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**Inaugural Lecture Series 239**

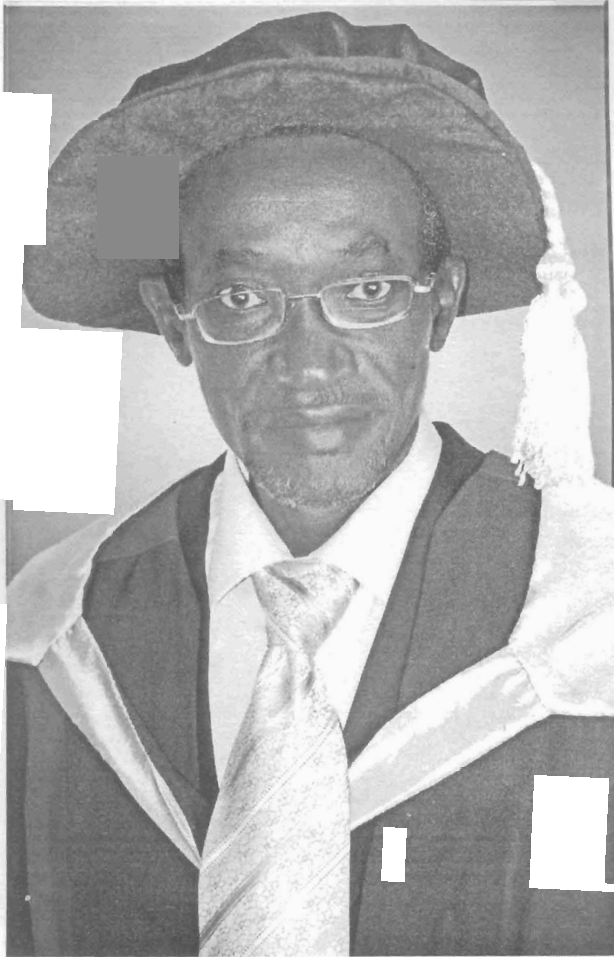
**A TREE MODEL FOR  
MANAGING MEDICINE USE  
AND SUPPLY**

By

**Wilson Oyekigho Erhun**  
*Professor of Pharmacy Administration*



**OBAFEMI AWOLOWO UNIVERSITY PRESS LIMITED.**



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USE AND SUPPLY**

**An Inaugural lecture delivered at Oduduwa hall  
Obafemi Awolowo University, Ile-Ife  
On Tuesday 24<sup>th</sup> May 2011.**

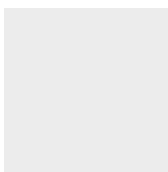
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## 1.0 PROLOGUE

Mr. Vice Chancellor,

In accordance with the Alma-Ata Declaration on Primary Health Care, health is declared as a fundamental human right; and the attainment of the highest possible level of health is a most important world-wide social goal. This, notwithstanding the budgetary allocation to the health sector, has not in any way reflected this reality in Nigeria. The yearly budgetary allocation to the health sector is less than six per cent of the total national budget, as against the 15 per cent recommended by the United Nations and the Abuja Declaration by African countries. There is need for a strong political will on the part of government to properly fund the health sector.

In the health sector there are many professional groups that team up, or should team up, to ensure that health, which is expected to be a fundamental human right, is a right indeed. Each of these professional groups has a distinct role to play in the provision of health care. The pharmacist is one of these health care professionals trained to provide services that are promotive, preventive, curative and rehabilitative; with medicine as the main instrument of intervention.

Medicines give credibility to a health care system and also serve as major determinant of health services utilization. It therefore stands to reason that substantive improvements in the supply and use of medicines are necessary for the overall improvement of the health status of the population.

In the use of medicines, cost is a major factor; because medicines could constitute as much as 20 per cent of total national health expenditures. A most pressing issue is that, at present in Nigeria, the laudable National Health Insurance scheme notwithstanding, most consumers of medicines pay out-of-their pockets. (Erhun, Akanbi and Akande, 2009)

Most leading causes of death and disability in developing countries can be prevented, treated or at least alleviated with cost effective essential medicines. Despite this fact, literally, hundreds of millions of people do not have regular access to essential medicines. Many of those who do have access are given the wrong treatment/fake medicine, receive too little medicines for their illness, or do not use them correctly.

## **2.0 THE NATIONAL DRUG POLICY**

The maiden National Drug Policy (NDP), for Nigeria was adopted and launched in 1990 against the background of inadequacies in medicine availability, supply and distribution resulting from various factors. The primary goal of the policy was to make available, at all times, to the Nigerian populace adequate supplies of medicines that are effective, affordable, safe and of good quality; to ensure the rational use of such medicines; and to stimulate increased local production of essential medicines. In other words, the NDP was established to ensure an effective and efficient medicine management system in the country. The strategies for the implementation were well articulated but unfortunately, most of the set targets of the NDP have not been met.

The pharmacist is regarded as the medicine expert and if there is going to be any positive change in medicine management, pharmacists are best positioned to ensure this. It is in this context that I have focused on promoting effective and efficient management of medicine use and supply as my research and service efforts in the last two decades.

## **3.0 THE TREE MODEL**

I have taken a wholistic approach in trying to present a model that captures most of what is needed for the effective and efficient management of medicines use and supply in Nigeria. Fig.1 shows the tree model, some components of which will be the focus of this inaugural lecture. The tree model pictorially presents the features of a medicine use and supply system that is effective and efficient resulting in rational dispensing, rational prescribing, appropriate use of medicines by patients, available and affordable safe and effective essential medicines as well as value for money, all of which will lead to better health for all. These are the fruits. The nutrients (useful and toxic) that the plant feeds on include contributions of open markets, consumers, health care professionals, finance institutions, electronic and print media, schools and universities, pharmaceutical industry, health facilities, itinerant vendors and the government. The nutrients are channeled through a trunk without which there would be no fruits. The trunk consists of legislation and regulations, human resource development, medicine selection process, supply management, quality assurance, rational drug use as well as monitoring and evaluation. The components of the tree

model have been my main interest in the last 30 years and would remain my focus until I retire by God's grace from university academic activity.

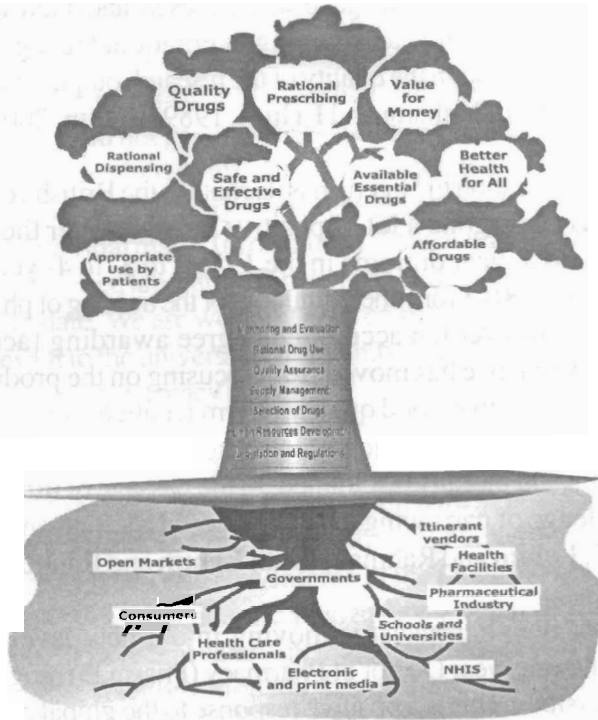


Fig 1: Tree Model for Managing Medicine Use and Supply

## 4.0 THE MAKING OF A PHARMACIST

### 4.1 The Pharmacy Curriculum

Pharmacy is a science that should respond positively to the social, cultural and economic aspects of human activities, in its quest to promote the use of medicine in safe quantities to conquer disease and disease states, with minimum discomfort to the users.

The way a pharmacist will practice his profession is a product of training, skills acquired and ability for self development. Over the years we have been studying the curricula of pharmacy faculties in Nigerian universities, with the main aim of identifying weaknesses and suggesting how best these deficiencies could be corrected. (Erhun, 1983a, b, c.)

We had looked at pharmacy curricula of 18 different countries and came to the conclusion that there can be no model professional pharmacy curriculum for all nations. What we need is a Nigerian pharmaceutical education system, deriving its strength from the present and future healthcare needs of the Nigerian people and gaining international recognition and credibility basically through the quality of the research output of pharmacy academia. (Edafigho, Oyebanji and **Erhun**, 1989; **Erhun**, 2001).

Pharmaceutical education in Nigeria has its roots in the British educational system and has undergone a lot of positive changes over the years. It moved from 2- to 3- year diploma in the 1950's to 3- to 4- year degree programme in the 1960s. From one institution for the training of pharmacists in the late 1950s to over ten accredited degree awarding faculties by 2010. Pharmacy practice has moved from focusing on the product to the patient. It is expected that good quality pharmaceutical education must produce a graduate who is technically competent, scholastically capable, socially relevant and morally disciplined. In the passage of time, we have faced the challenge of narrowing the gap between training and practice. (**Erhun**, 1987; **Erhun** and Rahman, 1988; **Erhun** and Rahman, 1989).

The training of the pharmacist is moving into a new level with the introduction of the six year Doctor of Pharmacy (Pharm.D) programme in Nigerian universities. This is a positive response to the global community expectation of a pharmacist trained to provide pharmaceutical care and relevant in delivering the emerging responsibilities of the pharmacist. (**Erhun**, 2005; **Erhun**, 2007). This programme should not be seen in the context of titles but service. The goal of the Pharm.D programme is to produce pharmacy practitioners with knowledge, skills and motivation to provide comprehensive pharmaceutical services. (NUC, 2006). I have always believed that this is the way to go for the profession. I was the foundation Dean of the Faculty of Pharmacy, Niger Delta University, Wilberforce Island, Bayelsa state, Nigeria. I was also Consultant to the Delta state university, assisting the pioneer Dean of the Faculty of Pharmacy, (Prof. David. Okpako), to develop their pharmacy programme. In both capacities, I favoured the Pharm.D programme. Here in Ife, as the premier pharmacy faculty in Nigeria, we must rise up to the challenge of the implementation of a Pharm.D programme if we are to remain relevant.



The level of facilities available in the faculty is very important as we consider taking this positive step. I recall how our faculty, here in Ife, that runs a B.Pharm. programme, was granted interim accreditation status some years ago because of the absence of a Pharmacy Information Centre (PIC) and a clinical pharmacy programme that was considered rather deficient in clerkship exposure by the accreditation panel. I was appointed Ag. Head of the culprit department in the face of this challenge of interim accreditation in 2002. We could not get university funds to establish the PIC. I initiated a process that resulted in my department floating a national workshop. The proceeds from that workshop (internally generated revenue) was used to establish a Pharmacy Information Centre and refurbish/equip our Pharmacy Practice laboratory. There is no Nigerian university with better facilities to date. We are working hard on making the services of the PIC more relevant to the university community, in addition to its important role in the training of pharmacy students.

#### **4.2 The Pharmacy Lecturer**

The brain drain phenomenon began biting hard in pharmacy many years ago. We are still finding it difficult to attract our best graduating students to take up jobs as Demonstrator/Interns in the faculty. This is attributed to the poor salaries of academic pharmacists, relative to their hospital counterparts. The recent salary increase has not significantly changed the situation. The telecom industry has remained a main attraction for pharmacists. While this suggests the robustness of the training of the pharmacist as a versatile graduate, the trend calls for concern. The challenge of brain drain prompted us to study how academic pharmacists responded to the relatively poor salaries in Nigerian universities. (Erhun and Babalola, 2002). The study identified about 18 different types of individual coping strategies. Sources of extra income identified by respondents varied; ranging from academic, non academic to social support. In the prevailing adverse socio economic environment, it is feasible to create conditions that allow individual pharmacy lecturers adopt strategies that are compatible with equity and quality, while responding to their aspiration for survival, social status and professional satisfaction.

One practical way of attracting and retaining pharmacist lecturers is to allow academic pharmacists register pharmaceutical premises for practice.

This will not only improve their income base and check economically catalysed brain drain but will more importantly, provide lecturers with relevant practical examples to illustrate their lectures. This is necessary, if lecturers are to promote entrepreneurship in pharmacy. If you do not possess/acquire the entrepreneurial spirit you cannot impart entrepreneurship.

### **4.3 Teaching of Pharmacy Students.**

When a fresh lecturer is appointed, it is assumed that academic qualification is adequate to make a person effective as a teacher. My over 30 years experience as a lecturer, has shown me that this is not true. When I joined the services of this university as an Assistant lecturer in 1980, I initiated the use of a Student's Evaluation of Teaching questionnaire which I obtained from the Obafemi Awolowo University(OAU) senate papers. After my lectures, questionnaires were distributed to all students and analysed thereafter. I did this for three consecutive years. The reports were sent to the Head of Department through internal memoranda of 3<sup>rd</sup> April 1981, 18<sup>th</sup> March 1982 and 7<sup>th</sup> April 1983. In fact, by a memo of 5<sup>th</sup> April 1981, the HOD (Prof. A. Sofowora) acknowledged my first memo with these remarks: "I like this kind of initiative on your part to assess yourself". I hold a strong position that, the most reliable means of determining whether or not a lecturer is effective is through student evaluation not necessarily examination performance. (Erhun, 1985). Over the years, the comments of students on my teaching has helped me to sharpen my teaching skills significantly. It is therefore not surprising that when the Federal Ministry of Health, in collaboration with the World Health Organization organized a workshop in October 2005 for lecturers in pharmacy, to generate and share information on contemporary pharmacy practice issues, in order to evolve a modern curriculum that will be responsive to current challenges in pharmacy practice, I was one of the three lecturers in Nigeria selected as resource persons. There is a need for all fresh lecturers to be exposed to basic teaching techniques when they are employed. This should be institutionalized. Communication skills do not necessarily improve with progression on the academic ladder.

Mr. Vice Chancellor, when I was Head of department, all newly appointed (fresh) lecturers were made to attend my lectures as observers. After the

lectures, I welcomed their comments through which I also trained them on how best to teach pharmacy students. I also attended some of their lectures to further guide them. This is an initiative – a form of mentoring - that could be formalized. We, as pharmacy lecturers, need to be effective communicators to produce the kind of pharmacists that can drive a model management system for medicine use and supply.

#### **4.4 The Pharmacy Student**

The undergraduate pharmacy programme has always been regarded as very hectic. In the 1980's, pharmacy students hardly belonged to socio-cultural organizations as a result of lack of time and interest. Results from one of our studies (Erhun, 1986) prompted an awareness creation to encourage pharmacy students to be more interested in social, cultural and religious activities. The outcome is that pharmacy students are becoming more involved in such activities.

Lecture attendance is a vital aspect of the assessment of the pharmacy student. Active participation at lectures will be affected by various factors, including motivation. We have shown that attitude, teaching style and competence of lecturers affect students' motivation for class attendance, in addition to the structuring of lecture time table and the adequacy of available facilities. The above factors should therefore be considered in the process of curriculum development and implementation.

Interpersonal communication with patients is a key factor in managing the service encounter. This affects building lasting relationships with patients. We carried out a study to assist pharmacy educators assess the need or otherwise for the development of an appropriate inter personal skill training course, that will assist in reducing communication apprehension amongst pharmacy students (Erhun and Olayinka, 1994). I am happy to note that communication skill training is now a composite part of the pharmacy curriculum in Nigerian pharmacy schools.

#### **5.0 THE PRACTICE OF PHARMACY**

The practice of pharmacy takes place in academic, hospital, industrial and community settings. The challenges faced in each of these career options

vary. However, hospital and community pharmacists are the most visible in the pharmacy profession.

## 5.1 Hospital Pharmacy

My major interest has been the empowering of hospital pharmacists to improve upon the quality of pharmaceutical services provided in public health institutions in Nigeria. (Erhun, 2005; Erhun, 2006)

Hospital Pharmacy Practice is fairly well established in government owned secondary and tertiary healthcare institutions in Nigeria. This is not the case with the private healthcare institutions. We sought to examine the role(s) played by pharmacists in private clinics and the physicians' perception of the pharmacist's role. About 60% of the 64 private clinics studied had pharmacies and 48% of these had resident pharmacists. The study showed that the level of record keeping of medicines in the private clinics was generally very low, where there were no pharmacists. This has implications for the appropriate monitoring of the therapeutic efficacy of medicines, especially where there is a need for change in dosage regimen. The study showed that the level of pharmacy practice in private clinics, in Nigeria, is far from satisfactory. (Erhun and Ademola-Oresanya, 1991). In the National Drug Policy, it is specified in section 6.16.2(iii) that "In every health care facility where there is a qualified and licensed medical practitioner, there shall be a qualified and licensed pharmacist to manage medicines." This provision should be enforced. There are too many private hospitals/clinics that operate without pharmacists.

The level of confidence a patient has in the pharmacist could affect his level of compliance with dispensed medication. We carried out a study on how patients perceived the services rendered by the pharmacist in a public hospital. (Erhun and Fagbule, 1994). The study showed a correlation between the time patients spent on collecting medicines, politeness of the pharmacy staff and the rating of the performance of the Pharmacist. This led us to study patients' response to waiting time. (Afolabi and Erhun, 2003). We found that the total waiting time for a dispensing process averaged 17 minutes and 90% of this was due to delay components. We therefore recommended that more time should be devoted to counseling while reducing the total time spent by the patient in having their prescription

sheets filled. It is gratifying to note that the time spent on prescription billing and payment has improved significantly at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) as an outcome of this study.

### **5.1.1 Drug Revolving Fund**

The Drug Revolving Fund (DRF) is a fund for which capital is provided by government appropriation or bilateral donation but which is intended to be self sustaining with all expenditures being replaced from monies collected from the fund. This is a cost recovery mechanism. Experiences have shown that, although the concept of DRF is simple, the successful establishment and long term sustainability of such schemes have been fraught with difficulty. Often the monies collected are insufficient to replenish the original stocks and the fund gradually gets depleted (Erhun, 2000; Erhun, 2005).

The DRF has assisted in ensuring sustainable medicine supply in many public health institutions in Nigeria. In fact, the OAUTHC is one of the DRF success stories in Nigeria. Nationally the major challenge facing the scheme is the feeling of many hospital chief executives that the DRF fund is money available for emergency use. This situation is worsening with the current economic meltdown. I have advocated over the years, consistent with the provisions of Essential Drug Programme regulations, that the head of the hospital pharmacy department should be a signatory to the DRF account. In this way it would be easier to separate surplus fund from the monies needed to replenish stock, thereby preventing decapitalisation. Financial discipline, rather than a one time capital grant is the key to a successful DRF. There are so many suppliers who will be ready to supply large quantities of medicines on credit, provided that the hospitals will keep to agreed payment terms. I venture to say that with the DRF, the question of out of stock medicines should be alien to us. May I also say that funding should not be a challenge in the financing of medicine supply in the public sector because there is a ready market. What the governments need to do is to go into partnership with reputable manufacturers/importers with binding contractual agreements/memoranda of understanding that will make such suppliers supply medicines on mutually agreed credit terms.

This will also curtail the challenge of drugs expiring on the shelves in some hospitals.

### **5.1.2 Unit Dose Dispensing System**

The Unit Dose Dispensing System (UDDS) is a system of distributing medications to in-patients in a hospital, in which each patient's medication requirements are given for only twenty four hours. Unit dose dispensing of medications is a standard practice in hospitals in developed countries. A major advantage of UDDS is that it brings pharmacists into the medication use process, in order to reduce medication error and enhance the quality of pharmaceutical care to the patient.

UDDS has many advantages over the traditional system of dispensing. These advantages include: improved patient care, reduction in medication errors, more efficient use of hospital personnel, significantly reduced medicine costs, alleviation of medicine shortages, ready availability of medicine information to other health professionals/patients, better relationship among health professionals, and accurate determination of medicine costs.

The earliest attempt to introduce and operate UDDS in Nigeria was at the beginning of the 1980s, but it was not quite successful. In 1998, National Agency for Food and Drug Administration and Control (NAFDAC) passed a circular urging all teaching hospitals to adopt the system so as to incorporate all the advantages of the system into their work. Nothing came out of the circular. Infact all efforts to adopt the UDDS proved abortive. (Obiaga, 2005).

However in 2001, at the Curriculum Review Committee Conference organized by the Pharmacists Council of Nigeria (PCN) in Sango Ota, where I was invited to make an expert presentation on Pharmacy Administration, I interacted with Pharmacist Obiaga who initiated the scheme at the Ahmadu Bello University Teaching Hospital in the 1980's. He narrated the problems being faced in the implementation of the system nationwide. I told him that I will successfully midwife the project. Thereafter, I initiated a series of national training workshops on UDDS. The first of these workshops was held in this university in 2002. (Erhun, 2002). This

was followed by sensitization/mobilization workshops for nurses, as well as medical doctors. In the last couple of years, I have been engaged in the training of hospital pharmacists across the country on UDDS.

In March 2005, a state wide implementation workshop on the UDDS, sponsored by World Bank assisted Health System Development Project, was organized by the Akwa Ibom state government. Thereafter, it was adopted as a statewide scheme. Expectedly, Pharmacist G. Obiaga (the father of UDDS in Nigeria) and myself (the mother of UDDS in Nigeria) were lead resource persons at that historic workshop. It is quite heart warming to note that a good number of hospitals in Nigeria have adopted the system, thereby drawing from its tremendous benefits. I was Consultant appointed to implement the UDDS at University College Hospital, Ibadan. I consider the UDDS as one of my major contributions to the development of hospital pharmacy administration in Nigeria.

## **5.2 Community Pharmacy**

Community pharmacy practice is essentially retail pharmacy business. Any retail medicine outlet with a displayed registered pharmacy emblem is a community pharmacy. It is only with the pharmacy emblem that you can physically differentiate a community pharmacy from a patent medicine store. Patent medicine stores are operated by non pharmacists who are holders of Patent and Proprietary Medicine Vendor's Licenses (PPMVL). The medicines sold in patent medicine stores are restricted. In practice, however, many patent medicine stores operate as either pharmacies, clinics or even as hospitals. The relevant regulatory bodies could save some time from the overregulation of registered pharmaceutical premises, which are superintended by qualified and registered pharmacists, so that they could better control the operations in the patent medicine stores.

It is my considered opinion that registered community pharmacies could play the role of primary health care centers for the delivery of health services, such as family planning, immunization and specialized medication counseling. This was what prompted me to do a research proposal that secured a grant from the John Hopkins University/ Population Communication Services of the United States Agency for International

Development, to carry out a nationwide study on the role of Pharmacists in family health. The initial study determined the level of pharmacist's knowledge of family planning methods, as well as established the willingness of pharmacists to participate in family planning activities. We also established that the family planning content of the undergraduate pharmacy curriculum was inadequate. We made appropriate recommendations. (Erhun *et al*, 1998). I dilated on this in my keynote address at the 2008 pharmacy week of the Ondo State branch of the Pharmaceutical Society of Nigeria. (Erhun, 2008.)

## 6.0 MAINTAINING COMPETENCE OF PHARMACISTS

Maintaining competence throughout their career is a lifelong challenge for all health care professionals, including pharmacists. Being aware of the fast evolution of knowledge and the responsibilities of health care professionals, there are genuine concerns about maintaining competencies. This moral sense, however, has not always sufficiently self motivated health care professionals to continuously pursue new knowledge. Consequently, professional associations and authorities alike started developing formal lifelong learning systems with the aim of sustaining the practitioner's competence and ensuring the provision of quality professional services.

Formal continuing pharmaceutical education was started in Nigeria in 1972. I did a critical appraisal of the programme in 1985. The conclusion reached from that study was "continuing pharmaceutical education in Nigeria, at the age of over ten years, is still far from being able to attract the practitioners for whom it is meant." (Erhun, 1985). The programme was not mandatory.

In 1995, the Honorable Minister of Health directed all professional regulatory bodies to discuss the modalities for the early take off of the Mandatory Continuing Professional Development Programme (MCPD). We did a position paper on the recertification of pharmacists in Nigeria to the Pharmacists Council of Nigeria. (Erhun and Elujoba, 1996). The PCN commenced the first cycle of the Mandatory Continuing Professional Education (MCPE) for the recertification of pharmacists on 1<sup>st</sup> April 1998. The OAU pioneered this programme and I was the first coordinator of the programme. The programme is mandatory for pharmacists. The first



cycle was rounded off in December 2003. It was later rebranded MCPD with no significant change in both content and delivery style from MCPE. The second cycle, which commenced in August 2005 was rounded off in 2007. We did an appraisal of the programme in 2008 (Erhun and Akintilebo, 2008). Consequent upon our findings, we recommended that the PCN should work on providing the programme through distance learning, and also allow participants to choose the topics or courses of their interest, from which they would like to acquire specific skills. The MCPD surely needs a significant overhaul if it is to remain relevant and achieve its set objectives. The PCN and the Pharmaceutical Society of Nigeria should collaborate to ensure that this is achieved. It is a partnership that can work.

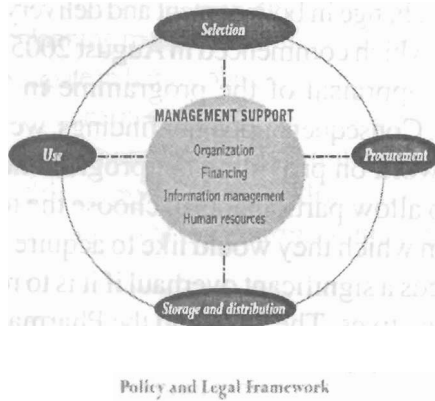
## **7.0 PHARMACEUTICAL MANAGEMENT**

Pharmaceutical management has been defined as the set of practices aimed at ensuring the timely availability and appropriate use of safe, effective, quality medicines and related products and services in any health-care setting. Pharmaceutical management is a subset of Pharmacy Administration. The latter is a sum total of all activities involved in the management of pharmaceutical administrative structures, facilities and processes.

Pharmaceutical management involves many activities that must be carefully coordinated to ensure that the right medicine, in the right quantity, of the right quality, through the right route, at the right time, gets to the right patient. Pharmaceutical management activities can be divided into six main components as shown in the medicine management cycle (Fig. 2). These are: selection, procurement, distribution, use and management support operating within a policy/legal framework.

### **7.1 Selection of Medicines**

The selection of medicines for use should be based on prevailing health and medicine policies at the Federal and State levels, in addition to the pattern and prevalence of diseases, as well as the level of care to be provided. Other considerations include availability of human and financial resources.



Source: Strategy Proj Supply, WHO/WHO, September 1997

**Fig 2: Medicine Management Cycle**

Source: WHO Training Manual on Management of Drugs at the Health Centre level 2004.

In August 2002, the Federal Ministry of Health organized a State wide Essential Drug Programme (EDP) implementation review meeting bringing together all major stakeholders to the round table to identify common problems that militate against implementation of the EDP, amongst other objectives. I was a consultant to that meeting. The meeting observed that medicine selection could be better undertaken to ensure effective management of medicines under the EDP nationwide (FMH, 2002). In the public sector medicines are expected to be selected from the Essential Drugs List, while taking into consideration the disease pattern of the community served by the health facility.

## 7.2 Medicine Procurement and Distribution

Good practices should be adopted in the procurement of medicines at all levels of care. The right medicines should be procured in the right quantities, at the lowest possible total cost. Reliable suppliers of quality medicines, at the lowest possible purchase price, should be selected to ensure timely delivery and notification.

In a normal medicine distribution channel, medicines are procured from distinct levels in the channel i.e. manufacturers, importers or wholesalers. In Nigeria, the channel is chaotic. What we find is a situation where a manufacturer is at the same time an importer and the wholesaler is at the same time a retailer. I am aware that the Federal Government is concerned about this. I served as a main resource person to the National Committee set up by the Federal Ministry of Health in 2006, on the development of a protocol for sustainable drug supply, distribution and availability in public health facilities. I have discussed extensively, the challenges of the medicine distribution chain in the keynote address I delivered at the 2008 Association of Community Pharmacists of Nigeria drug fair in Delta state, Nigeria. (Erhun, 2008)

A few years ago, the Central Bank of Nigeria took a bold step and raised the minimum capital base of banks, which resulted in mergers and acquisitions. The number of banks was reduced to a few viable ones. I am of the opinion that considering the capital intensive nature of pharmaceutical manufacturing, importation and distribution, the Nigerian pharmaceutical industry may need to positively examine the merits of mergers and acquisitions for future growth. Industry practitioners in Nigeria must imbibe the culture of collaborating with others, to promote their products and investing in promising compounds; even as the industry can play a pivotal role in healthcare delivery in the West African sub-region. The Nigerian government should increase its patronage of the local pharmaceutical industry, by procuring from them all medicines on the Essential Drugs List, which are being produced locally, for its hospitals and such other government organizations. This will further encourage the pharmaceutical companies to scale up their production capabilities – a factor that could further stimulate mergers and acquisitions. (Erhun, Demehin and Erhun, 2005).

At the level of community pharmacy practice, sole proprietorship has limited the growth of the business. We carried out a research-grant sponsored survey which revealed that general practice pharmacy in Nigeria is largely individualized, with only a handful of joint ownership. The few existing partnerships were on the verge of total eclipse. Ironically, pharmacists still

desire partnerships but the actualization is fraught with bias, fear and suspicion. The profession and its practitioners will be better enabled to provide qualitative pharmaceutical services, if effective partnerships are entered into. (Afolabi, Olayiwola and **Erhun**, 1999)

### **7.2.1 Open Medicine Markets**

In Nigeria, medicines are sold almost anywhere including open markets. Stakeholders in the medicine arena have maintained that the major factor that has significantly contributed to the proliferation of substandard and fake medicines is the existence of market places, where medicines are sold. We therefore carried out a study in the Church street area in Lagos. We found that there were pharmacies, with Superintendent Pharmacists and some others that operated without registration; though some displayed fake certificates while some others displayed certificates of “Register and Go” pharmacists. Although some classes of medicines are expected to be sold exclusively by Pharmacists, virtually all classes of medicines were sold by non Pharmacists in the Church street market. We found that a bulk of the medicine supplies to the wholesalers and distributors in the market came from local manufacturers (56%). Despite the odds of human and vehicular traffic congestion in the area, operators would prefer not to relocate because of the fear of reduced sales. (**Erhun** and Agunedu, 1995). The situation is changing positively.

For easy and sustainable dismantling of illegal medicine markets which is considered necessary for the sanitization of the medicine distribution channels, NAFDAC proposed the concept of Zonal Drug Distribution Centre (a.k.a. Drug Mart) in the six geopolitical zones of the country. After many years, the proposal is still on the drawing board because of the strong opposition of major stakeholders.

We carried out a study to know the views of the stakeholders in the Nigerian healthcare sector on the NAFDAC Drug Mart concept. We found that the stakeholders generally held a positive view of the concept. Majority (80.3%) believed that it was a laudable step in the right direction. The general view was that it would effectively tackle the problem of

counterfeit medicines in Nigeria. However, to ensure the success of the Drug Mart, the following issues will have to be addressed:

- i. Fears abound among a few stakeholders that the Drug cartels and the illegitimate marketers might “kill” the Drug Mart when established. These fears should be allayed by NAFDAC and other relevant agencies.
- ii. There is need to increase the level of awareness of the concept among the healthcare professionals.
- iii. There should be a greater involvement of the healthcare professionals in the planning and establishment of the Drug Mart.
- iv. Other healthcare professionals, apart from Pharmacists, must be made to understand that the Drug Mart concept is one aimed at sanitizing the medicine distribution system in Nigeria and not a way of giving Pharmacists undue leverage. (Erhun and Ezeigbo, 2009)

If the Drug Mart is allowed to see the light of day and drug laws are implemented, we may as well be on the path to having a sanitized medicine distribution system and, consequently, the faster disappearance of fake medicines in Nigeria. In a study on medicine distribution in Ogun state, we found that pharmaceutical inspectors, who should routinely collect suspicious medicines for detailed analyses, were incapacitated due to lack of funds to operate optimally. We found premises that had only been inspected once or twice since being established years before. (Erhun and Adeola, 1995). It is necessary that the Drug Distribution Inspection Committee set up by the government to monitor drug distribution (WAPCP, 2008) and ensure drugs are distributed only through approved channels, is not handicapped by poor funding.

Pharmacists, through the various non-regulatory agencies, should be in the vanguard of disseminating information about suspected counterfeiting activity to their professional colleagues, and the public law enforcement agents. Pharmaceutical industries should establish post marketing medicine surveillance units to routinely monitor their products in the market; not only to identify fake products, but also to report any untoward effects. (Erhun, Babalola and Erhun, 2001).

## 7.3 Use Of Medicines

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

### 7.3.1 The Prescription

A prescription is a legal document, and can be described as an instruction from a prescriber to a dispenser. It is as an order (often in written form) by a qualified health care professional, to a pharmacist or any other recognized health practitioner, for a treatment to be provided to their patient. It also indicates the prescriber taking responsibility for the medicine therapy of the patient and the resultant outcomes. Its format is officially regulated to ensure precision in the interests of safety and efficacy, as well as to prevent fraudulent use. (Katzung, 2004).

We carried out a study to examine the degree of deviation in adequately filling prescription forms on the part of prescribers and the legal implications of such deviations for the prescriber and the institution. We found deviations in the manner in which prescribers filled prescription forms. Poor habits in prescription writing undermine patient safety and might increase the incidence of injuries to patients. As patients become more aware of their legal and health rights, through the media and the implementation of the National Health Insurance Scheme, there is increased potential for litigation against prescribers. (Erhun *et al*, 2009). It is gratifying to note that pharmacists' knowledge of negligence and liability issues in pharmacy practice appear adequate. (Erhun, Adejumo and Erhun, 2009)

### 7.3.2 Medication Errors

A prescription may be correctly written, but errors could arise during the act of dispensing and administration of the medication. We carried out a study on medication errors at the OAUTHC. The fundamental factor perceived to be contributing to errors in medication dispensing and administration was excess workload, resulting from inadequate staffing. The most important measure/strategy for ensuring error-reduction in medication dispensing and administration is for the hospital to recruit more

pharmacists and nurses, so as to eliminate the perennial problem of excess workload with its negative consequences. (Demehin, Babalola and Erhun, 2008). In another study at LAUTECH Teaching Hospital, we demonstrated that the pharmacist could play a very positive role in reducing the rate of medication errors in a tertiary healthcare facility. (Erhun and Iyanda, 2009)

### **7.3.3 Patient Adherence.**

Compliance means the ability to follow instructions. A “compliant” patient in a healthcare setting is simply someone who does what he is told, often without detailed understanding. However, in medicine use, the term adherence is what is preferred. Adherence can be defined as the extent to which a patient’s behavior coincides with health-related advice. It includes the ability of the patient to attend clinic appointments as scheduled, take medication as prescribed, make recommended lifestyle changes and complete recommended investigations.

The HIV/AIDS pandemic is well known. Antiretrovirals (ARVs) are particularly susceptible to drug resistance and adherence is therefore very important. ARV treatment is optimally effective when patients are over 95% adherent to their medication. Inconsistency in taking the medications at the correct time empowers the very cunning virus to develop resistant strains to the antiretroviral drugs, which are meant to reverse its replication and stop the progression of HIV to AIDS.

We studied a population of 300 HIV/AIDS patients being treated at University of Port Harcourt Teaching Hospital to ascertain the level of adherence to antiretroviral therapy and the barriers to adherence. The rate of non-adherence in the study population was high, as many patients did not comply with the clinicians recommendations for taking their medications. The barriers to adherence were identified as patient related, health provider related, medicine related; and other factors like distance from the hospital, occasional non-availability of drugs, cost, etc. We suggested that the development and implementation of various adherence intervention strategies such as monitoring, education, and regular counseling of patients, and the introduction of simpler medication regimen, will go a

long way to enhance adherence, and solve the problems of non-adherence. (Amana and **Erhun**, 2008)

We also carried out a study to determine the degree of patients' compliance with prescribed medications, as well as assess the possible role of the hospital pharmacist in facilitating client's compliance. Over 80% of the study population having post secondary education had missed their doses while on prescribed medicines. Prohibitive cost of prescriptions, unpleasant medicine effects and long duration of therapy were some of the reasons adduced for non compliance. Many of the subjects agreed that the instructions of the pharmacists were clear (75%) and the importance of following directions was emphasized (54%), but only 37% received information from the pharmacist about use of medicines. About 50% of the subjects did not receive any information about the potential adverse effects of their medications. We concluded that the pharmacist should effectively communicate with the patient in order to encourage compliance. (**Erhun** and Maitanmi, 2007). We have looked at some effective ways of managing patients' compliance in hospital pharmacy (**Erhun & Makanjuola**, 2008).

With the clinical pharmacy movement, the situation where the pharmacist will be at the bedside to take patient's medication history will soon become a norm at least in our teaching hospitals. We attempted to explore, describe and analyse communication patterns that occur in interactions between pharmacists and elderly patients during medication history interviews in a hospital setting. It was hoped that a better understanding of these patterns could assist in improving the current situation in Nigeria and other developing nations. This is the first published pharmacy study to use sociolinguistic analysis to map communication deficiencies and thus provide feedback on identified skills gap. The study identified the main areas of miscommunication as acoustics, lexicon and conception. Pharmacists conducting medication history interviews should make the environment conducive for listening, with a private area, as well as reduction of noise level. There is an indication that pharmacists may be missing important pharmaceutical care needs or assessment information during the period of a patient's hospitalization because of existing communication skill gap.



(Babalola and **Erhun**, 2001). National initiatives taken by Pharmaceutical Society of Nigeria and the Pharmacists Council of Nigeria can encourage patients to engage in dialogue with pharmacists and ask questions about their medicines.

### **7.3.4 Medicine Advertisement**

Media advertisement of pharmaceutical products, in Nigeria, is explained by provisions of Part VI of the Medicines Act (promotion and sale of medical products) and other provisions. The advertisement of medicines, especially herbal remedies, has provoked a lot of outcry in the local pharmaceutical press, as a result of the wild claims made by some traditional medical practitioners in their advertised medicines. The extent to which these adverts affect medicine behavior needs to be understood.

We have shown that broadcast media (radio and electronic) create and enhance the existing level of awareness of Over The Counter (OTC) medicines in adults. The advertisements in both media do not adequately inform listeners about the risks and side effects of medicines. For all classes of medicines most of the respondents (>50-85%) indicated that if they were in a position to recommend or determine what medicines others would use, the advertisements they were exposed to would play significant roles. (**Erhun** and Erhun, 2002). This further buttresses the need for the regulation of medicine and herbal supplement advertisements in Nigeria.

## **8.0 PHARMACISTS IN THE MANAGEMENT OF COMMON DISEASES**

### **8.1 Malaria.**

Malaria is an endemic infectious disease in Nigeria. It has remained a leading cause of death amongst the under fives in Africa. Numerous factors complicate the prevention and treatment of malaria. These include: economic constraints, leading to non-affordability of antimalarial medicines, health seeking behavior, inadequate health care infrastructures and non adherence to medicine regimen.

Assessing and analyzing local malaria problems are a prerequisite for successful control interventions.

We studied how OAU students managed what they perceived as malaria. Our study showed that only 21% sought treatment at the health centre when they had malaria, despite the fact that 70% of the study population was registered at the health centre. Over 47% of the population had missed lectures as a result of malaria. (Erhun and Adebayo, 2002). Factors influencing respondents' choice of malaria treatment and preventive methods included cost, religious belief, perceived safety and convenience of respondents. We found that convenience and the severity of the disease affected respondents' choice of treatment in more than 50% of the cases. We have recommended that preventive measures be incorporated in malaria alleviation programmes, in addition to developing an appropriate educational intervention strategy, highlighting the importance of dosage and adherence. (Erhun, Agbani and Adesanya, 2005)

A considerable proportion of malaria treatments occur through self-medication via medicines bought from medicine retailers. I was awarded a World Health Organization research grant to study the management of malaria in retail medicine outlets in selected urban and rural areas in the Niger Delta area of Nigeria. (Erhun, 2001) We also repeated the study in Lagos state. We found that retailers had a fair knowledge of how to recognize malaria but there is the need for suitable educational intervention to improve upon the knowledge and treatment practices of medicine retailers. (Erhun and Osagie, 2004).

## 8.2 Hypertension

Hypertension is a common health problem in Nigeria. It is also a major risk factor of cardiovascular diseases. Effective interventions will require the assessment of the socioeconomic magnitude and extent of the burden of hypertension in the working class. We carried out a worksite study of hypertension prevalence at the Obafemi Awolowo University and found an overall crude prevalence rate of 21% in the respondent population. About 16% of these were already on medical treatment. A sizeable portion of the study population (14.4%) had history of hypertension treatment as at survey time. Of these however, only 4.8% had controlled blood pressure (BP); thus indicating a poor BP control level in this sub group. (Erhun *et al*, 2005). There is the need for increased awareness of the disease and

other cardiovascular risk factors within this community. We encourage the possession or provision of blood pressure self-measurement devices.

We carried out a 2-year retrospective cohort review of the outpatient medical records of a primary health center in Ile-Ife to gain insight into the control of uncomplicated essential hypertension at the primary care level. Bivariate regression analysis revealed that systolic blood pressure contributed moderately to the variances of medicine and regimen decisions. Among the 128 hypertensive patients with average and modal ages of  $57.2 \pm 11.1$  and 60 years, respectively, only 37.5% had controlled blood pressure after the first treatment; with 10.2% and 4% of the study population needing three and five re-treatments respectively, within 6 months to achieve target blood pressure levels. We recommended a more aggressive management strategy that individualizes diuretic therapy by titrating dose to systolic blood pressure. (Erhun, Agbani and Bolaji, 2003).

Patient's non compliance with treatment is common in hypertensive therapy (Hyman and Pavik, 2002). Patients may forget to take medications, misunderstand when or how to take them, take extra doses to treat stubborn symptoms, or consciously decide to stop taking medications. (Horne *et al*, 2001). Clinicians could be ignorant of these problems and may interpret unidentified non adherence as poor medicine effectiveness. The Pharmacist can play a major role in this context.

We proceeded to determine whether the provision of further practice-based support by pharmacists will bring about improved outcomes for blood pressure (BP) control in middle-aged and elderly Nigerian hypertensive patients managed with combination diuretics at the primary care level. This was a one-year prospective, randomized cohort study of the outpatients in a state comprehensive health centre. Free primary health services, including free medicines, were provided for all patients. The study population comprised 51 Nigerian patients, with uncomplicated hypertension aged  $\geq 45$  years, with a 0.2-3.0-year history of hypertension, registered at the facility. They were invited into the pharmacist-managed hypertension clinic and followed up for the study period. Participating pharmacists counseled for current medication and monitored treatment outcomes between enrolment and return visits. Patients' satisfaction and

the number of treatment failures within 6 months post enrolment were compared with retrospective data from our earlier study, involving physician-managed patients under a similar setting. This intervention reduced uncontrolled BP from 92 to 36.2% within  $10.15 \pm 5.02$  days after enrolment. Treatment failures were observed in only 5.9% of the total return visits ( $n = 184$ ) within 6 months. The pharmaceutical service provided by a pharmacist-managed hypertension clinic improved BP control, reduced treatment failures and recorded remarkable patient satisfaction. (Enun, Agbini and Bolaji, 2005). This further confirms the need for team work amongst healthcare professionals.

Perhaps members of the health care team in Nigeria would need to learn from the words of the Apostle Paul, in his letter to a community in Corinth, that "in fact the body is not one member but many. If the foot should say, 'Because I am not a hand, I am not of the body,' is it therefore not of the body? And if the ear should say, 'Because I am not an eye, I am not of the body,' is it therefore not of the body? If the whole body were an eye, where would be the hearing? If the whole were hearing, where would be the smelling?" (Paul, AD 57)

Hypertension management and risk prediction, based on diastolic blood pressure, may be of little value for older people and people with isolated systolic hypertension (ISH). We carried out a three-year retrospective cohort review of outpatient hypertensive medical records, at the same primary health care facility in Ile-Ife. Treatments were graded as relatively non-aggressive, mildly aggressive and moderately aggressive. The medicine/regimen choice controlled systolic blood pressure (SBP) in only 46.9% of the population after the first visit to the clinic. SBP control among treated patients was significantly inadequate. Group mean SBP was consistently  $> 150$  mmHg in 28.13% of the patients for not less than six weeks after enrollment and for at least two additional visits. Data analysis revealed an increasing tendency to place patients on monotherapy or "no medicine treatment" with successive visits to the clinic; even in cases of uncontrolled systolic blood pressure, as well as declining prescription of moderately aggressive combination therapy. Isolated systolic hypertension should be seen as an important clinical condition and aggressively managed at the primary care level, which, for most patients in the setting of this

present study, may be the first and last orthodox port of call (Agbani, **Erhun** and Ojo, 2006).

## **9.0 EPILOGUE**

Mr. Vice Chancellor, What I have attempted to do in this presentation, thus far, is for us to appreciate the complexity of ensuring that the right medicine, in the right quantity, through the right route, at the right time and of the right quality, gets to the right patient. A wholistic approach has been adopted, as captured by the tree model of managing medicine use and supply, tracing the process from the training of the pharmacist, who is the universally acknowledged medicine expert, to his practice and ultimately following the movement of medicines through the medicine management cycle. I have attempted to show how my interest in the field has modestly contributed to the science and art of pharmacy with emphasis on pharmaceutical management, a subset of pharmacy administration. I cannot agree less with Burroughs when he said “Blessed is the man who has some congenial work, some occupation in which he can put his heart, and which affords a complete outlet to all the forces there are in him.” For me, Pharmacy Administration has been that outlet.

I give praise to the all wise and all knowing invisible God who created the heavens and the earth, for the opportunity to tell part of my academic story through this inaugural lecture. It is only by divine arrangement that this is the first inaugural lecture from the Department of Clinical Pharmacy and Pharmacy Administration of this great University, hosting the premier pharmacy faculty in Nigeria. I am not only the first professor in the department but also the first Professor of Pharmacy Administration in West Africa. To God be the glory.

I agree with Clarke when he wrote “All the strength and force of man comes from his faith in things unseen. He who believes is strong; he who doubts is weak. Strong convictions precede great actions.”

I graduated from this university as university scholar with a Bachelor of Pharmacy degree in 1978; and defended my M.Sc. thesis in Pharmaceutical Chemistry in September 1979, in this same university. This was at a time when fresh pharmacy graduates were allowed to pursue post graduate

studies during the internship year before proceeding for NYSC. On my return from NYSC, I desired to take up a lectureship position in Pharmaceutical Chemistry, but there was no vacancy.

It was Van Loon that said, “The world is in dreadful need of men who will have the courage of their own visions and who will recognize clearly that we are only at the beginning of the voyage, and have to learn an entirely new system of seamanship”. My mind was made up on pursuing my academic career in Ife and because I needed a job, I had to change my academic interest. “And we know that all things work together for good to those who love God and are the called according to His purpose” (Rom. 8:28).

Professor Abayomi Sofowora, the first Nigerian professor of pharmacognosy and my academic mentor, as head of the department of pharmacognosy, offered me a job as assistant lecturer in 1980. I obtained my Ph.D in Pharmacognosy in 1984, thereby becoming the first Ph.D in that discipline from this university. I thank you sir, for trusting in my ability and encouraging me to be myself. You trained me to face challenges head on.

I was a Lecturer II when I was appointed the first Curriculum Development Officer of the faculty of Pharmacy in 1983 to monitor the implementation of the curriculum and offer necessary advise to the Dean on ways of improving the programme. It was during this period, as Curriculum Development Officer that my research interest began an irreversible shift from Pharmacognosy to Pharmacy Administration. Immediately I was promoted a Senior Lecturer in pharmacognosy in 1987, I decided to fully pursue this interest in my new found love. So determined was I in this quest, that when I was appointed the Ag. Head of the Department of Pharmacognosy in 1988, I did not think twice before respectfully turning down the offer. My reason was that I no longer had sufficient interest in pharmacognosy to be able to provide appropriate all round academic leadership. I thank Prof. E.A. Aduayi (as Provost of PG school) and Prof. Pat Oribabor (my MBA project supervisor) for their encouragement in my quest for an MBA. I was a Visiting International Professor of Pharmacy Practice Management at the University of North Carolina at Chapel Hill,

in 1993. I was the second academic to be so honored on that programme. The trip was part sponsored by the International Pharmaceutical Federation (World body of Pharmacists) through an international travel scholarship of which I was the first recipient. Here in Ife, it was in 1999 that I finally had an opportunity to be interviewed for the post of Senior Lecturer in Pharmacy Administration. Thereafter, I was transferred to my present department.

The “transfer dilemma” spanned the period 1988 to 1999. I was only able to maintain my balance during the waiting period because of the grace of God that also offered me diverse consultancy opportunities with NAFDAC, Federal Ministry of Health, World Health Organisation and the organized private sector. I was appointed the first Executive Secretary of the Pharmaceutical Society of Nigeria in 1991.

In essence, my academic career in Pharmacy Administration, in this University, formally started after 12 years as a senior lecturer in Pharmacognosy. When my waiting grace was virtually exhausted and by God’s mighty hand, I had the rare privilege of receiving two letters of promotion in the same year. In the first quarter of 2008, my promotion to the post of Reader was announced, with effect from October 2002; and in the last quarter of the same year, my promotion to the post of Professor was announced, with effect from October 2006. To God be the glory. For with God nothing shall be impossible.

May God bless the following people for their intervention at very crucial times in my academic career: Professors: C. Onyeji, Ogundaini, A., Akingbohunge, A.E. and Abayomi Sofowora. I thank all the former VCs and particularly Prof. Mike Faborode in whose tenure this university has witnessed very remarkable physical development. Your words of encouragement will forever remain fresh. I also thank A. Ogunraku. and S.L. Adefemi. I appreciate Professors P. Olurinola and Fola Tayo, my senior friends and all my former and present students including Pharm. A.I. Demehin as well as my many brothers and sisters in CPPA, faculties of Pharmacy in most Nigerian Universities and the West African Post graduate College of Pharmacists. I recognize and appreciate all men of honor (Pharmacists) who have come to join hands with me on this occasion. There are too many others that time constraint will not allow me to mention.

Pastor (Dr.) E.O. Abina, General Overseer, The Gospel Faith Mission International, your prayers are working for me. All Gofamint leaders and ministers and the Chaplains here present you are all highly regarded. I acknowledge the inestimable support of Mercy, my reliable partner and only wife, and those of Eguono, Aghogho, Joseph and Glory, our children. God hit the target by bringing us together as a family.

Mr. Vice Chancellor, I imagine that my experience has shown clearly, that every problem in life, like any medicine, has an expiry date. On sober reflection, I can now say like the apostle Paul in 2Ti 4:7a, that "I have fought a good fight" but I have not yet finished my course. In reality my race has just started. May we sow the right seed, provide adequate nutrients and pray for the right weather so that we can eat the good fruits of the tree of managing medicine use and supply in Nigeria. May God, the creator of the heavens and the earth, bless you for your presence and kind attention. Sincerely, I appreciate your coming.

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