders through;

- Listing of prices or relative price information in therapeutics manuals (e.g. British national formulary)

-Listing of price information in pharmacies like in the Philippines

-Printing retail prices on drug packages

-Regular publications of pharmaceutical prices guide or manual (e.g. Colombia)

-Publication of selected pharmaceutical prices in local newspapers or other media (e.g.in Argentina)

-Lastly Pharmaceutical price index based on the same principal as consumer price indices for monitoring inflation is one approach to making such comparisons. WHO has described such a method for calculating the value of a "basket of drugs " (Brudon-Jakobowicz et al., 1994).

Comparison of retail and wholesale prices (see appendices 3 and 4) indicates that retail mark-up is high. It is argued that in remote areas, in areas with poorly developed formal distribution systems and in countries with limited regulatory control, distribution margins may be much higher than in countries with regulatory controls (WHO/DAP/97. 2). WHO proposes five basic methods that can be used to control price through determining distribution margins for pharmaceuticals. It is hoped that policy makers in Uganda will find these methods useful.

a) Cost + fixed percentage; In this approach, wholesalers and retailers add a fixed percentage to the price they pay.

b) Cost + declining percentage: This has been adopted in some countries where by margins are based on a declining percentage. The more costly the drug, the lower the percentage mark-up.

c) Cost + fixed dispensing fees: This reduces the incentive to dispense higher-cost drug. Some countries have adopted a system of fixed professional dispensing fees. Where by the pharmacist charges a fixed amount per prescription plus the wholesale cost of the drug.

d) Maximum allowable price: With this approach the sale price or reimbursement level is fixed for the generic equivalents of certain drugs or for therapeutic categories.

However, choosing which approach to adopt should be done cautiously. For example pricing control mechanisms, which use a fixed percentage mark-up, may achieve reduction in individual drug prices, but they retain a strong incentive for retailers to dispense more expensive drugs. Such systems entail lower mark-up for generics and essential drugs and thus are likely to discourage, rather than encourage, dispensing of these drugs

(WHO/DAP/97. 2). In some places where price regulations have been enforced, it has been shown to control drug prices though not total drug expenditure (Grupper, 1994). Lowering individual drug prices may be offset by prescribing and dispensing greater quantities of drugs or a different (more costly) selection of drugs (Balance et al., 1992).

However when considering the above observations caution should be taken because most of the empirical evidence on effect of price controls comes from OECD countries, where the objectives for price control are different from developing countries. While OECD countries wish to contain total expenditure, developing countries hope that it will increase by enhancing affordability. Secondly some developing countries may not have enough capacity to implement and monitor some of the proposed mechanisms of price control.

It should be noted that despite the wide spread use of price controls, there is little agreement on their overall impact. Proponents of pharmaceutical price control believe that price control can;

- Lower individual drug prices.
- Lower total drug expenditure.
- Improve price information for insurers and consumers.
- Are necessary because market forces alone cannot ensure competition.

However opponents believe that price controls are

- Cumbersome and open to manipulation.
- Encourage misleading accounting practices.
- Have no impact on patient or overall health expenditure, they encourage use of higher quantities of drugs and more expensive drugs
- Create scarcities (real or artificial)
- Are unnecessary for most therapeutic needs if drugs are sold competitively by generic names (Balance et al., 1992).

It is advisable that before policy makers decide on which price control mechanism to adopt they should seek more information on issues like, change in prescribers and consumers behaviour in the face of price control. They should also find out whether lower prices lead to more prescription of needed essential drugs, or providers and sellers increase profits by prescribing and selling more expensive drugs or unnecessary drugs.

They should also explore the potential risks of price regulation, because if prices are set at less than competitive prices, there are likely to be shortages of the product and parallel market with unregulated prices will develop. Alternatively prices could be set too high, further damaging affordability. Most importantly policy makers should also bear in mind that price regulation may have unintended consequences. It is important therefore, to evaluate carefully the economic reasoning behind price regulation policies and to anticipate the economic responses of producers, distributors, and consumers (WHO/DAP/97.2).

6.2.4. Other methods of improving affordability

To further improve affordability policy makers should look at the possibilities and feasibility of introducing financing schemes, such as pre-payment and insurance schemes. The need for drugs and health often cannot be predicted. This makes it difficult to plan household budgets so as to take account of them. Financing schemes may make drugs more affordable. Insurance schemes may also have a critical impact on drug utilization patterns through the payment mechanism they use. Prospective forms of payment (such as capitation, or case-based payments) fix in advance the total amount paid to the provider and therefore it is not in the interest of the provider to prescribe unnecessary drugs. In contrast fee- for service type of payment may, if they allow mark-ups on drug encourage over prescription and prescription of more expensive drugs in order to enhance profitability (Grabowski & Mullins, 1997). Therefore it is important for policy makers to critically analyse all the payment mechanism available before they commit them selves to any.

6.2.5. The way forward

It is difficult for Government to operationalise the above recommendation through private sector, whose major objective is to make profits, but most of these recommendations can be realised through the use of autonomous bodies in which government has interests. Fortunately in Uganda there are two autonomous bodies whose objectives fit well with the above recommendations. NMS can take on the responsibility of making sure that drugs are available and affordable in all corners of the country. This could be achieved by either opening branches in all districts or by giving agencies to pharmacies in those places. In this

way they would be able to influence the price at which these pharmacies sell. However, the study indicated that NMS is at times more expensive than some wholesalers. Therefore before NMS embarks on spreading as suggested above it should improve its efficiency and use the comparative advantage it has over other private distributors. It should be able to bargain for lower prices from manufacturers and international distributors and cover any other loophole that may exist in their operations for it to be able to supply drugs at lower prices than any other local distributor. Alternatively the government should look at the possibility of breaking NMS monopoly by allowing public health units to purchase drugs from private wholesalers who may be willing to offer lower prices than NMS.

The second option is government to open private pharmacies and sell drugs to the public at prices that can make them recover overhead expenditure but not making profits, like the Sudanese government is doing[8].

National Drug Authority by nature of the power given to it by the National Drug Policy and Authority Statute, 1993 should be able to handle the regulatory mechanisms recommended. However, it is important to impart legal, conceptual and political skills to the employees of NDA if they are to manage the regulatory system effectively. Secondly the institution needs an effective legal system to take sanctions against organisations/ individuals, it also needs to maintain high ethical standards especially in inspection unit. Terms of service and ethical practices that encourage reliable inspection and avoid illegal payments should be instituted.

[8] Personal communication with a Sudanese pharmacist working in such pharmacy.

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Appendix 1

Questionnaire used in drug out-let premise

DISTRICT _____

NAME OF PHARMACY/DRUG SHOP/CLINIC _____

PERSON INTERVIEWED _____

DISTANCE FROM KAMPALA (KM) [ ]

QUESTION ON OVER HEAD

How much do you spend on rent? ____ [ ]

Salaries _____ [ ]

Taxes _____ [ ]

Others (specify) _____ [ ]

Presence of valid registration certificate and license _____ YE NO

Qualification of the person handling drugs
a) Pharmacist
b) Dispenser
c) Doctor
d) Trained nurse
e) Other specify

How do you determine your retail prices?

How do you decide what to stock?

What are the problems and constraints you encounter when setting prices

How do you think these problems can be solved?

TABLE USED TO GATHER INFORMATION ON WHOLESALE AND RETAIL PRICES, TURNOVER, AND STOCK OUT

DRUG NAME	DOSAGE FORM	PACK UNIT	WHOLESALE PRICE	RETAIL PRICE	TURNOVER FOR THE LAST ONE MONTH	DATS OUT OF STOCK IN THE LAST ONE MONTH
CHLOROQUINE 150 MG	TABS	1000				
QUININE 300MG	TABS	100				
CHLOROQUINE 40MG/ML	AMPUOLE	1				
QUININE 300MG/ML	AMPUOLE	1				
HALOFANTRINE	TABS	6				
PYRIMETHAMINE/SULFADOXINE	TABS	3				
FANSIDAR *	TABS	3				
AMODIAQUINE 200MG	TABS	100				
ARTESUNATE 100MG	TABS	14				
ARTENAM 100MG *	TABS	14				
AMPICILLIN 250/MG	CAPS	1000				
AMOXICILLIN 250 MG	CAPS	1000				
COAMOXICLAV 250/125MG	CAPS	20				
AUGMENTIN 250/125 MG *	CAPS	20				
CEFTRIAXONE 1000MG	VAIL	1				
ROCEPHINE 1000MG *	VAIL	1				
CEFUROXIME 1000MG	VAIL	1				
GENTAMICIN 80MG/ML	AMP	1				
BENZYLPENICILLIN 1MEG	VAIL	1				
CLOXACILLIN 250MG	CAP	100				
ERYTHROMYCIN 250MG	TAB	100				
CHLORAMPHENICAL 250MG	CAP	1000				
CHLORAMPHENICAL 500GMS	VAIL	1				
COTRIMOXAZOLE 480MG	TABS	1000S				
DOXYCYCLINE 100MG	CAPS	100				
TRAMADOL 50MG	CAP/TABS					
PARACETAMOL 500MG	TAB	100				
ACETYLSALICYLIC ACID	TABS	100				
PANADOL 500MG *	TABS	100				
CODEIN 30MG	TABS	100				
DICLOFENAC 50MG	TABS	100				
DICLOFENAC	AMP	1				
OLFEN 50MG *	CAP	100				
VOLTAREN 50MG *	TABS	100				
INDOMETTACIN 25MG	TABS	1000				
IBUPROFEN 200MG	TABS	1000				
ATENOLOL 100MG	TAB					
CAPTOPRIL 25MG	TAB	100				
HYDRALAZINE 20MG/ML	AMP	1				
NIFEDIPINE 10MG	TAB1	100				
ADALAT(RT) 100MG *	TABS	100				
TERNORMIN 25MG (ATENO) *	TABS	100				
PROPRANOLOL 40MG	TABS	1000				
METHYLDOPA 250MG	TABS	100				
LISNOPRIL 10MG	TABS	100				
ZESTRIL 10MG	TABS	100				
GLIBENCLIMIDE 5MG	TABS	1000				
METFORMINE 500MG	TABS	100				
INSULIN SOL 40IU/ML/10ML	VAIL	1				
INSULIN ZINC 40IU/ML/10ML	VAIL	1				
GLUCOPHAGE 500MG	TAB	100				
TOLBUTAMIDE 500MG	TAB	1000				

FLUCAP	CAPS	100				
DAWANOL	TABS	100				
HEDEX	TABS	100				
MAGNESIUM SULPHATE 200MI.	BOTTLE	1				
MAGNOMIT 200 ML *	BOTTLE	1				
ZEDEX 100ML	BOTTLE	1				
METAKELFINE	DOSE	3				

Appendix 2

Questionnaire to be used with key informant

DATE _____

NAME OF THE INSTITUTION _____

PERSON INTERVIEWED _____

JOB DESCRIPTION OF THE PERSON INTERVIEWED _____

What is your opinion on ;

a) Sales of drugs by unlicensed dealers

b) Ability of national medical store to open out lets in the regions or districts out side Kampala

c) On drug shops and clinics stocking above thier authorised limit.

d) Possibility for government to regulate retail prices of drugs? If possible what is the best way to do it

e) Impact of drug registration and verification fees on drug prices in general and retail price in particular

APPENDIX 3

Table 12 showing average prices in the four districts visited and price differentials (Jinja as the reference district)

Drug name	Adult dose	Avg cost (Lira) ush	Avg cost Kabarole ush	Avg cost (Kampala) ush	Avg cost (Jinja) ush	Price differencial in %		
						Jinja/lira	Jinja/Kabarole	Jinja/Kampala
CHLOROQUINE 150 mg	10 TABS	231	304.5	489	248	-7.3593	22.782258	97.17741935
QUININE 300MG	30TABS	3,000	3,000	3,000	3,000	0	0	0
CHLOROQUINE40MG	8 AMPS	3,840	3,860	3,256	2,033.6	88.82769473	89.811172	60.11014949
QUININE INJ300/ML	15 AMP	8,921	10,676.5	9,300	8,125	9.796923077	31.403077	14.46153846
HALOFANTRINE	6 TABS	-	14,333	16,166	**14,500**	0	-1.1517241	11.48965517
S/P	3 TABS	881.9	947	1,071	579.6	52.15665977	63.388544	84.7826087
AMODIAQUINE 100MG	8 TABS	800	800	800	800	0	0	0
ARTENAM	14 TABS	16,214	15,000	1,439	14,723	10.12701216	1.88141	-90.22617673
AMPICILLIN 250MG	40 CAPS	1,924.8	2,227.2	2,400	2,034.8	-5.4059367	9.4554747	17.94770985
AUGMENTIN250/125	20 TAB	-	42,875	35,000	30,000	0	42.916667	16.66666667
COAMOXICLAV250/125	20 TABS	-	25,333.3	23,000	22,000	0	15.151364	4.545454545
CEFRTIAXONE 1GM	5 VAILS	-	83,000	66,000	67,142	0	23.618599	-1.700872777
ROCPHINE 1GM *	5 VAILS	-		207,500	**22,3333**	0	0	-7.089413566
GENTAMICIN 80 MG/ML	10 ANPS	3,105	4,461	4,850	2,847	9.062170706	56.691254	70.3547594
X PEN 1 MEG	40 VAILS	11,809	20,090	16,500	1,1391	3.669563691	76.367308	44.85119831
CLOXACILLIN 250MG	40 CAPS	4,000	4,000	4,000	4,000	0	0	0
ERYTHROMYCIN 250MG	40 CAPS	4,000	4,000	4,000	4,000	0	0	0
C/PHENICOL250MG	40 CAPS	1,760	2,060	2,111	1,630	7.975460123	26.380368	29.50920245
COTRIMOXAZOLE480MG	20 TABS	613	754.5	1,127	539.1	13.70803191	39.955481	109.0521239
TRAMADOL50MG	ONE TAB	625	650	462	762.5	-18.0327869	-14.754098	-39.40983607
PARACETAMOL500MG	30 TABS	424	363.6	626	339	25.07374631	7.2566372	84.66076696
A SA 300MG	30 TABS	300	309.1	300	279	7.52688172	10.78853	7.52688172
CODEIN 30MG	15 TABS	3,750	3,600	4,125	4,600	-18.4782609	-21.73913	-10.32608696
DICLOFENAC 50MG	20 TABS	1,588	1,614.6	1,570.6	1,105.3	43.67140143	46.077988	42.09716819
DICLOFENAC INJ	5 AMPS	3,,133.3	3,687.5	4,772.7	2,763.8	13.36927419	33.421376	72.68615674
OLFEN 50 MG	15 TABS	12,000	10,500	9,438	8,931	34.36345314	17.568021	5.676855895
INDOMETHACINE 25MG	15 CAPS	356	415.2	513	281	26.69039146	47.758007	82.56227758
HYDRALAZINE 20MG/ML	1 VAIL		4,000	3,500	3,500	0	14.285714	0
IBUPROFEN 200MG	15 TABS	390.3	476.2	624	311	25.49839228	53.118971	100.6430868
ATENOLOL 100MG	28 TABS	4,200	4,178	5,091.7	3,818	10.00523834	9.4290204	33.36039811
CAPTOPRIL 25 MG	20TABS	4,000	3,800	4,111	2,857	40.00700035	33.00665	43.89219461
NIFEDIPINE 10MG	30 TABS	3,000	3,577	3,350	3,100	-3.22580645	15.387097	8.064516129
PROPRANOLOL 40MG	60 TABS	1,816.7	2,188	3,025	1,533.3	18.4830105	42.698754	97.28689754
METHYLDOPA 250MG	90 TABS	9,000	10,038	16,714	7,907	13.82319464	26.950803	111.3823195
LISNOPRIL 10MG	30 TABS	24,000	17,125	14,500	13,530	77.38359202	26.570584	7.169253511
ZESTRIL 10MG	30 TABS	60,000	45,000	45,545	**40,000**	50	12.5	13.8625
GLIBECLIMIDE 5MG	30 TABS	2,250	2,812	2,750	2,500	-10	12.48	10
METFORMINE 500MG	30 TABS	4,500	4,250	3,875	3,490	28.93982808	21.776504	11.03151862
INSULIN SOL	1 VAIL	7,000	5,000	5,062	5,000	40	0	1.24
INSULIN LENT	1VAIL	7,000	5,000	5,062	5,000	40	0	1.24
TOLBUTAMIDE 500MG	20 TABS	4,000	2,166	2,571.4	2,000	100	8.3	28.57

GLIPIZIDE 2.5 MG	30 TABS	-		6,000	6,833.3	0	633	2.857730616
FLUCAP	1 PAIR	200	186.8	200	131	52.67175573	42.59542	52.67175573
HEDEX	1 PAIR	-	191.2	200	172	0	11.162791	16.27906977
MAGNESIUM SUP	1 BOTTLE		1,041	1,111.7	1,041	-100	0	6.79154659
MAGNOMIT SUP *	1BOTTLE	1,535	1,572.2	1,812.5	1,527	0.523903078	2.9600524	18.69679109
METAKELFINE	3 TABS	2,500	2,343	2,476	2,061	21.30033964	13.682678	20.13585638
DOXYCYCLINE 100MG	14 TABS	1,400	1,400	1,400	1,400	0	0	0
C/PHENICOL I GM	20 VAILS	20,000	21,777	22,000	19,384	3.177878663	12.345233	13.49566653
FANSIDAR	3 TABS	2,225	1,750	1,917.6	1,38.5	14.77946866	-9.7240134	-1.078153211
AMOXYCILLIN	30 CAPS	2,550	2,857.5	3,136	2,060.87	23.73415111	38.655034	52.16874427
					561834.67	743.8443266	1646.2099	1357.1679
				AVERAGE DIFFERENCIAL	ENTIAL MEAN	21.43%	31.47%	26.50%
					MEDIAN	8.50%	13.68%	16.20%

Chi square 49990

P = 0.0853

One U.s Dollar is equivalent to 1870 Uganda shillings

APENDIXE 4

Table 13 showing average wholesale prices in the four districts as compared to NMS prices

DRUG NAME	PACK SIZE	W/SALE PRICE LIRA USH	WHOLESALE PRICE KABAROLE USH	WHOLESALE PRICE (KAMPALA) USH	WHOLESALE PRICE (JINJA)USH	WHOLESALE PRICE NMS (USH)
CHLOROQUINE 150 mg	1000 TABS	10,000	12,000	8,000	9,300	11,175
QUININE INJ300/ML	1 AMP	300	350	250	250	302
S/P	100 TABS	10,000	16,600	5,500	6,000	6,458
AMODIAQUINE 100MG	100TABS	3,000	3,000	2,100	2,500	2,286
ARTENAM	14 TABS	13,000		10,000	10,500	
AMPICILLIN 250MG	1000TABS	27,000	27,000	25,000	25,000	30,071
AUGMENTIN250/125	20TABS			27,000	27,000	24,865
COAMOXICLAV250/125				16,000	16,500	17,650
CEFRTIAXONE 1GM	1 VAIL	15,000		11800	11000	**9873**
GENTAMICIN 80 MG/ML	1 AMP	100	200	80	80	94
X PEN 1 MEG	1VAIL	150	200	150	150	130
CLOXACILLIN 250MG	100CAPS	4,000	6,000	4,000	4,000	3,366
ERYTHROMYCIN 250MG	100TABS	6,500	8,000	6,000	6,100	5,757
C/PHENICOL250MG	1000 TABS	17,000	21,000	17,000	17,500	22,50
COTRIMOXAZOLE480MG	1000 TABS	10,500	13,500	10,000	10,000	12,750
TRAMADOL50MG	100 TABS	25,000		25,000	19,500	
PARACETAMOL500MG	1000TABS	4,500	4,800	3,600	3,,600	4,200
A SA 300MG	1000 TABS	3,000	3,000	2,300	2,300	2,750
CODEIN 30MG	100 TABS	13,500	18,000	13,000	13,000	12,750
DICLOFENAC 50MG	100 TABS	1,500	2,500	1300	1300	
DICLOFENAC INJ	10 AMP	2,250	3,500	1,500	2,000	
OLFEN 50 MG	10 TABS	4,500		3,800	3,800	
INDOMETHACINE 25MG	1000 TABS	4,500	6,000	4,200	4,500	5,191
HYDRALAZINE 20MG/ML						**17,200**
IBUPROFEN 200MG	1000 TABS	6,400	8,500	6,200	6,200	
ATENOLOL 100MG	100 TABS	8,000		6,000	7,200	4,815
CAPTOPRIL 25 MG	100 TABS			8000		
NIFEDIPINE 10MG	100 TABS	6,000		4,500	4,700	4,400
PROPRANOLOL 40MG	1000 TABS	9,000	15,000	9,000	9,000	11,595
METHYLDOPA 250MG	100 TABS	8,500	8,500	8,000	8,100	6,133
LISNOPRIL 10MG	100 TABS			26,000	26,000	
ZESTRIL 10MG	100 TABS			117,857		
GLIBECLIMIDE 5MG	1000 TABS			6,85.70	7,200	3,544
METFORMINE 500MG	100 TABS	8,000		4,300	4,300	3,022.50
INSULIN SOL	1 VAIL			4,000	4,000	3,150
INSULIN LENT	1 VAIL			4,000	4,000	3,150
GLIPIZIDE 2.5 MG	100TABS			10,500		
FLUCAP	100 CAPS	3,800	4,000	3,700	3,800	
HEDEX	100 TABS	6,200	7,000	6200	6,200	
MAGNESIUM SUP	200ML BTL		700	500	500	
MAGNOMIT SUP *	200 MLBTL	1,250	1,200	900	1,100	
METAKELFINE	30 TABS	24,,000	30,000	22,500		
DOXYCYCLINE 100MG						
C/PHENICOL I GM	1 VAIL	700	800	500	600	448
FANSIDAR						
AMOXYCILLIN	1000 TABS	31,500	32,000	28,000	28,000	34,311

APPENDIX 5 Table 14 comparing average retail prices between drug shops, clinics and pharmacies

DRUG NAME	ADULT DOSE	AVE DRUG SHOP PRICE	AVER PHARMACY PRICE	AVER CLINIC PRICE
CHLOROQUINE 150 mg	10 TABS	289	312	366.7
QUININE 300MG	30 TABS	3,000	3,000	3,000
CHLOROQUINE40MG	20AMPS	6,974	6,240	11,080
QUININE INJ300/ML	15 AMPS	8,800	7,937	10,673
HALOFANTRINE	6 TABS	15,000	15,305	
S/P	3TABS	800	850	957
AMODIAQUINE 100MG	8 TABS	800	800	800
ARTENAM	14 TABS	15,000	14,041	17,,425
AMPICILLIN 250MG	40 CAPS	2,073	21,33.3	23,04.7
AUGMENTIN250/125	20 TABS	-	36,173.6	50,000
COAMOXICLAV250/125	20 TABS	22,000	23,200	-
CEFRTIAXONE 1GM	5 VAILS		71,578.95	90,000
ROCPHINE 1GM *	5 VAILS		212777	
GENTAMICIN 80 MG/ML	10 AMP	2,850	3,152	4,613
X PEN 1 MEG	40AMP	13,419	11,272.7	19,440
CLOXACILLIN 250MG	40 CAPS	4,000	4,000	4,000
ERYTHROMYCIN 250MG	40 CAPS	4,000	4,000	4,000
C/PHENICOL250MG	40 CAPS	1,800	1,691	2, 200
COTRIMOXAZOLE480MG	20 TABS	670.7	762.5	884.5
TRAMADOL50MG	1*1	666.6	610	666.7
PARACETAMOL500MG	30 TABS	411	412	509.6
A SA 300MG	30 TABS	283	281	332
CODEIN 30MG	15 TABS	4,500	3,609	6,000
DICLOFENAC 50MG	15 TABS	1,384	1,333.3	1,720
DICLOFENAC INJ	5 VAILS	2,942	2,663	4,700
OLFEN 50 MG	15 TABS	9,000	9,487.5	12,000
INDOMETHACINE 25MG	15 CAPS	330	393.7	498
HYDRALAZINE 20MG/ML	1 VAIL		3,550	
IBUPROFEN 200MG	15 TABS	421	385.1	537.3
ATENOLOL 100MG	28 TABS	4,900	3,985	5,200
CAPTOPRIL 25 MG	20 TABS	6,000	3,400	6,000
NIFEDIPINE 10MG	30 TABS	3,273	2,895.8	4,200
PROPRANOLOL 40MG	60 TABS	1,800	1,937	2,566
METHYLDOPA 250MG	90 TABS	8,871.4	12,600	10,500
LISNOPRIL 10MG	30 TABS	18,000	14,210.53	19,328.5
ZESTRIL 10MG	30 TABS	45,000	43,500	45,000
GLIBECLIMIDE 5MG	30 TABS	2,571.4	2,054.3	4,050
METFORMINE 500MG	30 TABS	3,750	3,,560	5,400
INSULIN SOL	1 VAIL		5,250	7,000
INSULIN LENT	1 VAIL		5,250	7,000
TOLBUTAMIDE 500MG				
GLIPIZIDE 2.5 MG	30 TABS		5,909	6,000
FLUCAP	1 PAIR	174	176	200
HEDEX	1 PAIR	191	188.4	195.5
MAGNESIUM SUP	1 BOTTLE	961	989	1,171
MAGNOMIT SUP *	1 BOTTLE	1,535.7	1,625	1,735.7
METAKELFINE	2 TABS	2,175	2,208	2,545
DOXYCYCLINE 100MG	14 CAPS	1,400	1,400	1,400
C/PHENICOL 1 GM	20 VAILS	19,200	20,434	22,000
FANSIDAR	3 TABS	1,907	1,890	2,080
AMOXYCILLIN	30 CAPS	2667.5	2612	2631