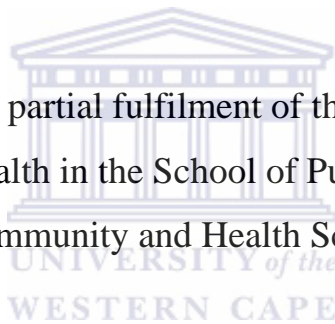


**Affordability of medicines for patients with diabetes attending  
University of Nigeria Teaching Hospital (UNTH), Enugu**

**Ogori Taylor**

**Student No: 2520547**

A minithesis submitted in partial fulfilment of the requirements for the degree  
of Magister in Public Health in the School of Public Health in the Faculty of  
Community and Health Sciences



**UNIVERSITY OF THE WESTERN CAPE**

**Supervisor: Hazel Bradley**

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**Affordability of medicines for patients with diabetes  
attending University of Nigeria Teaching Hospital (UNTH),  
Enugu**

**Ogori Taylor**

**KEYWORDS:**

Diabetes

Diabetes medicines

Affordability

Rational prescribing

Out-of-pocket

Essential medicines list

Poverty

Teaching hospital

Developing country

Nigeria.



## **ABSTRACT**

### **Affordability of medicines for patients with diabetes attending University of Nigeria Teaching Hospital (UNTH), Enugu**

**Background:** In developing countries, diabetes is the leading cause of blindness, renal failure and lower limb amputation with most deaths due to cardiovascular disease complications. The prognosis for diabetes is poor and life expectancy is short and akin to the era in which insulin was not available to manage diabetes (Beran *et al.*, 2005). These poor outcomes have been attributed to chronic shortage and non-affordability of diabetic medicines.

**Aim:** This study determined the affordability of medicines for diabetic patients attending the diabetic clinic of the University of Nigeria Teaching Hospital (UNTH), Enugu.

**Methods:** The study was a cross-sectional, time-delimited, descriptive study of affordability of medicines for diabetic patients aged >18 years and who pay for medicines out-of-pocket. All eligible patients attending the diabetes clinic who are responsible for payment of their prescribed medicines were recruited between September 19 to October 31, 2007. A structured questionnaire was used to collect sociodemographic information about patients and the prescription was assessed in terms of conformity with the essential medicines list (EML), cost and ability to be completely filled by the patient. Data was analysed using EPI Info software.

**Results:** Of the 189 respondents, 37% were able to completely fill their prescriptions with funds from income (40%), borrowed funds (15%) or gifts from friends/relatives (43%). The total number able to completely fill their prescriptions increased to 47% when substitutes from the EML were made. The mean number of days' wages to completely fill the prescription was 6.5

days and this reduced to 4.8 days when the choice was made wholly from the EML. The prices patients paid to purchase the key medicines to manage diabetes and cardiovascular disease were 2 to 26 times international reference prices.

**Conclusions:** The results show that medicines prescribed for diabetes patients are unaffordable to the majority of patients who attend the UNTH diabetic clinic. While choice from the EML would have a positive impact on affordability, ability to afford out-of-pocket payment would also be greatly improved with reduction in prices patients pay for their medicines. There is need to restructure financing mechanisms for chronic disease management with the aim of reducing or abolishing out-of-pocket payments for medicines and health services in the country.



## DECLARATION

I declare that *Affordability of medicines for patients with diabetes attending University of Nigeria Teaching Hospital (UNTH), Enugu* is my own work, that it has not been submitted for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Full name: Ogori Taylor

Date: February 21, 2008

Signed



## **ACKNOWLEDGEMENT**

My gratitude goes to my supervisor Hazel Bradley for her commitment to the successful realization of this project.



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## ACRONYMS

DCaCTR	Diabetes Control and Complications Trial Research
DFID	Department for International Development
EC	European Commission
EML	Essential Medicines List
FMOH	Federal Ministry of Health
HAI	Health Action International
HDC	Higher Degrees Committee
HMO	Health Management Organisation
IDF	International Diabetes Federation
IRP	International Reference Price
MRC	Medical Research Council
MSH	Management Sciences for Health
UNTH	University of Nigeria Teaching Hospital
UKPDS	United Kingdom Prospective Diabetes Study
USD	United States Dollar
WHO	World Health Organization



## CHAPTER 1 – INTRODUCTION

WHO (2006a) estimates that more than 180 million people world wide have diabetes and this figure is likely to double by 2030. In developing countries where more than 80% of diabetes deaths occur, the prevalence is likely to increase by 150% in the next 25 years. Thus, diabetes is a global threat to public health that is worsening particularly in the developing world.

With globalization and epidemiological transition, most sub-Saharan African countries face the double burden of communicable and non-communicable diseases. The prognosis for diabetes is bleak in sub-Saharan Africa as two out of three diabetes patients will die as a result of cardiovascular complications (Kengne *et al.*, 2005) and life expectancy for a child with newly diagnosed type 1 diabetes can be as short as seven months in rural Mozambique (Beran *et al.*, 2005). This is mainly due to weak health systems which are primarily focused and experienced in acute care and have inadequate capacity and resources to effectively manage chronic diseases. In addition, the response of governments to this growing public health threat is grossly inadequate.

Several studies have shown poor availability and affordability of essential medicines in developing countries (Mendis *et al.*, 2007; FMOH, 2005). For example, despite the availability of insulin for almost a century, successive surveys carried out by the International Diabetes Federation (IDF) over the past 12 years have shown a chronic shortage and non-affordability of life-saving insulin in sub-Saharan African countries (Deeb *et al.*, 1994; IDF, 2003; Beran *et al.*, 2005).

WHO (2006b) suggests that Nigeria has the greatest number of people living with diabetes in Africa, with an estimated burden of about 1.7 million which will increase to 4.8 million by 2030. The economic burden of diabetes is enormous in terms of the direct cost of intensive monitoring and control of blood glucose and managing cardiovascular, renal and neurological sequelae.

Presently, Nigeria does not have standard treatment guidelines for managing people living with diabetes, although it developed its first essential medicines list in 1998. Prescribers are required to select medicines from the list but implementation has not been successful and they often choose medicines outside the list without due consideration to affordability, availability, safety and efficacy. The national standard treatment guidelines for the diseases of public health importance are currently being developed.

In Nigeria, a substantial portion of health care costs is borne by the patient – 74.5% of the health care expenditure in 2003 (WHO, 2006b). The report also estimates that 90.2% of Nigerians live below the poverty level of 2 United States Dollars (USD) per day. Thus, affording health care will be a challenge to people living with diabetes in Nigeria. This difficulty is evidenced by the reports showing high prevalence of complications due to diabetes (Okesina *et al.*, 1999; Unachukwu *et al.*, 2007).

In this study, I will explore affordability of medicines prescribed to people living with diabetes attending the diabetic clinic of a teaching hospital in Nigeria.

## CHAPTER 2 – LITERATURE REVIEW:

### 2.1. *Burden of diabetes*

There is a consensus that sub-Saharan African countries are facing a double burden of communicable and non-communicable diseases, with the incidence of diabetes rising steadily (Beaglehole and Yach, 2003). In a press release, the International Diabetes Federation (IDF) considers diabetes “the epidemic of the 21<sup>st</sup> Century” and estimates that 80% of diabetic patients are in developing countries (IDF, 2006). Kengne and Mbanya (2006) reported that over the past two or three decades, the prevalence has increased by 2 to 10 fold in most sub-Saharan African countries.

The true prevalence of diabetes in sub-Saharan African countries is unknown although most studies provide varying estimates ranging from 0% to 10.4% (Sobngwi *et al.*, 2001; IDF, 2003), making Africa the region with the lowest prevalence. This apparent low prevalence may represent an underestimation due to several factors related to the method of assessment, the insidious nature of the disease, weak health systems with inappropriate detection policies and practices, as well as poor access to health facilities (Kengne and Mbanya, 2006). For example, reported estimates are derived from death certificates and this underestimates the prevalence of diabetes because individuals with diabetes often die of cardiovascular and renal diseases (Roglic *et al.*, 2005). Wild *et al.* (2004) noted that while most diabetes patients are >64 years in developed countries, the age range in sub-Saharan Africa is between 45 – 64 years, thus studies that focus on the aged would

certainly miss most of the cases. More realistic estimates could be obtained through well designed population studies. In addition, systematic recording and analysis of mortality and morbidity data would help in revealing the true burden of diabetes.

## **2.2: *Complications of diabetes***

WHO (2004) asserts that that complications and death due to diabetes can be prevented or delayed through effective management. The authors suggest that by combining healthy lifestyles and effective medications, people living with diabetes can lead full and healthy lives. Numerous authors have also demonstrated that intensive blood glucose control in diabetics not only reduces complications but increases the time they are free from complications (Gray *et al.*, 2000; Group UPDS, 1998; Group DCaCTR, 1993). Therefore, access to health care and medicines required for appropriate glycaemic control is important to mitigate complications and premature mortality.

The reality is that complications are rife in Africa and the IDF (2003) asserts that diabetes is now the leading cause of blindness, renal failure and lower limb amputation with 70 to 80% of deaths due to cardiovascular disease complications.

Estimates of the burden of complications are quite unreliable due to wide variability in study designs and paucity of information in many countries especially in sub-Saharan Africa (IDF, 2003; Abbas and Archibald, 2005). Thus, population based studies with standardized protocols are required to produce reliable estimates of prevalence of

complications that are comparable across countries and from one period to another (IDF, 2003).

### ***2.3. Diabetes and poverty***

WHO (2005) concludes that poor people are more likely to develop chronic diseases, develop complications, and die after developing chronic diseases. The authors assert that the reason is that the poor are more likely to have material deprivation, psychosocial stress, high levels of risky behaviour, unhealthy living conditions and poor access to good quality health care. For example, Bartley *et al.* (2000) suggest that risk factors of diabetes such as consumption of energy dense and high fat foods, physical inactivity, overweight or obesity are more likely to be present in the poor. In cases of ill health, the poor are also less likely to access good quality health care and diagnostic services due to financial constraints, lack of proximity to health care facilities, and poor responsiveness of the health care system (WHO, 2005)

### ***2.4. Cost of diabetes***

Diabetes exerts a heavy toll on individuals, their families and nations in terms of human suffering and economic costs. WHO (2004) estimates that the burden of premature death from diabetes is similar to that of HIV/AIDS yet the problem is largely unrecognised by governments. The authors also reveal that loss of life from premature death from diabetes is greatest in developing countries despite the greater prevalence in developed economies.

This is due to the fact that people with diabetes in developing countries generally die at a younger age than in the developed world. Thus, loss of life, disability and the consequent effect on quality of life and productivity, are hindrances to economic growth. It is reported that some countries spend as much as 2.5% to 15% of annual health care budgets only on diabetes and up to five times the amount spent on diabetes on lost productivity (WHO, 2003).

Most studies on the cost of diabetes relate only to direct costs of treatment in health facilities. There is little or no publication on indirect and intangible costs of diabetes although it is increasingly affecting the productive segment of the society and consequently impacting on economic growth and poverty levels of individuals in countries. In sub-Saharan Africa, most of the health care costs are borne by individuals and their families and this may explain why there is little interest in economic cost of the disease studies. Most available studies are carried out in established economies whose governments play a greater role in the health care provision of the populace.

Thus, in situations where the responsibility for bearing the cost of treatment falls fully on the individual and his family, when care is unaffordable, individuals are left to the consequences of non-treatment. This is usually translated into high rate of morbidity and mortality from poor glycaemic control and resulting complications. In their review, Kengne and Mbanya (2006) showed that indeed mortality was reported to be high with life expectancy of type 1 diabetics at diagnosis not exceeding 5 years in most African countries.



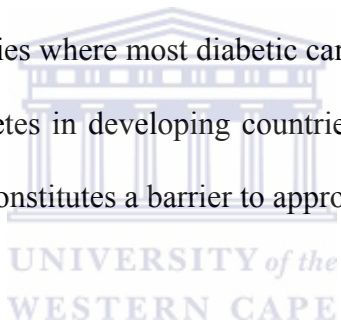
## ***2.5. Out-of-pocket costs and diabetes***

Several studies have linked out-of-pocket expenditure with barriers to care especially for patients with chronic diseases (Piette *et al.*, 2004a; Karter *et al.*, 2003; Hsu *et al.*, 2006). There is ample evidence to show that with Medicare beneficiaries in the United States cost sharing caused a reduction in drug consumption (Rector and Venus, 2004; Tseng *et al.*, 2004) and poorer adherence to prescribed medication (Rector and Venus, 2004; Tseng *et al.*, 2004; Cox *et al.*, (2001). In a review, Hsu *et al.*, (2006) demonstrated that when patients had no insurance coverage for medicines, they had lower rate of use of essential medicines, higher rates of visits to the emergency room and death.

While such studies abound in developed countries there are few studies which relate the consequences of out-of-pocket or lack of insurance to health care in developing countries. Some studies have shown that poor patients who cannot afford their medications shop around with traditional medicine practitioners, drug sellers or even avoid medical treatment and this worsens their conditions (WHO, 2004). Aikins (2005) in a qualitative study of diabetic patients in Ghana was able to reveal that diabetic patients considered biomedical management as ideal. However, due to non affordability of diabetic medicines and care, they were driven to cure seeking with ethnomedical systems of care which resulted in diabetic complications. Also in Mexico, self-medication and use of complementary medicines in diabetic patients were associated with being uninsured (Pegan and Puig, 2005).

## **2.6. Access to diabetes medicines**

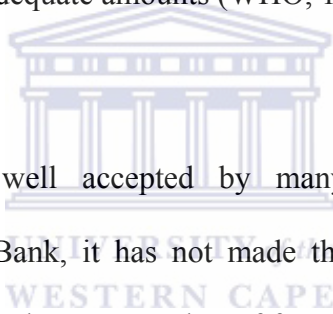
Many studies in developed countries have identified non adherence to a complex regimen of medical care and lifestyle modification required to manage the disease, as the prime factors in the development of complications and premature death of people living with diabetes (Cramer, 2004; Group UPDS, 1998; Group DCaCTR, 1993). In developing countries, the situation is very different. For type 1 diabetics and a large percentage of type 2 diabetics, the availability of medicines and testing facilities can dictate the morbidity and mortality patterns due to the disease. Thus, access to diabetic medications and technology is required in order to save lives of diabetics and minimise complications. In contrast to developed countries where most diabetic care is covered by insurance, most of the people living with diabetes in developing countries pay for management of their condition out-of-pocket. This constitutes a barrier to appropriate control of diabetes.



Poor access to medicines is an intractable problem in developing countries and has been a key focus of the WHO since the initiation of its essential medicines program in 1977. The need to secure affordability and geographical access has been recognized, with affordability being the most important determinant of accessibility to life saving medicines (Everard, 2002). Several studies have testified to poor availability and high cost of diabetes medicines in African countries (Mendis *et al.* 2007) including Nigeria (FMOH, 2005). As mentioned earlier, Beran *et al.*, (2005) suggest that the life expectancy of diabetic children in some sub-Saharan African countries is comparable to pre-insulin era due to poor access to the life saving medicine.

## **2.7. Essential Medicines List (EML) and affordability**

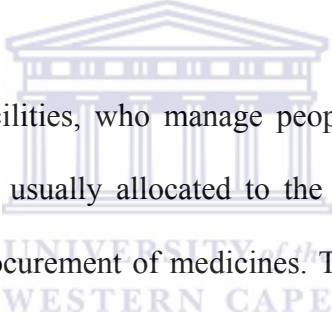
Although effective medicines to treat many diseases were known by 1970, half of the world population did not have access to these medicines due to non availability, non affordability, poor quality and inappropriate use (WHO, 1998). In 1977 the essential drug concept was born with the drawing up of the first Essential Medicines List. This list contained carefully chosen medicines made on the basis of efficacy, safety and comparative cost-effectiveness. These medicines were those that satisfy the priority health care needs of the majority of the population and were required to be available in health facilities at all times in adequate amounts (WHO, 1998).



Although the concept was well accepted by many countries and international organisations like the World Bank, it has not made the anticipated impact on health outcomes (WHO, 1997). This is due to a number of factors including direct opposition to the concept by the pharmaceutical industry whose sale of expensive medicines was threatened; and doctors who viewed their freedom to prescribe restricted and others who felt that essential medicines were “poor man’s medicine” (Weerasuriya and Brudon (1998). Furthermore, Weerasuriya and Brudon (1998) suggested that political commitment, poor implementation strategies and numerous stakeholders with differing interests have prevented countries from benefiting from the full potential of essential drug concept.

## **2.8. Nigerian health system**

About 40% of the population in Nigeria utilise the public health facilities. The Nigerian public health system is pluralistic and uncoordinated and managed by the three levels of government namely the federal, the states and the local governments. These three levels all have responsibility for health and thus each has a specific domain of influence. The federal government has responsibility for policy formulation and management of tertiary hospitals, the state governments for secondary health facilities, while the local government authorities, the primary health facilities. Thus, there is little or no stewardship of the levels by the central government.

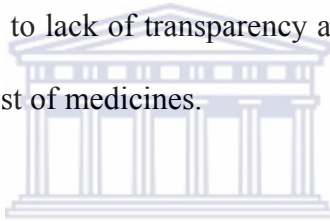


The tertiary and secondary facilities, who manage people living with diabetes, run as autonomous bodies. Funds are usually allocated to the facilities to cater for all needs without any earmarking for procurement of medicines. There is usually full recovery of funds for all services including prescribing, laboratory testing, hospitalisation and medicines. This means that patients pay for all diabetes services out-of-pocket including medicines.

Nigeria drew up its first essential medicines list in 1988 and it was backed by Essential Drugs Law which mandated prescribing, procurement and use of medicines to be limited to the EML. Implementation of the concept has not been effective as physicians still prescribe any medicines they deem appropriate for the patient. In addition, there is unhindered access of industry representatives to prescribers and several studies have shown their influence in the choice of newer, more expensive medicines (Caudill *et al.*,

1996; Lexchin, 1997; Caamaño *et al.*, 2002, Wilkes, Doblin and Shapiro, 1992; Styrer and Bero, 1996; Powers *et al.*, 1998). The facility pharmacies tend to stock medicines which are usually prescribed, to reduce incidence of patients not having their prescriptions filled in the health facility. This results in stocking and procuring medicines which are not on the essential medicines list and which are expensive. This in turn impinges on availability as scarce resources are used to procure a few expensive medicines.

Medicine procurement in the country is also adhoc and facility based. This means that medicines are unaffordable due to lack of transparency and non exploitation of economy of scale to reduce the overall cost of medicines.



A survey of medicine prices in Nigeria showed that facilities both in public and private sectors charged between 2 to 64 times international prices (FMOH, 2005) and most of the targeted medicines had very low availability in the facilities. Glibenclamide, an essential medicines in the treatment of diabetes, was found to cost more than 17 times international price in the public sector (FMOH, 2005). Availability was also found to be low for metformin (28.6%) and glibenclamide (45.2%). While the survey did not seek out availability and affordability of insulin, IDF, (2006), reported that in recent assessments in 25 countries in Africa, insulin was regularly available in large hospitals in half of the countries and only in 5 countries in rural facilities.

WHO (2006c) describes affordability in terms of the number of days the lowest paid government worker would work to afford medicines. The reality is that most Nigerians do not work for the government. FMOH (2005) tried to identify factors which might contribute to the high cost of medicines at the national level such as taxes and tariffs, mark-ups at the level of importers, manufacturers, wholesalers and retailers. The role of selection in the affordability of medicines at the prescriber level was not considered.

Enugu which is the study setting, is a typical state capital in Nigeria and the inhabitants consist mainly of subsistence farmers, petty traders and a smaller number of government employees. Due to the fragmented and poor functioning of the health system in Nigeria, most patients seek help directly at secondary and tertiary facilities which are nearest to them. This is because health professionals are concentrated in urban areas and such health facilities provide the only possibility patients have to receive appropriate care for chronic illnesses. Most patients who attend public health facilities in Nigeria are poor.

This study will thus examine affordability of medicines prescribed to patients attending the diabetic clinic at the University of Nigeria Teaching Hospital, Enugu.

## **CHAPTER 3 – RESEARCH DESIGN AND METHODOLOGY**

### **3.1 Aim**

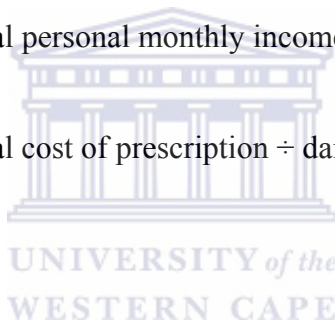
The aim of the study is to conduct a situation analysis of affordability of medicines prescribed to diabetic patients attending the University of Nigeria Teaching Hospital in Enugu

### **3.2 Objectives**

- To determine the socioeconomic status of people living with diabetes attending University of Nigeria Teaching Hospital, Enugu
- To determine the percentage of patients who can completely fill their prescriptions from the hospital pharmacy
- To calculate the percentage of prescribed medicines selected from the essential medicines list (EML) for patients attending the diabetic clinic in the hospital
- To compare affordability of medicines as prescribed by the physician with those totally conforming to the EML
- To compare patient prices of key medicines used to treat diabetes and its co-morbidities with international reference prices.

### 3.3. *Definition of terms*

Definitions of affordability	<ol style="list-style-type: none"><li>1. Ability to completely fill the prescription</li><li>2. A prescription that costs equal or less than one days' income</li><li>3. Medicine prices costing less or equal to 1.5 times the international reference price</li></ol>
International Reference Price	The MSH issues an annual International Price Indicator Guide of prices offered by not-for-profit suppliers to developing countries for multisource generically equivalent products
Daily wage	Total personal monthly income $\div$ 30 days
Number of days' wages to purchase medicine	Total cost of prescription $\div$ daily wage





### **3.4. Study Design:**

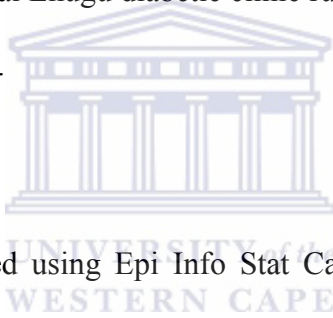
The study was a cross sectional descriptive time delimited study of affordability of medicines prescribed for diabetic patients paying out-of-pocket, as it relates to selection of medicines from the national essential medicine list by prescribers.

### **3.5. Study Population:**

The study population is adult diabetic patients aged more than 18 years, who are managed at the University Teaching Hospital Enugu diabetic clinic run once every week and who pay for their medications out-of-pocket.

### **3.6. Sample Size:**

The sample size was calculated using Epi Info Stat Calc. According to the 2006 census, Enugu state has a population of 3.5million persons. The calculation of the study population was based on the 75% of the population in Nigeria that pay out-of-pocket for the health needs (WHO, 2006b), that 40% of the population utilise public health facilities, that 60% of the population are adults and the prevalence of diabetes is 2.8% among adults. Also considering that there are two teaching hospitals in the Enugu state the study population was estimated to be 6,300 persons. Based on preliminary assumption that about 10% of the target population cannot completely fill their prescriptions and with a degree of error of 5% and a power of 95%, our sample size was calculated to be 113 patients.



### ***3.7. Sampling Procedure:***

Patients with type I or type II diabetes attending the diabetic clinic at UNTH, Enugu, who have been prescribed any medicine used for treating diabetes were recruited. Since most diabetics have other diseases such as hypertension, the full range of medicines prescribed for the patients was assessed. Those who pay the full cost for their medications were included in the study, while those on any form of insurance or third party payment (e.g. employer) were excluded.

### ***3.8. Data Collection:***

A structured questionnaire (appendix 1) was used to collect data between 19 September and 31 October, 2007. The questionnaire was pre-tested on 10 diabetic patients attending the health facility prior to commencement of the study and minor changes were made.

The data collection took into consideration the procedure for service delivery to diabetic patients. At the diabetic clinic run every Wednesday, the patient first sees the physician who writes a prescription for medicines. The patient then goes to the pharmacy department where the prescription is evaluated and priced and handed over to him to pay at the finance department. If the patient cannot pay the full cost of the prescription, the pharmacy department costs part of it in relation to how much the patient can afford. After the adjustment is made the patient pays at the finance department, collects a receipt and then goes back to the pharmacy to collect medicines.

I used two pharmacists to collect data. The first data collector filled in the background information on patients at the waiting room of the diabetes clinic. The second data collector completed the details of the prescription as well as the amount the patient paid for the medicines. All patients attending the diabetes clinic, and fulfilling the study criteria, were included in the study and data collection continued until the required number of patients had been recruited.

Subsequently, the completed questionnaires were then examined to determine those which had medicines prescribed outside the approved National Essential Medicines List. Appropriate alternatives were suggested by two clinical pharmacologists at the University of Lagos, Nigeria. Since there is no officially approved protocol for the management of diabetes, the draft Nigerian Standard Treatment Guidelines which is currently being pre-tested by some secondary and tertiary institutions was used as a reference to guide to the pharmacologists. Where the choices were different, a third specialist adjudicated between the selections. The cost of the medicines prescribed and alternatives suggested by the experts were determined from the current hospital price list. Where the medicines were not available in the facility, the cost in the closest private pharmacy was used to determine the price the patient would pay for the prescribed medicine.

### ***3.9. Data analysis:***

The completed instruments were further cross checked and appropriate sections were completed and entered into Microsoft Access by the researcher and later exported into Epi Info software for analysis. Double entry of all data was done to ensure accuracy of entry. The

entered data was subsequently cleaned by the researcher who generated the full set of descriptive data for all the variables and examined them for errors.

Descriptive statistics were generated using the Epi Info software. The sample characteristics, affordability and medicine selection were described using means or median and frequency and the extent of dispersion of data was demonstrated by the confidence interval.

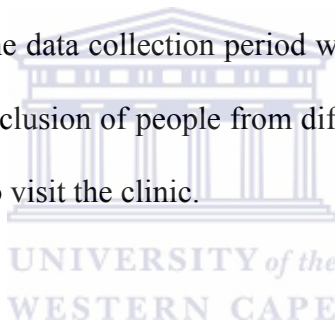
Affordability was described in terms of the ability of a patient to completely fill the prescription as adherence to a diabetic regimen is essential to control the disease and mitigate against development of complications. I also measured the proportion of patients able to pay for their medicines with one days' income. The prices patients were required to pay for their medicines were also compared to international prices (MSH, 2006). Medicine prices were deemed affordable when they did not cost more than 1.5 times international reference prices (Mendis *et al.*, 2007).

Medicine selection was described according to percentage of medicines prescribed from the EML. The difference between the cost of prescriptions written by the physician and the alternative regimen from the EML suggested by the clinical pharmacologists, was assessed using a two-tailed t-test. The severity of diabetes in terms of patients with diabetes only and those with other co-morbidities such as hypertension was stratified and analysed.

To assess patient prices, unit cost of medicines of the same strength was compared with international reference prices (MSH, 2006). Patient prices which cost more than 1.5 times international prices were deemed unaffordable. The researcher was solely responsible for the analysis of data.

### ***3.10. Validity/Reliability:***

The sample calculation was based on 95% confidence level and 5% margin of error in order to obtain a large enough sample to limit the likelihood of chance influencing the results. All attendees at the clinic within the data collection period were approached. Data was collected throughout the day to ensure inclusion of people from different backgrounds who may prefer some specific time in the day to visit the clinic.



Measurement bias was minimized by first of all designing the data collection tool to be simple, short and appropriately formatted to reduce error of data collection and entry into the database. The data collectors were also adequately trained and the tool was piloted so that requisite skills were acquired before undertaking the survey. Pharmacists were employed as data collectors to ensure correct interpretation of prescriptions.

### ***3.11. Ethical Considerations:***

The proposal was approved by the Ethics Committee of the University of the Western Cape and permission was granted by the Ethics committee of the University of Nigeria

Teaching Hospital. The aims and purposes of the research were explained to the patients verbally either in English or Ibo (Appendix 2) and written informed consent (Appendix 3) was obtained. The participants were assured of confidentiality and anonymity and that their decision to participate was not intended to affect their treatment at any time. Participants were also informed that they were free to withdraw from the study at any stage without any adverse consequences to them. As the study did not involve any invasive procedures I did not anticipate any adverse psychological or emotional reaction from respondents. Participants were made to understand that the study results and recommendations will be communicated to UNTH hospital management board as well as the Federal Ministry of Health.

### **3.12.            *Limitations***



The ideal design would have been a multistage sampling in which the first stage would be random sampling from the list of all secondary and tertiary health facilities in the sample frame. Thereafter, the patients attending the sampled facilities would in turn be randomly sampled in proportion to usual attendance rate to the clinics. This was not logistically feasible due to the cost that will be required to implement such a self funded study. The consequences of this might be over representing some groups of patients who may have a preference for the teaching hospital over other facilities. I have tried to minimise the sampling bias by increasing the sample size and collecting data throughout the day.

The choice of an alternative medicine from the EML may have been done without the full appreciation all the underlying causes which the prescribing physician would have taken into

consideration. This would thus mean comparing the cost of medicines which are not strictly equivalent. However, I tried to minimize this by ensuring alternatives from the EML have very similar characteristics and can be used for patients with similar underlying pathologies.

Obtaining valid information on expenditure was very difficult and often incomplete as the participants did not always know how much they spend habitually. This was especially true for farmers who may have most of their income in kind (farm produce). However, I was able to measure this critical information on the patients.



## **CHAPTER 4: RESULTS: PRESENTATION AND DISCUSSION**

### ***4.1. Results***

In order to ascertain affordability of medicines prescribed for diabetic patients attending the diabetic clinic of the University Teaching Hospital Enugu, a total of 189 patients were interviewed between 19 September and 31 October, 2007.

#### ***4.1.1. Socioeconomic background***

Table 1 shows that there were more females (62%) than males and the mean age of diabetic patients was found to be 56 years. The age distribution of diabetics attending the health facility shows a predominance (61%) of respondents between the ages of 45 to 65. The majority of the respondents are married and about two thirds of them have little or no educational attainment. About two thirds of the respondents are employed and one third are retired. Table 2 shows that although most of them are employed, they are mostly engaged in petty trading, subsistence farming and blue collar government jobs as civil servants.



**Table 1: Demographic variables (N =189)**

Variable	Number	Percentage	Measure of dispersion
Sex			95% Confidence Interval (%)
Male	72	38%	31.1 – 45.4
Female	117	62%	54.6 – 68.9
Age			Range
Median age (years)	56		22 – 85
Age group			95% Confidence Interval (%)
20 - 44	29	16%	11.1 – 22.3
45 - 64	110	61%	53.6 – 68.3
65+	41	22%	16.9 – 29.6
Marital status			95% Confidence Interval (%)
Single	6	3%	1.2 – 6.8
Married	160	85%	78.7 – 89.5
Widowed	23	12%	7.9 – 17.7
Educational attainment			95% Confidence Interval (%)
None	41	22%	16.1 – 28.4
Primary	73	39%	31.8 – 46.2
Secondary	38	20%	14.7 – 26.7
Tertiary	36	19%	13.8 – 25.5
Employment status			95% Confidence Interval (%)
Employed	111	59%	51.4 – 65.8
Unemployed	22	12%	7.4 – 17.1
Retired	56	30%	23.2 – 36.7

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**Table 2: Occupation of employed respondents (N=111)**

Type of occupation	No	Percent
Professionals	14	13
Civil servants	18	16
Commercial activities (petty traders)	61	55
Subsistence farmers	12	11
Household employees	6	5

Table 3 shows that most of the respondents earn very low income as more than one third (38%) earn less than 2 USD per day (table 4). It is important to note that regular gifts from friends and relatives are also included in the income. Their disposable incomes are not enough to meet their routine needs as their median expenditure (18,000 naira) is more than their median income (12,000 naira). About one out of every 10 respondents do not earn any income and are thus themselves dependent on others as they are either

housewives or students. The median number of dependents is 3 and a majority of them came to the clinic with funds given to them as gifts by relatives and friends or borrowed. It is therefore clear that most of the people living with diabetes attending this health facility do not have the financial capability to pay for their medicines or other needs related to their conditions.

**Table 3: Socioeconomic variables (N = 189)**

Variable	Value	Measure of dispersion
Median personal monthly income (N=181)	₦12,000	Interquartile range (25% - 75%) 5,000 – 30,000
Median day's wage (N=181)	₦ 400	Interquartile range (25% - 75%) 167 – 10,000
Median monthly expenditure (N=161)	₦ 18,000	Interquartile range (25% - 75%) 500 – 200,000
Median number of dependants (N=189)	3	Interquartile range (25% - 75%) 1 – 6 persons
Source of funds used to purchase medicines	Percent	95% Confidence Interval (%)
Income	83 (42%)	32.1 – 51.0
Borrowed	34 (16%)	9.7 – 20.2
Gift	95 (44%)	34.9 – 49.4
Sold property	3 (1%)	0.3 – 4.6

**Table 4: Distribution of income in USD per day (N=181)**

USD/day	Number	Percent	Cumulative percent	95% Confidence Interval (%)
0	15	8.3	8.3%	4.7 – 13.3
1	38	21.0	29.3%	15.3 – 27.7
2	17	9.4	38.7%	5.6 – 14.6
3-5	47	26.0	64.6%	19.7 – 33.0
6-10	31	17.1	81.8%	11.9 – 23.4
>10	33	18.2	100.0%	12.9 – 24.6

#### **4.1.2. Medical and prescription information**

A majority of the respondents (67%) had other conditions in addition to diabetes. Of those who had other conditions, hypertension (56%) and eye problems (9%) were the

most prevalent. Leg ulcer was not common with these diabetics. They also complained mainly of arthritis and peptic ulcer disease.

On the average, the respondents had 5.5 medicines prescribed for them. Most of the medicines prescribed were on the essential medicines list with an average of 5 medicines conforming to it. Of those not conforming to the EML, 20% of them had at least one item prescribed as fixed dose combination. While the median cost of the prescriptions was 2942 naira, the median cost paid by respondents was just about the half (1585) of this median cost. Only 37% of patients were able to completely fill their prescriptions.

**Table 5: Medical history (N= 189)**

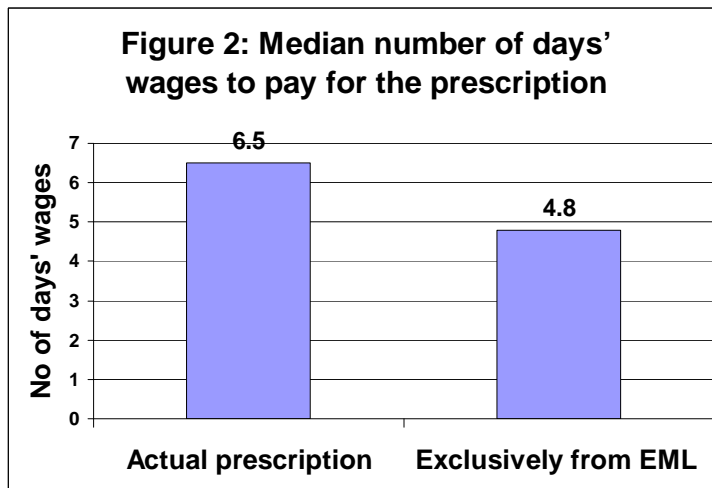
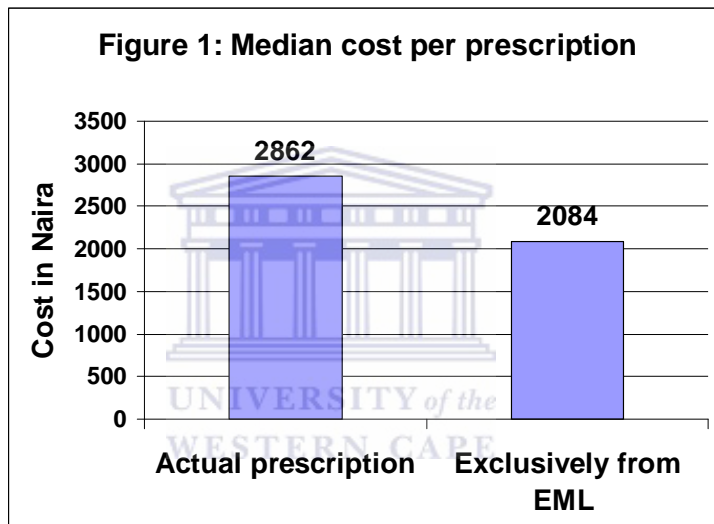
Variable	Number	Percent	95% confidence interval
Co-morbidity			
Yes	126	67	59.5 - 73.3
No	63	33	26.7 - 40.5
Other conditions apart from diabetes			
Hypertension	106	56	48.7 - 63.3
Eye problem	17	9	5.3 - 14.0
Leg ulcer	2	2	0.1 - 3.8
Other diseases			
Arthritis	10	36	21.1 - 61.3
Peptic ulcer disease	7	32	12.1 - 49.4
Miscellaneous	8	32	

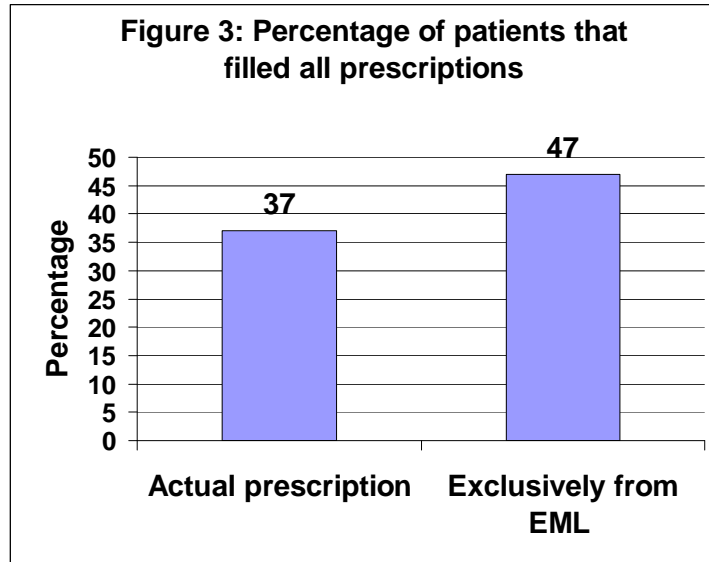
**Table 6: Prescription details (N=189)**

Variable	Value	Measure of dispersion
Average number of items per prescription	5.6	Std deviation 1.7
Average number of medicines prescribed from the EML	5	1.8
Percentage of prescriptions with at least one fixed dose combination	38 (20%)	95% confidence interval 14.7 - 26.7
Median cost per prescription in Naira	₦2862	Interquartile range (25% - 75%) 1720 - 4816
Median amount paid by patients in Naira	₦1585	0 - 6525
Prescription completely filled		95% confidence interval
Yes	69 (37%)	29.6 - 43.8
No	120 (64%)	56.3 - 71.3

**4.1.3. Effect of choice of medicines from the EML on affordability**

With the help of clinical pharmacologists, medicines which were selected outside the EML were substituted with equivalent ones from the EML. The affordability measures were then used to assess if there was any difference in ability of the patients to afford their medicines. The results showed some reduction in median cost of prescriptions by 778 naira (figure 1) and a reduction in the median number of days' wage required to afford the medicine by 1.7 (figure 2) and 10% increase in the number of patients who could completely fill their prescriptions (figure 3).





#### 4.1.4. *Effect of co-morbidity on affordability of prescription*

When the cost of medicines for those suffering from only diabetes was compared with those with co-morbidities no significant difference in the median cost per prescription was found (table 7). There was also no significant difference between the number of patients able to fill their prescriptions with or without co-morbidities. However, the mean number of days that patients will work to be able to afford their medications was significantly higher in relation to the patients with other conditions. This may suggest that the patients with co-morbidities had lower income than those with only diabetes.

**Table 7: Comparison of cost of medicines with severity of disease**

Variable	Severity		
	Diabetes only	Diabetes with other co-morbidities	P value
Median cost per prescription (naira)	2558	2991	0.3235
% of patients that fill all prescriptions	37	37	0.5886
Median number of days' wages to pay for the prescription	4.3388	7.8493	0.0063

#### 4.1.5. *Effect of UNTH prices on affordability of prescriptions*

Patient prices for key medicines used to treat diabetes and co-morbidities were compared with international reference prices. The results in table 8 showed that the patient prices for all medicines ranged from 2 to 26 times international price. This indicates that prices charged by the facility for medicines contributed to non affordability of these vital medicines used to manage diabetes and co-morbidities.

**Table 8: Comparison of unit cost of key medicines for diabetes and cardiovascular disease in UNTH with International Reference Price (IRP)**

	IRP Median cost/unit (\$)	IRP Median price/unit <sup>1</sup> (₺)	UNTH patient prices (₺)	Ratio
Insulin 70/30	0.9384	117.3	231	2
Artovastatin 10mg	0.8075	100.9	170	2
Metformin 500mg	0.017	2.1	4.6	2
Hydralazine 25mg	0.0227	2.9	6.5	2
Methyldopa 250mg	0.0272	3.4	8.5	3
Fluvastatin 20mg	0.4305	53.8	170	3
Spironolactone 100mg	0.036	4.5	11.5	3
Propranolol 40mg	0.0055	0.7	3	5
Amlodipine 10mg	0.2388	29.9	155	5
Furosemide 40mg	0.0048	0.6	3.5	6
Tramadol 50mg	0.0688	8.6	50	6
Lisinopril 10mg	0.0698	8.7	62.5	7
Ofloxacin 400mg	0.0979	12.3	85	7
Hydrochlorothiazide 50mg	0.0038	0.5	3.5	8
Warfarin 5mg	0.0414	5.2	48	9
Nifedipine R 20mg	0.0189	2.3	22.5	10
Glibenclamide 5mg	0.0036	0.5	5	11
Enalapril 5mg	0.0164	2.1	25.5	12
Gliclazide	0.0254	3.2	82.5	26
<b>Mean ratio</b>				<b>6</b>

<sup>1</sup> 1 US\$ is ₺125

## **4.2. Discussion**

In the management of chronic diseases, access to essential medicines is very important in order to prevent suffering and premature mortality and complications. This study sought to ascertain the ability of diabetic patients attending UNTH, Enugu to procure their medicines after their regular visit to the physician.

### **4.2.1. Socioeconomic status**

The results show that the people living with diabetes attending the clinic in UNTH represent the lower income, poorly educated and more elderly members of the population. Other reports from Nigeria and other countries show diabetics having similar sociodemographic characteristics (Karter *et al.*, 2003; WHO, 2005; Okoro, Adejumo and Oyejola, 2002; Akanji, 2002). The results also debunk the commonly misunderstood notion that chronic diseases mainly affect rich people (WHO, 2005). The authors assert that the poor are more likely to suffer from diabetes and progress more rapidly into complications and death than the non-poor. Changing the mindset of prescribers, dispensers and the community may have a positive impact on the policies on chronic care especially as it affects access to medicines.

The age distribution in this study is different from those of developed countries but congruent with the age range in which there is higher prevalence of diabetes in developing countries. Wild *et al.*, (2004) demonstrated that diabetes afflicts the 45 – 65 age range in developing countries in contrast to > 64-year range in developed countries.

In this study about two thirds of the respondents were women. Wild *et al.*, (2004) also reported that although the prevalence of diabetes is similar in men and women, there are more women who are diabetics than men. The sex distribution found in this study may not be a true reflection of the proportion of male and female diabetics in the population. There may be other factors responsible for more women visiting this particular facility. Researching such reasons is beyond the scope of this study. Only a well designed population based study may be able to provide the true sex distribution of diabetics in the population.

#### **4.2.2. *Medicine financing***

The results show that patients in this study generally spend more than they earn and are saddled with the responsibility of other dependants. It is therefore clear that they cannot assume the responsibility of financing the management of their conditions effectively. Inability to procure needed medicines to appropriately manage chronic conditions in the poor may be the reason why WHO (2005) asserted that poor patients who suffer from chronic diseases are more likely to develop complications. Other authors (Rector and Venus, 2004; Tseng *et al.*, 2004; Cox *et al.*, 2001; Hsu *et al.*, 2006) have also demonstrated that when the poor are not supported through insurance and social security, they have reduction in drug consumption, poorer adherence to prescribed medication, higher emergency room visits and death. Other authors (Kengne and Mbanya, 2006; Okoro, *et al.*, 2002) have associated the poor prognosis of diabetes in sub-Saharan African countries to poor access to vital medicines. To remedy this, the government needs to review its policies regarding financing



of medicines and supplies required for the management of chronic diseases to exclude out-of-pocket sources especially for the poor who are suffering from chronic conditions.

The results also show that there is a high level of solidarity among friends and relatives in the care of the less endowed members of the community as most of the diabetics were funded by them. This phenomenon of health care funding by friends and relatives was also reported by some authors (Okoro *et al.*, 2002; Ogunniyi and Baiyewu, 2002). However, funding from charity or from the extended family system is unsustainable for the management of long-term health problems. Nevertheless, it could be exploited to provide social security for those less privileged members who cannot afford to fully support their health care needs. Indeed health insurance schemes in cultures with strong social support as the extended family system should not be patterned after western models. They should exploit the existing framework whereby relatives and friends naturally feel responsible for sustaining the less endowed members.

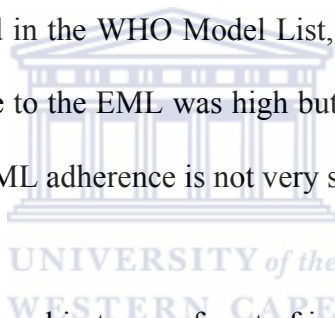
The health insurance scheme in the country which is currently in its infancy urgently needs to be restructured. This is because only organisations employing more than 10 persons currently contribute towards the scheme and others are required to join on a voluntary basis. Again the scheme is managed by Health Management Organisations (HMOs) who are traditionally known to “cream” the rich in the society. Mechanisms to ensure the participation of the poor in insurance schemes are strongly advocated especially for those who have chronic diseases.

#### **4.2.3.           *Affordability***

The study clearly demonstrates that medicines were not affordable to the majority of patients visiting the diabetic clinic. Several studies have used various affordability measures to determine financial access to medicines. In this study, I have measured it in several ways. Firstly I have considered ability of the patient to completely fill the prescription during the visit. While this measure is a very important indicator as adherence is key to appropriate management of diabetes, it does not completely uncover the extent of the problem. This is because most of patients admitted to visiting the clinic with funds which were from relatives/friends or borrowed. In this study, only about one third of the patients were able to go home with the full complement of prescribed medicines despite most of them being financially supported. This is a clear indication of non affordability.

Secondly, affordability was measured in terms of the number of days a person will work to be able to afford his medication. WHO (2006c) suggested that a prescription that will require more than one day's wage is considered unaffordable. This measure seems reasonable to determine the ability to pay for medicines as data available suggest that the poorest families in Nigeria spend as much as 90% of their income on food alone (Federal Office of Statistics, 1999). Therefore, procurement of needed medicines should not compete with other basic needs such as feeding. The median number of days of 6.5 days measured in this study indicates that the prescriptions were generally out of reach of most of the patients. The extreme case of the patient who will need to work for 15 years to afford the month's prescription is worthy of note.

Affordability was also considered in terms of medicines selected with reference to the essential medicines list. This measure makes the assumption that only cost-effective medicines are included in the list. This may not always be the case as a list is determined by practitioners in the country, it may mirror irrationality in the system and may not always be developed following transparent processes. For example the Nigerian essential medicines list has both captopril and lisinopril on the list, both medicines are from the same class which is important in managing co-morbidities associated with diabetes. While captopril costs 12.5 naira in the facility, lisinopril costs 43 naira which represents almost 4 times the cost of the former. One would have thought that given the socioeconomic state of the patient population, captopril which is also selected in the WHO Model List, would have been the more rational choice. In this study, adherence to the EML was high but the medicines were not affordable. This indicates that the use of EML adherence is not very sensitive in measuring affordability.



Finally, affordability was measured in terms of cost of individual medicines purchased in the facility. Patient prices for key medicines were measured against international reference prices. Medicines which were purchased more than 1.5 times international price were deemed unaffordable (WHO, 2006c). While this measure is useful in determining the role of patient prices in contributing to affordability, it may give a false sense of security in that too many items on the prescription may render the prescription unaffordable. The median ratio of 6 for key medicines used for diabetics found in this study is clearly excessive and has shown that patient prices has contributed to the inability of most patients to fill their prescriptions.

The study suggests that the most sensitive measure of affordability is the ratio of cost of the prescription to the patient's income. Affordability measures such as prescribing from the EML and assessing procurement prices in relation to international prices serve to identify factors affecting affordability which will help the facility design interventions to improve affordability.

#### **4.2.4.            *Selection of medicines***

##### **4.2.4.1.          *Prescriber adherence to medicines list***

Realising that the selection of medicines have a role to play in determining the quality of care and affordability of medicines, the World Health Organization has promoted the concept of essential medicines for 30 years. Thus WHO publishes a list of carefully selected, cost-effective medicines to guide countries in the choice of their national list. This study was also aimed at assessing the adherence of prescribers to the national list as a proxy to measuring affordability of prescriptions.

The results show that adherence of prescribers to the list was quite high. Further analysis showed that indeed, prescribing from the EML was a first step to ensuring affordability of medicines. However, the few medicines selected outside the list had a profound effect on affordability. The results show that despite the high price charged by the facility for medicines, a significantly higher number of patients would have gone home with most of their prescriptions filled had the prescribers adhered completely to the EML.

Despite the initial reticence reported by Weerasuriya and Brudon (1998) in which the essential drugs list was not making the requisite impact, due to oppositions by the

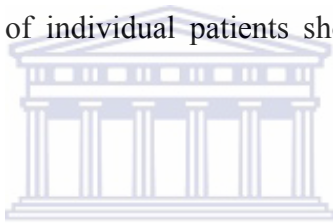
pharmaceutical industry, prescribers themselves and the public, the WHO has consistently developed and reviewed Model Lists to guide the development of national lists for the past 30 years. This has helped in the global acceptance of the concept of essential medicines as a powerful tool to promote health equity. By the end of 2003, 156 Member States had official essential medicines lists and have reaped benefits of increased availability and affordability of essential medicines in health facilities. There is evidence that carefully selected lists and standard treatment guidelines are effective in ensuring appropriate prescribing (Grimshaw and Russell, 1993; Woolf *et al.*, 1999; Kafuko and Bagenda, 1994).

#### **4.2.4.2. Fixed dose combinations**

One out of every five medicines which was selected outside the EML was a fixed dose combination product. In the case of glibenclamide and metformin which are cornerstones in the management of diabetes, the fixed dose combination is nine times more expensive than individual components. While fixed dose combinations are promoted to improve adherence, it may not be useful for economically challenged patients living with diabetes whose primary concern is first and foremost ability to acquire their medicines. Grant *et al.*, (2003) reported that adverse drug reactions and out-of-pocket prescription costs were better predictors of adherence than polypharmacy. It is possible that the clinicians use fixed-dose combination to mitigate poor adherence to therapy without realising that it exacerbates the very condition which they try to remedy. This indicates lack of communication between patients and clinicians. Indeed, some authors have reported lack of communication regarding cost of medicines with health care providers as a reason for poor adherence (Piette *et al.*, 2004b). The authors provided several reasons why patients did not call attention of the physician to their plight. Some reasons include failure of the clinician to initiate discussions on ability to

afford the prescription, insufficient time for discussions in the consulting room and perception that the clinician was unable to provide any form of help. Mason *et al.*, (2001) also showed that it is difficult to enforce cost considerations among prescribers.

WHO (2001) encourages the use of single compounds except when fixed-dose combinations have proven advantage in therapeutic efficacy, safety or compliance over single compounds administered separately. The use of fixed combination of glibenclamide and metformin does not really meet these criteria as there is no enhanced benefit of combining both in a formulation. An obvious disadvantage is the difficulty in adjusting dosage of any of the components to meet the need of individual patients should there be a need to titrate the dosage to individual needs.



#### **4.2.4.3. *Dispensing practices***

The fact that patients were not able to procure all their medicines raises an important question related to the management of chronic diseases. The practice in the facility is to sell part of the prescription according to ability of the patient to pay for them. What criteria are used to determine which medicines to sell to patients? Do the patients return to the facility to purchase more medicines? These questions need to be further investigated in order to understand the implications of non-affordability to the management of chronic diseases especially diabetes. Certainly, inability to completely fill prescriptions during the normal hospital visit will impact negatively on adherence. Factors such as inability to obtain more funds, transportation costs and other competing activities may militate against patients returning to the facility to procure more medicines.

#### **4.2.5. *Predictor of affordability – EML or patient prices***

The results appear to indicate that choice of non-EML medicines definitely has a negative effect on affordability of medicines in this study. However, patient prices would seem to exert more influence on ability to fill prescriptions by patients. The most prescribed medicines were glibenclamide, metformin and lisinopril. While the cost of metformin was considered acceptable when compared with expected patient cost in relation to international prices, those for glibenclamide and lisinopril were clearly too expensive (11 and 7 times international reference prices respectively). Better patient prices would have made greater difference in the proportion of patients able to afford all their medicines.



## **CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS**

In this study, I have assessed the affordability of prescriptions given to diabetic patients who attend University of Nigeria Teaching Hospital, Enugu. I found that, like in other settings people living with diabetes have lower income, are poorly educated and are more elderly members of the population. They are clearly not able to provide adequate finances for procurement of medicines required to manage their chronic illnesses in order to prevent premature mortality and development of complications. The government should review the financing of health care particularly for medicines used to manage chronic illnesses especially with the changing epidemiological transition that is already underway. This is to ensure that patients with chronic conditions and those from the low economic stratum of the society have access to life saving medicines. They may well explore the already available solidarity existing between relatives and friends to evolve a more sustainable and equitable means of financing health care for all Nigerians.

The study revealed that most of them were not able to completely fill their prescriptions for the management of their conditions. I identified the selection outside the EML contributory to the non affordability of essential medicines. As clinical guidelines have been found to be effective in rational prescribing, the national treatment guidelines which are currently being developed for major conditions of public health importance need to be institutionalised in health facilities in the country in order to support clinicians in prescribing. The UNTH should develop mechanisms to monitor treatment of people living with diabetes in order ensure patient access to medicines, prescriber adherence to the EML, and improved communication



between all departments. This could be achieved by institutionalising a Drugs and Therapeutics Committee at the facility.

The study also revealed that prices charged by the institution for medicines contributed in no small measure to the non affordability of medicines of this group of patients. The pharmacy department of the UNTH should explore means of procuring medicines at lower prices against the benchmark of international reference prices. This will greatly enhance ability of patients to completely fill their prescriptions.



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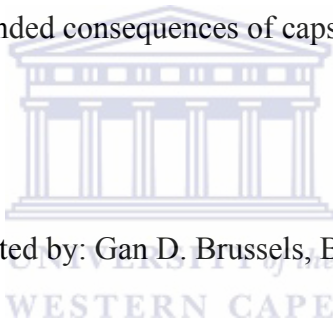
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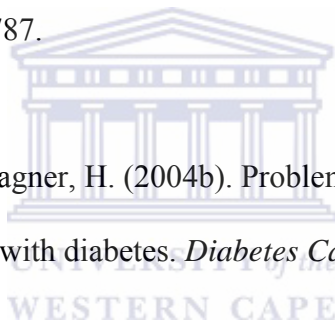
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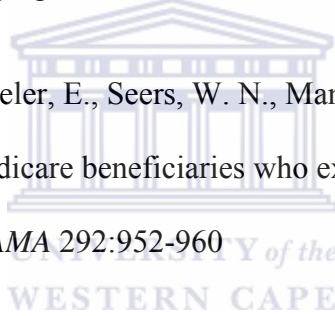


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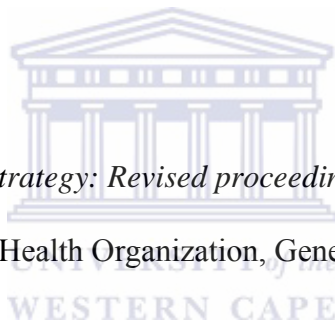
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# APPENDICES

## Appendix 1: Data collection tool

### Background information

1. What is your first name?

2. What is your date of birth?  Age

3. Sex:

1	Male	
2	Female	

4. What is your marital status?

1	Single		3	Widowed	
2	Married		4	Divorced/separated	

5. Which highest level of education did you pass?

1	None		3	Secondary education	
2	Primary education		4	Tertiary education	

6. What is your employment status?

1	Unemployed	
2	Employed	
3	Retired	

7. What is your occupation?

8. State your dependants

Spouse

1	Yes	
2	No	

Children

1	Yes	
2	No	

If yes, how many?

Others

1	Yes	
2	No	

If yes, how many?

Total number of dependants

9. What is the usual monthly income of your household? (complete all that apply)

Your job/pension		Relatives' job/pension		Rent	
Stocks		Trading		Others	
Regular monetary gifts		<b>Total</b>			

10. What is the usual monthly expenditure of your household? (complete all that apply)

Rent		Food		Transportation	
School fees		Others		<b>Total</b>	

11. Where did you get funds for purchase of medicines prescribed today?

1.	Income	
2.	Borrowed	
3.	Gift from relatives/friends	
4.	Sold property	
5.	Others specify	

12. Do you have any other diseases apart from diabetes?

1	Yes	
2	No	

If yes, specify



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13. How much did you pay for your medicines today?

<sup>23</sup>*Prescription details*

SN	Name of medicine	# of units (tabs, cap, ml)	EML (No = 0, Yes = 1)	Unit cost	Total cost	Substitute From EML	Unit cost	Total cost
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
<b>Total</b>								

<sup>2</sup>The shaded parts are to be filled after the interview

<sup>3</sup> The darker shade is not to be filled at all

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*Appendix 2: Patient Information Sheet*



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*School of Public Health*

Private Bag X17 • **BELLVILLE** • 7535 • South Africa  
Tel: 021- 959 2809, Fax: 021- 959 2872

**PARTICIPANT INFORMATION SHEET**

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1. This is a survey to measure the affordability of medicines to treat diabetes in patients who come to this clinic. The medicines which your doctor has prescribed will be assessed and the amount which you paid to obtain your medications will be requested from you.
2. The purpose of the research is to ensure that the cost of medicines to patients does not constitute a barrier to proper management of diabetes. This is because, strict adherence to medicines used to treat diabetes is required to live longer and healthier lives.
3. Since the researcher works with the government to improve availability and affordability of medicines, information obtained will be presented to policy makers and recommendations on how to improve the situation will be made to them.

The researchers will also like to publish the results in a journal in which the outcomes will be shared with other people.

4. I will only need you to provide information about your background and the medicine the doctor has prescribed for you. Therefore, I do not anticipate any adverse result from this interview
5. I will kindly request you to grant me permission to interview you;
6. You may withdraw from the interview at any time if you no longer wish to participate. I will not be offended and it will not lead to any negative consequence to you in any way.
7. Your identity will be kept confidential and I will not indicate your full name in any part of the data collection tool nor the publication. The results will be an aggregate of data collected from all respondents.
8. The name of the researcher is Ogori Taylor (+2348034068096, [tayloro@ng.afro.who.int](mailto:tayloro@ng.afro.who.int)) and her supervisor is Hazel Bradley (+2721 959 2630 [hbradley@uwc.ac.za](mailto:hbradley@uwc.ac.za))

### **Appendix 3: Consent Form**

#### **RECORD OF INFORMED CONSENT TO CONDUCT AN INTERVIEW**

Date:

Interviewer:

UWC Student no: 2520547

Tel: +2348034068096 Fax: + 234 94618725

E-mail: [tayloro@ng.afro.who.int](mailto:tayloro@ng.afro.who.int)

Institution: School of Public Health, University of the Western Cape

Place at which the interview was conducted: \_\_\_\_\_

Thank you for agreeing to allow me to interview you. What follows is an explanation of the purpose and process of this interview. You are asked to give your consent to me verbally before I conduct the interview.

#### **1. Information about the interviewer**

I am Ogori Taylor a student at the SOPH, University of the Western Cape. As part of my Masters in Public Health, I am required to conduct a research on diabetic medicines at UNTH, Enugu. I will be focusing on affordability of medicines to patients living with diabetes. I am accountable to Hazel Bradley who is contactable at +2721 959 2630 or c/o SOPH Fax: 021 959 2872 or by e-mail at [hbradley@uwc.ac.za](mailto:hbradley@uwc.ac.za)

Here is some information to explain the purpose and usage of my interview.

#### **2. Purpose and contents of interview**

The purpose of the research to find out if medicines prescribed for people living with diabetes who attend this hospital are affordable to them. This is to ensure that cost of medicines does not constitute a barrier to proper management of diabetes. You will be required to respond to a few questions and show us your prescription.

#### **3. The interview process**

I will only need you to provide information about your background, the medicines the doctor has prescribed for you and the cost you paid for it. Therefore, I do not anticipate any adverse result from this interview

#### **4. Anonymity of contributors**

At all times, your identity will be kept confidential and I will not indicate your full name in any part of the data collection tool nor any publication derived from the study. The results will be an aggregate of data collected from all respondents.

#### **5. Things that may affect your willingness to participate**

Although I do not foresee any adverse effects emanating from the interview, you may however withdraw from the interview at any time if you no longer wish to participate. I will not be offended and it will not lead to any negative consequence to you in any way.

#### **6. Agreement**

##### **6.1 Interviewee's agreement**

The respondent will be asked to give her/his consent verbally.

##### **6.2 Interviewer's agreement**

I shall keep the contents of the above research interview confidential in the sense that data will be aggregated and no mention will be made of any of the participants in particular. The contents will be used for the purposes referred to above, but may be used for published or unpublished research at a later stage without further consent. Any change from this agreement will be renegotiated with you.

Signed:

Date:

Place: