

**EVALUATING THE KNOWLEDGE AND ATTITUDE OF
COMMUNITY PHARMACISTS TOWARD TYPE II
DIABETES IN LUSAKA, ZAMBIA.**

BY

GUNET MWALUNGALI

**A dissertation submitted in partial fulfilment of the
requirements for the degree of Master of Clinical Pharmacy in
the University of Zambia.**

THE UNIVERSITY OF ZAMBIA

October, 2014

DECLARATION

I, Mwalungali Gunet, do solemnly declare that this dissertation;

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CERTIFICATE OF APPROVAL

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ABSTRACT

This study is hinged on the basis that in addition to knowledge updates, the attitudes of health care professionals toward current concepts about diabetes care is just as critical. The core philosophy of modern diabetes care puts emphasis on patient autonomy and optimal utilization of health care professionals' different specialties. This study was undertaken to evaluate the knowledge and attitude of community pharmacists toward diabetes care.

This was a descriptive cross-sectional study. The aim of this study was to determine the attitude and knowledge of community pharmacists towards type II diabetes in Lusaka. This study was designed to identify the knowledge that pharmacists routinely provided to people with diabetes and their attitudes towards the disease.

Eighty four conveniently selected community pharmacists were surveyed by the Diabetes knowledge Test (DKT) and Diabetes Attitude Survey (DAS) questionnaires. The Diabetes Knowledge Test evaluated the pharmacists' diabetes knowledge based on a validated 23 item questionnaire, the Michigan Diabetes Knowledge Test (MDKT). The Attitude Survey involved the likert scale to determine the community pharmacist's perceptions about the seriousness of type II diabetes, psychological impact of the disease, patient autonomy, need for special training in diabetes and finally the value of tight glucose control in type II diabetes.

The results showed the mean Diabetes Knowledge Test's overall score being 13.77/23(59.86%). General diabetes information score was 8.96/15(59.3%) and for Insulin Therapy-specific questions was 4.84/8(60.5%). The mean Attitude Survey's overall score on the likert scale was 3.04. Amongst the subscales of the Attitude Survey, the need for special training scored the highest (3.28) and the score on the subscale for patient autonomy was the least (2.88). This showed unacceptable level of knowledge and a bias of attitude towards neutral (neither positive nor negative). There was no association between knowledge and attitude of community pharmacists involved in the study. Some statistical difference was noted in respondents levels of knowledge based on their differences in ethnicity (race), practice setting (other than community pharmacy) and level of education.

In conclusion, the study has revealed with consideration of all its possible limitations and strengths that the levels of knowledge and attitude of community pharmacists in Lusaka are unacceptable. The attitude of community pharmacists equally leaves much to be desired as it displayed a lot of indecision with its tendency toward the neutral, meaning that the patient's expected desirable outcome could not have a guarantee to be optimised.

DEDICATION

I dedicate my dissertation work to my family and many friends. A special feeling of gratitude to my loving parents, Late father Ronald and mother Violet whose words of encouragement and push for tenacity ring in my ears. My sisters and brothers, who are very special and always offering spiritual and mental support. I also dedicate this dissertation to my many friends and family members who have supported me throughout the process. I will always appreciate all they have done.

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Equally important is the recognition of the Michigan University Diabetes and Research Training Center (MDRTC) for the permission granted to me to use their validated tools (questionnaires) in my study.

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LIST OF ACRONYMS

DAS Diabetes Attitude Survey

DKT Diabetes Knowledge Test

DM Diabetes Mellitus

DSM Disease State Management

MDRTC Michigan Diabetes Research and Training Centre

MOH Ministry of Health

PCS Pharmaceutical Care Services

SPSS Statistical Package for Social Sciences

TYPE II DIABETES Type Two Diabetes

TYPE 2 DIABETES Type Two Diabetes

U.K. United Kingdom

UNZABREC University of Zambia Biomedical Research and Ethics Committee

W.H.O. World Health Organisation

Z.M.R.A. Zambia Medicines Regulatory Authority

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.0 Introduction

This chapter provides the reader with the essential background to the study, starting out with a broad description of the research topic and moving on through a clear and accurate account of the previous research that has led up to this study. There is no one correct way to introduce this study, but probably a good idea to start off with a brief overview of the area of study to set the scene for what is to follow.

1.2 Background

Diabetes mellitus (DM) is a chronic, progressive, systemic disease characterized by dysfunction in metabolism of fats, carbohydrates, protein, and insulin with subsequent impairment of blood vessels and nerves (Yarborough, 2007).

The practice of diabetes care has dramatically changed during the past two decades. Knowledge regarding diabetes pathophysiology has quickly accumulated and has led to the development of new medications. In addition to knowledge updates, the attitudes of health care professionals toward current concepts about diabetes care are even more critical. The core philosophy of modern diabetes care puts emphasis on patient autonomy and optimal utilization of health care professionals' different specialties. Research evidence derived from clinical, economic, and humanistic outcomes also strongly supports the importance of patient autonomy and a team approach to diabetes care. Pharmacists' knowledge and attitudes toward diabetes can significantly influence patient outcomes (Hsiang-Yin, 2004).

Given the prevailing concept of a team approach toward diabetes care, only when all health care providers share the same high level of knowledge and positive attitudes could the quality of patient care be ensured (Hsiang-Yin, 2004). Pharmacists are highly accessible to chronically ill patients such as those with diabetes, especially when the disease becomes controlled and the patient only needs to visit a pharmacy to have their

prescription refilled (Hsiang-Yin, 2004). Pharmaceutical care has significantly reduced the occurrence of drug-related problems and fulfilled the desired outcomes of drug therapy in other diseases and conditions such as anticoagulation, hyperlipidemia, and asthma (Jungnickel PW, 1997). Studies have also shown that pharmacists' participation in the care of poorly controlled diabetic patients resulted in better outcomes (Jungnickel PW, 1997).

This study is focused on the attitude and knowledge of community pharmacists on type II diabetes which also received special mention in the WHO adherence report (WHO, 2003). Type II diabetes is a disease of pandemic proportions increasingly making its presence felt in the developing world where, it is predicted, most of the world's diabetes burden will in future be borne (King H, 1998). Furthermore, it is a disease where pharmacotherapy and lifestyle modification play major roles in the treatment and management of the condition, (Chitre MM, 2006) and where health promoting interventions in both these therapeutic areas are accommodated within the pharmacist's defined scope of practice (Wermeille J, 2004) (Kiel PJ, 2005) (Johnson LC, 1997).

Most, if not all, Type 2 diabetes patients make use of long-term pharmacotherapy to manage their disease. The prescription refill dynamic provides for frequent personal and informed contact between the patient and the pharmacist and thus positions the community pharmacist for roles in diabetes care beyond the traditional medicine-dispensing role (Kiel PJ, 2005) (Johnson LC, 1997). Encounters of this nature present pharmacists with ideal opportunities to provide pharmaceutical care across a range of chronic diseases.

Today, 300 million people have diabetes, mostly type II (that is 6.6% of the adult population) (Mbanya, 2009). Each year the number is increasing by 7 million (International Diabetes Federation, 2009). By 2030, 438 million people will have diabetes (7.8% of the adult population), a rise of 54% in 20 years (Mbanya, 2009). This is more than the populations of Mexico, the United States and Canada combined.

Diabetes which was once considered a rare disease in sub-Saharan Africa has its prevalence rising rapidly (Mbanya, 2010). In 2010, over 12 million people in Sub-

Saharan Africa were estimated to have diabetes, and 330,000 people would die from diabetes-related conditions.

Over the next 20 years, it is predicted that Sub-Saharan Africa will have the highest growth in the number of people with diabetes of any region in the world – the 2010 estimate is predicted to almost double in 20 years, reaching 23.9 million by 2030(International Diabetes Federation, 2009).

There are widespread indications in sub-Saharan Africa that as many as 85% of cases have not been diagnosed, although the rate of diagnosis is increasing(Baldé, 2007).

A call for action against diabetes in terms of advocacy, promotion of awareness, and public health policies that empower people to diabetes self-management (Alla, 2008) a concept towards which community pharmacists are uniquely positioned to contribute cannot be over emphasized.

Patients' empowerment and self-management mediated by education and motivation are very important (care, 2001). Logically, these would be more effective if support is delivered via readily accessible venues such as community pharmacies. Several models for involving community pharmacists in diabetes care have been described elsewhere (JR, 2002) though they are not widely practiced in less developed parts of the world (Al-Fadhel MA, 2002).

In Lusaka, Zambia, a wide network of community pharmacies is available which could potentially undertake a valuable supporting role in diabetes care. However, knowing the pharmacists' own level of readiness (knowledge and motivation) is a prerequisite step for any future planning. This study, therefore, attempts to evaluate diabetes-related attitudes of community pharmacists in Lusaka, Zambia, and secondly to assess their basic knowledge of diabetes that would help evaluate their ability to undertake a diabetes educator role.

1.3 Statement of the Problem

Currently, the level of knowledge and attitude of community pharmacists towards type 2 diabetes in Lusaka, Zambia, is not known. The research problem is subject to the

influence of a number of factors including: the nature of the disease, accepted models of care in type II diabetes, international evidence relating to pharmacist knowledge and attitude designed to promote outcome in type II diabetes and, most importantly, the capacity of Zambian community pharmacists to deliver diabetes care given the dynamics of pharmacy practice in the country

1.4 Purpose of the Study

The sole purpose of this study is to contribute to evidence based practice and education regarding pharmaceutical care of type II diabetes and to related further research.

1.5 Objectives

The main objective of this study was to assess the Knowledge, Attitude, Demographic variables and their associations towards type II diabetes in Lusaka, Zambia.

1.5.1 Specific Objectives

1. To assess the knowledge and attitude of community pharmacists on type II diabetes in Lusaka.
2. To identify demographic variables associated with the differences in community pharmacist's knowledge and attitude towards type II diabetes.
3. To determine any association between knowledge and attitude of community pharmacists towards type II diabetes in Lusaka.

1.6 Research Questions

The following research questions were considered:

1. What is the knowledge and attitude of community pharmacists towards type II diabetes?
2. What is the association of the demographic variables of community pharmacists with their knowledge and attitude towards type II diabetes?
3. What is the association of the level of knowledge of community pharmacists with their attitude toward type II diabetes?

1.7 Significance of the Study

The results for this study may influence public policy and help change the perceptions of patients and health care professionals about diabetes care. Community pharmacies are ideally placed to contribute to disease state management (DSM) programmes and assist in the detection, education and referral of individuals at risk of diabetes (Teh, 2001). They are widely accessible, available, in frequent contact with the public and able to access people who are apparently healthy (Jaber, 1996). The levels of the community pharmacists' knowledge and attitudes towards type II diabetes are not known in Zambia, since literature research revealed that no study has been conducted and documented to establish the two concepts. A Pub med search using the search term, 'community pharmacist knowledge or attitudes AND Type II diabetes AND Zambia', produced no results.

The existence of perceived differences or discrepancies between what exists and the ideal or desired situation in terms of levels of community pharmacists' knowledge and attitudes towards type II diabetes is eminent. The reasons for this discrepancy is currently unclear and this propelled the development of a research question which could have more than one possible solution. The findings of this study therefore will allow the policy makers come up with informed evidence based decisions on pharmaceutical care regarding type II diabetes in our communities. This study will generate information regarding the current state of diabetic care in community pharmacies and if need be help the policy makers improve sensitization hinged on health style modifications in preventing or delaying the complications of diabetes. Therefore, the patient is an ultimate beneficiary in the communities to which all type II diabetic patients belong. Furthermore, this study:

1. Will provide important data for informing people inside and outside the pharmacy profession about the knowledge of community pharmacists towards type II diabetes.
2. Provide baseline information for investigating what is good and not for type II diabetics in our community pharmacies and
3. Enable assessment of whether community pharmacy services are meeting current health care needs regarding type II diabetics and identification of ways in which services should be improved.

1.8 Limitations of Study

The main limitations of this study included: a relatively smaller sample size, an increased number of would be interviewees opting out, stringent ethical considerations which also contributed to the shrunk sample size, and the respondents were given more time than the standard prescribed 15 minutes for this validated tool to enable them complete the bulky questionnaire.

1.9 Definitions

COMMUNITY PHARMACIST - Is a pharmacist who works in a retail pharmacy.

GENERAL DIABETES TEST - Examines participants in the study on their general knowledge on diabetes.

DIABETES MELLITUS - Is a non-communicable disease usually chronic in nature which is as a result of deficiency or resistance to insulin

TYPE 2 DIABETES - Is the form of diabetes that usually affects individuals above forty years resulting from failure of body to utilise available insulin due to resistance.

TYPE 1 DIABETES - Results from mere deficiency of insulin and mostly it is autoimmune in nature.

GLYCATED HEMOGLOBIN - Is the parameter used to determine an individual's control of blood sugar over the past average period of two to three months.

EDUCATION ATTAINED - Is the level of education attained by participants in the study other than Bachelor of Pharmacy.

MASTERS DEGREE - Is the postgraduate degree acquired in a medical/health related field after a relevant first degree in pharmacy (i.e. B.Pharm. Or equivalent)

ATTITUDE SUBSCALE - Is one of the five subunits of the Diabetes Attitude Survey.

LIKERT SCALE - is used to measure the Perception (Attitude) of participants in the study on various statements regarding diabetes.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The fundamental aspect of this part of the study is the evaluation of related studies of pharmacists' knowledge and attitude towards type II diabetes. It looks at similar studies done in sub-Saharan Africa and the world over. Moreover, the essential, reasoned justification for this work would be impossible unless it was able to provide a balanced review of previous research involving community pharmacists.

2.1 Conceptual Framework

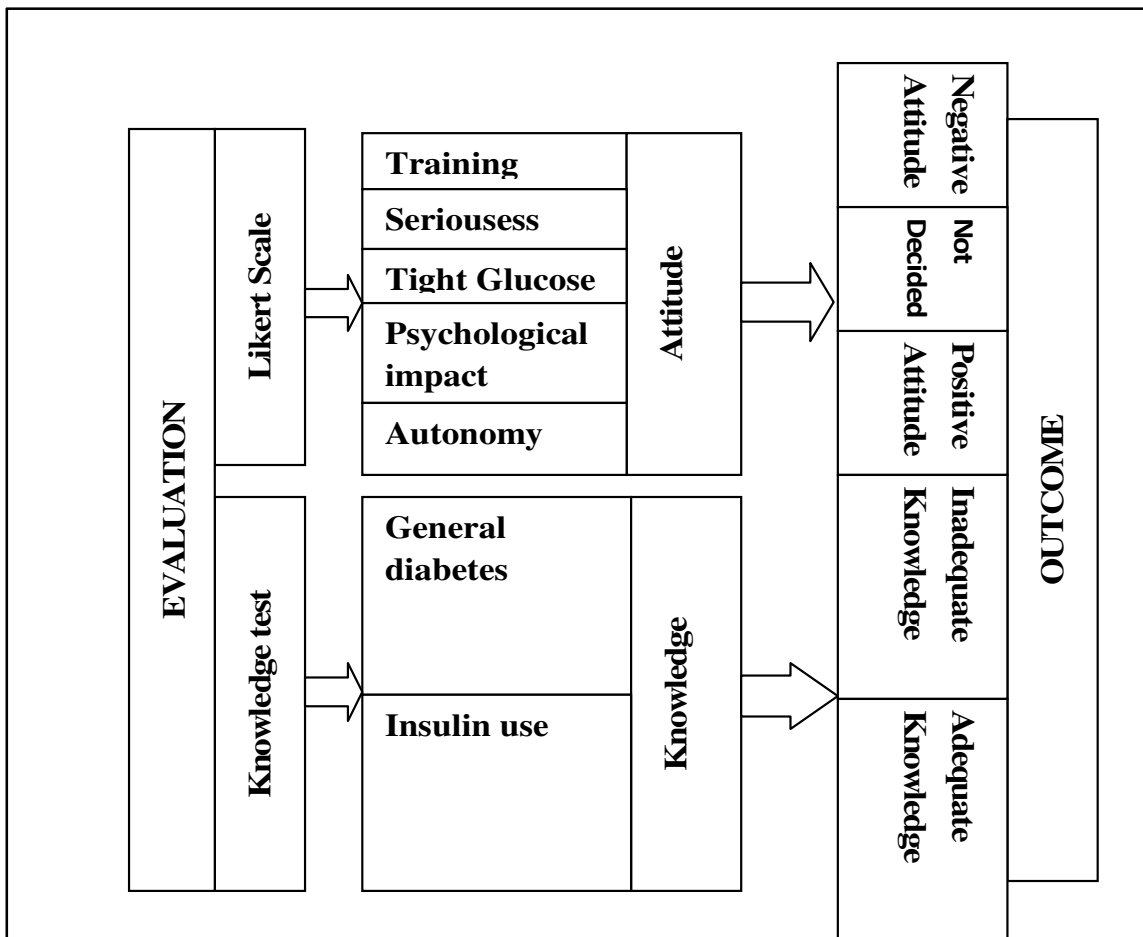


Figure 1: Conceptual framework-Evaluation of knowledge specific to type II diabetes

The almost universal use of medication as an important tool in the management of chronic diseases like type 2 diabetes facilitates relatively frequent encounters and interaction between patients and pharmacists (Johnson LC, 1997). It is the potential for providing care inherent in these encounters, especially in supporting patient self-management initiatives, together with the pharmacist's expertise as a medication specialist, that lends substance to the claim that pharmacists are well positioned to contribute to disease risk reduction and consequently positively influence patient outcomes in type 2 diabetes (Cranor CW, 2003). The conceptual framework for this study was largely underpinned by the need to know the levels of knowledge and attitude of community pharmacists towards type 2 diabetes, an indicator that would suggest how ready they are to take up an educator's role in type II diabetes. It demonstrated the core need for community pharmacists to have adequate knowledge and positive attitude towards diabetes mellitus patients. This would ultimately, amongst other factors, contribute to desirable patient outcome. The evaluation segment of this conceptual framework subjected community pharmacists to the validated knowledge test and attitude scale (likert scale) which following the thought process of the frame work ended up into the outcome.

2.2 Research on Pharmacists

Although yet to be routinely delivered by pharmacists, previous research supports the potential role that pharmacists can play in improving diabetes self-management. In a meta-analysis of 14 randomized-controlled trials investigating the effect of pharmacist intervention in patients with diabetes across a number of countries, significant and clinically relevant improvements in glyceimic control were observed (Collins, 2011). Pharmacist interventions included non-pharmacological diabetes education as well as pharmacological interventions such as medication counseling, adherence improvement strategies, avoidance of drug interactions and medication adjustment i.e. of medication type and dosages. It is this holistic approach that is believed to explain the beneficial effect on glyceimic control (Collins, 2011).

2.3 Unique Position of Community Pharmacists

Community pharmacies are ideally placed to contribute to Disease State Management (DSM) programmes and assist in the detection, education and referral of individuals at risk of diabetes (Teh R, 2001). They are widely accessible, available, in frequent contact with the public and able to access people who are apparently healthy (Jaber, 1996).

Traditionally, their services are accessed by extended working hours and without the restrictive systems of hospital appointments, thus enhancing the professional support to the patients' advantage. This is particularly valuable in parts of the world where multidisciplinary diabetes care teams are not yet well developed like in the case of Zambia. Diabetes education and support professionals such as diabetes nurses and educators are scarce in our region (Mbanya, 2002). In recent years pharmacists' roles have expanded from simply packaging and dispensing medications to working with other health care professionals and the public. There is a large volume of published literature on the evolving role of the community pharmacist in chronic disease management. The role of pharmacists in diabetes management, including patient identification, assessment, education, referral, and monitoring has been well established elsewhere in the world (George, 2010).

2.4 Knowledge and Attitude of Health Care Professionals

As already alluded to, in addition to knowledge updates, the attitudes of health care professionals toward current concepts about diabetes care are even more critical. The core philosophy of modern diabetes care puts emphasis on patient autonomy and optimal utilization of health care professionals' different specialties. Research evidence derived from clinical, economic, and humanistic outcomes also strongly supports the importance of patient autonomy and a team approach to diabetes care (Hsiang-Yin, 2004).

Community Pharmacists are highly accessible to chronically ill patients such as those with diabetes, especially when the disease becomes controlled and the patient only needs to visit a pharmacy to have their prescription refilled. Pharmaceutical care has significantly reduced the occurrence of drug-related problems and fulfilled the desired outcomes of drug therapy in other diseases and conditions such as anticoagulation,

hyperlipidemia, and asthma. Studies have also shown that pharmacists' participation in the care of poorly controlled diabetic patients resulted in better outcomes(Hsiang-Yin, 2004).

2.5 Accessibility of Community Pharmacists

Community pharmacists are the most accessible of health care providers, and since patients with diabetes visit their pharmacy up to eight times more often than the average patient,community pharmacists have excellent opportunity to help them manage their medications as well as the behavioral aspects of their regimen. In recent years, pharmacists in many practice settings have begun providing patient-centered services with the goal of improving drug therapy outcomes.

The concept of expanding the pharmacist's role to include patient care was first voiced by Hepler and Strand,(Hepler, 1990)who defined pharmaceutical care as "the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life." Pharmaceutical care includes providing services such as monitoring, documenting, and reporting patient adherence, drug therapy outcomes, and drug related problems in the context of a continuum of care from patient assessment through monitoring and follow-up. Since patients with diabetes suffer from a chronic disease requiring lifelong attention, they are well suited to receive Pharmaceutical care services (PCS). Few well-designed studies have evaluated the outcomes of PCS. Fewer have evaluated PCS in community pharmacies, and even fewer have focused on diabetes-related PCS in the community pharmacy setting. Most existing reports provide only a before and after assessment of services, and many are assessments of pilot studies rather than ongoing programs (Christensen, 2003).In Zambia, such data does not exist currently, according to the literature search conducted under this study.

2.6 Role of Community Pharmacists

To reap the benefits of modern medical therapies, more efficient and more effective interventions to aid people in following medical regimens are needed. Recently there has been interest in broadening the role of the community pharmacist beyond the traditional product-orientated functions of dispensing and distributing medication, to include a

greater role in public health. The pharmacy profession is increasingly being recognised as having a strategic position in health promotion, due to their in-depth knowledge of the rational use of medicines (Donovan, 2011). The role of the pharmacist as part of a multidisciplinary approach cannot be over-emphasized. Pharmacists are now a critical part of the healthcare teams and they are taking more responsibility for clinical outcomes of drug therapy. There are a number of limitations to the potential role that pharmacists may play however, including: lack of prescribing power on a part of pharmacists and a deficit of suitably qualified pharmacists with clinical experience in some countries. These may be further compounded by economic constraints, particularly in the third world countries (Donovan, 2011).

Although pharmacists' positive contributions in specialized or study settings are well recognized, the specific activities and services that other pharmacists provide to people with diabetes in various practice settings have not been well described. Medication management services vary from pharmacist to pharmacist and from pharmacy to pharmacy and depend on a number of factors, such as the patient population served by the pharmacy; the interest level, training and expertise of the pharmacist; and opportunities to partner with other health care professionals(Simpson, 2009).

Despite support for the notion that amount of knowledge is associated with attitude–behavior consistency, there are some limitations in the available research. One limitation is that in attitude–behavior consistency research, knowledge has always been measured rather than experimentally manipulated. Thus, it is difficult to decompose knowledge effects from other variables with which this construct is correlated, such as attitude certainty, extremity, and accessibility (Bassili, 1996); (Boninger, 1995). Therefore, there is no definitive evidence that knowledge per se exerts a causal influence on attitude–behavior consistency. In this regard, included in the specific objective of this study (under report) is to determine any association between the two concepts without regard to a causal relationship.

2.7 The Pandemic of Diabetes in Sub-Saharan Africa

The emerging diabetes epidemic represents an important opportunity for pharmacists to demonstrate their impact on patient care. As such, it is important to evaluate current pharmacy practices and to understand how best to encourage pharmacists to take a larger role in diabetes care(Simpson, 2009).

Diabetes is a chronic, debilitating disease that requires life-long treatment and greatly increases the risk of serious, long-term complications. Offering the long term monitoring and treatment needed is not easy for the healthcare systems of sub-Saharan Africa, which are more focused on managing acute infections. Awareness of the early symptoms of diabetes is low, even among healthcare professionals, so perhaps as many as 85% of diabetes cases are undiagnosed, remaining without treatment (Ayesha, 2010).

On the African sub-continent, present literature and the work of the World Diabetes Foundation have highlighted three countries, namely, Mali, Mozambique, and Zambia. Looking at the incidence and prevalence of today's emerging silent killer or diabetes in Sub-Saharan Africa, the theme is that time is running out for Africa and that, as was for HIV/AIDS, by the time the governments wake up and stop denying the catastrophic potential of the epidemic, diabetes will simply overwhelm the continent's resources, and the world will witness the death of millions of Africans (Alla, 2008).

Over the next 20 years, it is predicted that sub-Saharan Africa will have the highest growth in the number of people with diabetes of any region in the world – the 2010 estimated number is predicted to almost double in 20 years, reaching 23.9 million by 2030(Ayesha , 2010).

Because of the ageing and expanding population, rapid urbanisation with its associated processed diet and reduced exercise, and many other factors, the prevalence of diabetes is rising rapidly. The demographic changes alone in sub-Saharan Africa will account for an increase of 9.5 million people with diabetes between 2010 and 2030 (Ayesha, 2010).

The cost of diabetes to national economies is hard to estimate but very significant. As well as the direct cost of providing care for diabetes and its complications, illness causes

productivity loss to employers and the national economies due to lost working time, sub-optimal performance through physical and psychological problems, early retirement and reduced life expectancy. Business confidence and investment in infrastructure are reduced, leading to a stagnating environment with undermined political stability and reduced economic growth. It is estimated that more than half of Africa's economic shortfall is associated with its disease burden, demography and geography (Ayesha, 2010). Major studies involving thousands of patients from different parts of the world have shown that diabetes and its complications can be controlled, given early diagnosis and effective treatment. Lifestyle education can prevent people developing diabetes and prevent or delay them developing complications. The costs caused by diabetes to the individual and the economies of the sub-Saharan African countries could therefore be managed. But to do that requires a concerted effort by many different stakeholders (Ayesha, 2010).

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter gives a detailed description of the conduct of the study in terms of the timeline, or sequence of events, that characterised the study, from general introduction through specific data gathering and analysis. The following sections describe the major divisions that comprise the methodology for this study and explain the ways in which this part of the research was structured.

3.1 Study Design

This was a cross-sectional study. The aim of this study was to determine the attitude and knowledge of community pharmacists towards type II diabetes in Lusaka. This study was designed to identify the knowledge that pharmacists routinely provided to people with diabetes and their attitudes towards the disease.

Data was captured using the diabetes attitude survey and diabetes knowledge test questionnaires. The demographic characteristics were also collected using the demographic data tool.

This study design was justified by the present lack of systematic information on diabetic care in community pharmacies in Lusaka, Zambia. For many of the activities that are undertaken in relation to pharmacy services or the use of medicines, we may believe we have a good idea about what happens. Even if there is no systematic research, we may feel that, based on our own experience, that of our peers or anecdotal reports, we can estimate the frequency of different types of events in community pharmacy settings. We may believe that we have a good idea of the extent of certain health related problems or the range of concerns of individuals with regard to different services (Felicity, 2006).

However, if there is no systematic and accurate documentation of these phenomena, we cannot be sure about the true picture. Inferences and generalization of the information to

other groups of people or settings can only be drawn through clear and well-illustrated sampling procedures within a well-defined study design and this justifies the undertaking of this study (Felicity, 2006).

This study, therefore, sought to:

1. Provide important data for informing people inside and outside the profession about the knowledge of community pharmacists towards type 2 diabetics
2. Provide baseline information for investigating what is and is not good for type 2 diabetics in community pharmacies
3. Enable assessment of whether community pharmacy services in Lusaka, Zambia, are meeting current health care needs regarding type II diabetics and identification of ways in which services would be improved.

Above all, this was an essential starting point for planning any changes regarding community pharmacy services or interventions towards type II diabetes in Lusaka, Zambia; further justifying the aim to undertake the study.

3.2 Study Setting

The setting for this study was Lusaka. All the 77 registered Community Pharmacies in Lusaka were selected; pharmacists in those particular pharmacies were identified and formed part of the required study population. The study involved interviews through Questionnaires of the pharmacist practicing in that particular pharmacy.

The participants (community pharmacists) were not required to adhere to a specific protocol. Rather, the study was incorporated into the usual care process of the community pharmacy.

All participating pharmacists had to provide informed consent before engaging them in the study. The study had to be approved by the University of Zambia Biological Research and Ethics Committee (UNZABREC), amongst whose main aims is protection of the rights of human subjects as outlined under ethical consideration.

3.3 Study Population

The target population was all registered and practicing community pharmacists in Lusaka. The study population was the practicing pharmacist/s in any particular community pharmacy at the time of the study.

The sampling frame comprised 77 registered community pharmacies in Lusaka, a list of which was obtained from the Zambia Medicines Regulatory Authority (Z.M.R.A).

3.4 Sample Size Population

All the 77 registered community pharmacies were engaged in the study. All community pharmacists that attended to patients in that particular pharmacy at that time of the study were engaged in the study. In the event that more than one particular pharmacist reported for work at different times of the day in that particular pharmacy, a deliberate effort to make a follow up and capture all would be registered community pharmacists in that pharmacy was made. Cautionary measures were employed to avoid duplication of findings by assigning codes and avoiding interviewing one respondent more than once especially in the event of one working in more than one community pharmacy. Eighty four (84) community pharmacists were subsequently involved in the study with ethical considerations having been taken care of where each of the respondents had to give consent before being engaged in the research.

3.5 Inclusion Criteria

1. Community pharmacists practicing and registered with Health Professions council of Zambia were involved in the study.
2. Where there was more than one community pharmacist, all were engaged in the study to offset the unpredictable number of community pharmacists who would opt out of the study.

3.6 Exclusion Criteria

1. Any personnel in the community pharmacy other than a registered practicing community pharmacist.

3.7 Variables

Table 1: ^aVariables

Demographic Variables	Dependent Variables	
	Attitude	Knowledge
1. Gender	1. Need for special training in diabetes	1. General test
2. Race	2. Seriousness of type 2 diabetes	2. Insulin use
3. Year of graduation	3. The value of tight glucose control in diabetes care	
4. Education	4. Psychosocial impact of diabetes on patients	
	5. Patient autonomy	

^aAll the information about variables in the table is pertaining to community pharmacists.

Attitude and Knowledge in this table are both dependent variables.

3.8 Data Collection and Research Instruments

The data was collected using two validated questionnaires developed by the Michigan Diabetes Research Training Center. A diabetes knowledge test questionnaire and a diabetes attitude survey were used. The diabetes knowledge test (DKT) is a valid and reliable measure for estimating patients and health professionals' general understanding of diabetes ($\alpha > 0.70$) (Robert, 1998). The diabetes attitude survey (DAS) which equally has been shown to be valid and reliable gives general measures of diabetes-related attitudes ($\alpha > 0.65$) (Robert, 1998). The questionnaires focused on community pharmacists assessing their knowledge and attitudes towards type 2 diabetes respectively. In addition, the demographic characteristics of participants were captured using the demographic survey questionnaire.

3.8.1 Diabetes Knowledge Test - (DKT)

The Diabetes Knowledge Test consists of 23 knowledge test items developed by the Michigan Diabetes Research Training Center (MDRTC). These 23 items represent a test of general knowledge of diabetes. The first 15 items are appropriate for people who do not use insulin. The entire 23 items can be administered to people who do use insulin. The Diabetes Knowledge Test (DKT) in this study was modified from the University of Michigan Diabetes Research and Training Center (MDRTC) Diabetes Knowledge Test (DKT). The DKT is composed of 23 multiple choice questions, divided into 2 test segments: (1) general test with 15 questions, (2) insulin use with 8 questions. Test scores were calculated by adding the number of correct answers with 23 being the highest possible score. Correct answers scored one point and wrong answers scored zero points.

3.8.2 Diabetes Attitude Scale (DAS-3)

Pharmacists' attitudes towards diabetes was measured using a questionnaire, the Diabetes Attitude Scale (DAS), consisting of 6 subscales and 33 items. The DAS was modified from the third version of the Diabetes Attitude Scale (DAS-3). The DAS-3, with a total of 33 items, is divided into the following 5 subscales: (1) need for special training to provide diabetes care, (2) seriousness of type 2 diabetes, (3) value of tight glucose control, (4) psychosocial impact of diabetes, and (5) patient autonomy. The DAS includes these 5 subscales with 33 items from DAS-3. All of the items in DAS were scored on a 5-point Likert scale, with 1 indicating strongly disagree, 2 indicating disagree, 3 indicating neutral, 4 indicating agree, and 5 indicating strongly agree. Higher scores represented more positive attitudes toward the statements on current concepts of diabetes care.

The Diabetes Attitude Scale could be used with both people with diabetes and health care professionals as a measure of general diabetes related attitudes. Information about the scoring and psychometric properties of this scale which was available was used for data analysis.

Developing a questionnaire to assess knowledge and attitudes is a complex task. It would be difficult to demonstrate objectively that the items accurately reflect the relevant components in terms of beliefs, experiences and values (i.e. display content and construct

validity). In addition, attention would have to be paid to the capture and representation of the depth and breadth of feelings in relation to all these components.

Therefore, because a true attitudinal and knowledge measure was required in this study, it was best to find established and validated tools from the literature rather than attempt, in a limited period of time to develop one. To embark on developing a tool would require rigorous pre-testing field work, which available time would not allow.

The Knowledge test and diabetes attitude survey questionnaires which have both been slightly modified (domesticated) to suit my study was used with acknowledgement of the Michigan diabetes research and training center survey instruments (Michigan university health systems) as the source. "The Michigan Diabetes Research and Training Center (MDRTC) has developed several survey instruments for diabetes patients and health professionals. By downloading the forms you are agreeing to acknowledge the MDRTC as the source of the items in the survey instruments in any written instruments, reports, or publications resulting from their use or reproduction" as stated by this link- <http://www.med.umich.edu/mdrtc/profs/survey.html>.

3.9 Data Processing and Analysis

Data consisted of variables comprising demographic characteristics, Levels of Knowledge and the Attitude (perception) of respondents on type II diabetes. All the variables were categorical (Nominal or Ordinal) in nature.

The Statistical Package for Social Sciences (SPSS) version 16 was used for analysis of both Descriptive and Inferential statistics.

3.9.1 Descriptive Statistics

Comprised the analysis of data (continuous variables) using measures of central tendency including, mean, mode and standard deviation. Frequencies, Percentages, cumulative frequencies were also used for descriptive statistics. Graphs for categorical variables like tables were used for data presentation. A radar plot was also used to present a summary of respondents on Attitude towards type II diabetes.

3.9.2 Inferential Statistics

To test for any association or relationship between and among variables that included Demographic characteristics, Levels of Knowledge and Attitude of respondents all of which were categorical in nature (nominal and ordinal), a chi-square which is a test for independence, was used to establish if any relationship that existed between any variables was not due to chance.

3.10 Ethical Considerations

1. All participants had to provide informed consent before being engaged in the study.
2. The participating pharmacist freely had to agree to participate in this research programme on the understanding that any and all personal information provided to the researcher would be provided in the interests of furthering this research and would remain confidential
3. All information provided was treated confidentially
4. The right to discontinue participation in the study at any time and without prejudice was recognized.
5. Permission from University of Zambia, Biological Research and Ethics Committee (UNZABREC) was sought before commencing the study
6. MOH/ZMRA was informed before undertaking the study

CHAPTER FOUR

RESULTS OF THE STUDY

4.0 Introduction

This chapter presents the findings obtained from the study. These findings are essential in evaluating the knowledge and attitude of community pharmacists towards type II diabetes. The results will essentially comprise the following: **a.** Demographic characteristics **b.** Level of knowledge on type II diabetes **c.** Attitude towards type II diabetes and **d.** The associations among demographic variables, knowledge and attitude of community pharmacists towards type II diabetes.

4.1 Demographic Characteristics

The key demographic variables in the survey were: gender, practice setting other than community pharmacy, additional relevant education/qualification obtained after the first degree in pharmacy and year of graduation of respondents. The study involved 84 pharmacists of whom 59(70.24%) were male and 25(29.76%) female. Table 2 below shows their distribution among different demographic variables including practice settings, location of community pharmacies, race, year of graduation and education (In addition to the bachelor of pharmacy degree) attained. Out of the 84 community pharmacists engaged in the study, 31(37%) males also practiced in hospital pharmacy and only 1(1.19%) males also practiced in a clinic. 12(14.28%) females also practiced in hospital and 3(3.57%) females also practiced in a clinic. Most of the community pharmacies involved in the study were in shopping malls and the central business area of Lusaka. Most of the respondents were Africans (82.1%) and few were Asians (15.4%) and mixed race (2.38%). The greater percentage (83.33%) graduated in 2000 and later. Other than bachelor of pharmacy degree, only one pharmacist had special education in diabetes the nature of which was not disclosed. Only 13(15.47%) of community pharmacists had Masters Degrees some of which were not medical related and would, therefore, not necessarily be a relevant factor in influencing the outcome of knowledge/attitude regarding diabetes(type II) as per study aim and objectives.

4.2 Level of knowledge of community pharmacists on type II diabetes

Table 2 below shows the descriptive statistics for the scores on the knowledge test. The respondents were subjected to the Diabetes Knowledge Test (DKT) which comprised the General Test and Insulin use Test. The average score out of 23 questions was 13.77(59.87%) for the overall Knowledge Test. Out of the 15 questions, a mean score of 8.96(59.33%) was recorded in the General Test. The respondents scored an average of 4.85(60.6%) on the Insulin use Test. The maximum score in the overall knowledge test (a combination of general diabetes test and insulin use test) was 23(100%) out of 23 questions and the minimum score was 7(30.4%) out of the 23 questions.

Knowledge scores were classified as follows: (1) Acceptable was any knowledge score above 74%, (2) Partially Acceptable was any knowledge score 60-74% and (3) Unacceptable was less than 60%. In short, Acceptable = > 74%, Partially Acceptable = 60-74%, Unacceptable = < 60%.

Table 2: Descriptive statistics for the scores on the diabetes knowledge test

Type of test	N	Minimum	Maximum	Mean(%)	SD
Overall Knowledge	84	7.00	23.00	13.7(59.8)	3.22771
General Test	84	4.00	15.00	8.9(59.3)	2.21955
Insulin Use	84	1.00	8.00	4.8(60.6)	1.61688

N= Sample size

SD= Standard deviation

Table 2 gives the scores in the knowledge test which comprise the General test and Insulin use test. The scores include the average (also expressed in percentages), the minimum and maximum scores of the 84 community pharmacists in each of the tests.

4.3 Attitude Scores of community pharmacists towards type II diabetes

Table 3 below shows that the least mean score of 2.88 on the likert scale was on the attitude of community pharmacists on “Patient Autonomy” towards type II diabetes. The attitude towards the “Need for Special Training” in type II diabetes had the highest score of mean value 3.28. All the values on the Attitude subscales are closer to the neutral value of 3.

Table 3: Descriptive statistics of the attitude scale

Attitude Subscales	N	Minimum	Maximum	Mean	SD
^c Need For Special Training	84	1.00	5.00	3.29	1.16755
^d Seriousness of Type 2 DM	84	1.00	5.00	3.04	1.02318
^e Tight Glucose Control	84	2.00	5.00	2.99	.88487
^f Psychological Impact	84	1.00	4.00	3.06	.78158
^g Patient Autonomy	84	2.00	4.00	2.88	.75098

^c**Need for Special Training**= Attitude of community pharmacists on the need for special training in type ii diabetes.

^d**Seriousness of Type 2 DM**=Attitude of community pharmacists on the seriousness of type ii diabetes on diabetic patients.

^e**Tight Glucose Control**=Attitude of community pharmacists toward the need for tight glucose control in diabetic patients.

^f**Psychological Impact**=The Attitude of community pharmacists toward the psychological impact of type ii diabetes on diabetic patients.

^g**Patient Autonomy**=Attitude of community pharmacists toward the need for patient autonomy in the management of type ii diabetes.

In Table 3,attitude scale comprised five subscales as shown in first column of the table. The minimum score (either 1 or 2) was the extent of the negative attitude towards the specific subscale. The maximum score (either 4 or 5) was the extent of the positive attitude towards the specific subscales.

4.4 Likert Scale Values and group frequencies on the five Subunits of the Attitude Scale

The five sub-units comprising the Diabetes Attitude Scale showed a diverse of scores on a Likert Scale as shown in Table 4 below. It is noticeable that none of the respondents either strongly disagreed or strongly agreed with the general statement on the Attitude towards the diabetic Patient's Autonomy on the management of the disease. The general trend on the likert scale is a bias towards 3(Neutral). Both the extreme ends of the likert scale i.e.1(Strongly Disagree) and 5 (Strongly Agree) had the least scores generally. The score of 1 which represents a stronger disagreement against the general statement on the Attitude of Community Pharmacists on type II Diabetes had the highest number of respondents on the Need for Special Training one of the subunits of the Attitude Scale. The score of 3(Neutral) had relatively a higher number of respondents compared to all other scores on the Likert Scale.

Table 4: Likert Scale Values and corresponding frequencies of community pharmacists extent of beliefs on different Attitude Subscales

Likert Scale	Value of response	Attitude Subscales					Sum
		SpTr	ST2D	VTGC	PsyI	PA	
Strongly Disagree	1	9	3		2		14
Disagree	2	9	25	29	17	29	109
Neutral	3	27	30	31	39	36	163
Agree	4	27	18	20	26	19	110
Strongly Agree	5	12	8	4			24
^h Total		84	84	84	84	84	420
¹ Average Likert Scale Value				3.04			

SpTr= Need for Special training in diabetes.

ST2D= Seriousness of type II diabetes.

PsyI= Psychological impact of diabetes.

VTGC= Value of tight glucose control.

PA= Patient Autonomy

Sum=the frequency of community pharmacists response on each score (ranging from strongly disagree to strongly agree) of the likert scale.

^HTotal is the total sum of frequency of community pharmacists responding to a particular subscale

^IAverage likert scale= $\frac{(24 \times 5)+(110 \times 4)+(163 \times 3)+(109 \times 2)+(14 \times 1)}{420420} = \frac{1,281}{420} = 3.04$

420420

4.5 Summary of Results on Community Pharmacists Attitude on the five indicators of the Attitude subscales

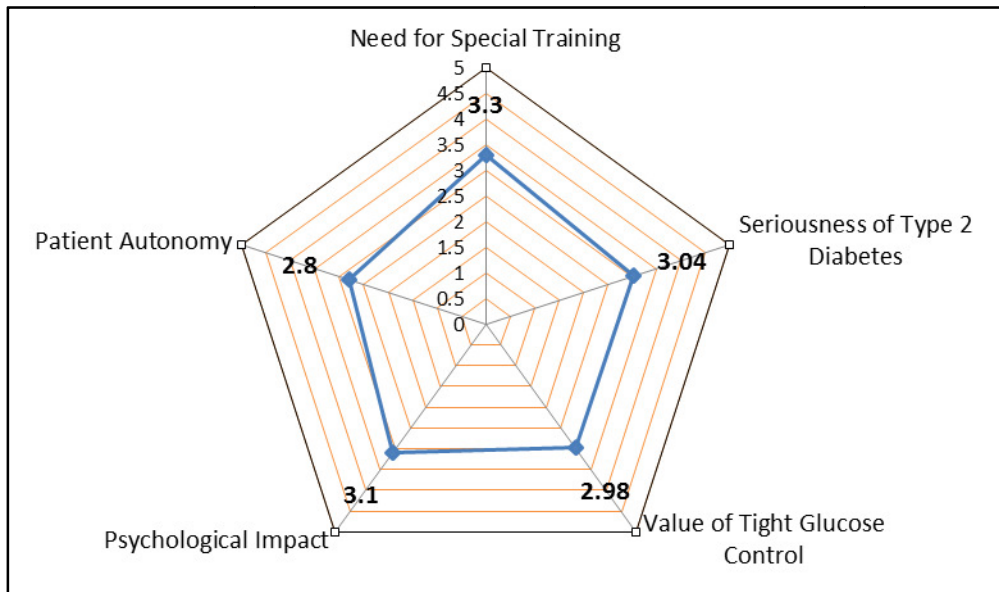


Figure 2: Summary of Scores on Likert Scale

Figure 2 above shows the summary of average likert scale values of the five subunits of the attitude scale. It demonstrates graphically the tendency of all values towards or around the neutral score of 3. Most of the values are slightly lower or above the neutral value of three (3).

4.6 Associations between Demographic variables, Knowledge and Attitude of community pharmacists towards type II diabetes

4.6.1 Association between Knowledge and Demographic Variables

4.6.2 Association between gender of community pharmacists with their level of knowledge towards type II diabetes

As explained in the immediate past section, Acceptable = score on knowledge test greater than 74 % (> 74%), partially Acceptable = score ranging from 60 to 74 % (60-70%), Unacceptable = score less than 60 % (< 60%).

The overall knowledge (Table 5 below) shows 7 (11.86%) males scored above 74% and 5 (20%) females scored above the acceptable mark of 74%. More males (27) than females (15) recorded unacceptable mark, i.e. less than 60%.

The score distribution between males and females showed there was no significant difference in the overall knowledge between male and female community pharmacists interviewed on type II diabetes: ($\chi^2 = 3.986$, $\rho = 0.136$, using Chi-Square).

Table 5: The effect of Gender on levels of Knowledge of community pharmacists towards type II diabetes

Gender	Overall Knowledge			Total
	^j Acceptable	^k Partially Acceptable	^l Unacceptable	
Male	7	25	27	59
Female	5	5	15	25
Total	12	30	42	84

($\chi^2 = 3.986$, $\rho = 0.136$ using chi-square)

^j Acceptable = Score > 74%, ^k Partially Acceptable = Score of 60-74%, ^l Unacceptable = Score < 60%. Table 5 above gives the association between Gender and levels of knowledge of community pharmacists towards type II diabetes. The levels expressed as acceptable, partially acceptable or unacceptable are explained above. The statistical differences in the levels of knowledge of community pharmacists on type II diabetes based on gender is illustrated in the parentheses as χ^2 and ρ values using chi-square test.

4.6.3 The association between different races of community pharmacists with their level of Knowledge on type II diabetes

As illustrated in table 6 below, the knowledge pattern among the three races shows 6(8%) of African, 5(38.46%) of Asian and 1(50%) of mixed race community pharmacists having acceptable levels of knowledge on type II diabetes. Most African community pharmacists 37(53.62%) had unacceptable levels of knowledge on type II Diabetes.

There was a statistical difference in the levels of knowledge among different races of respondents: ($\chi^2 = 10.911$, $\rho = 0.028$, using chi-square).

Table 6: The effect of different races of community pharmacists on their levels of knowledge towards type II diabetes

Race	Levels of Knowledge			Total
	Acceptable	Partially Acceptable	Unacceptable	
African	6	26	37	69
Asian	5	3	5	13
Mixed	1	1	0	2
Total	12	30	42	84

($\chi^2 = 10.911$, $\rho = 0.028$)

Table 6 above details the effect of different races of community pharmacists on their levels of knowledge towards type II diabetes. The levels of knowledge expressed as acceptable, partially acceptable or unacceptable are explained in the footnotes above. The statistical differences in the levels of knowledge of community pharmacists on type II diabetes based on their differences in race is illustrated in the parentheses as χ^2 and ρ values using chi-square test.

4.6.4 Association between different races of community pharmacists with their levels of knowledge on insulin therapy

There was a partially statistically significant difference among the three races of community pharmacists on their knowledge on the use of insulin in diabetes: ($\chi^2 = 9.306$, $\rho = 0.05$). Among the African pharmacists, 12(17.39%) had acceptable levels of knowledge, 27(39.13%) had partially acceptable levels of knowledge and 30(43.48%) had unacceptable levels of knowledge on the use of insulin. Considering the Asian

pharmacists 12(17%) had Acceptable levels of knowledge, 27(39%) had Partially Acceptable levels of knowledge and 30(43%) had Unacceptable levels of knowledge on the use of insulin. Looking at the mixed race who were only two (2) both of them had Acceptable levels of knowledge on use of insulin. This is illustrated in table 7 below.

Table 7: Effect of Race of community pharmacists on their level of knowledge on insulin therapy

Race of pharmacist	Level of Knowledge of pharmacist on Insulin Therapy			Total
	Acceptable	Partially Acceptable	Unacceptable	
African	12	27	30	69
Asian	3	3	7	13
Mixed	2	0	0	2
Total	17	30	37	84

($\chi^2=9.306$ $p=0.05$)

The terms Acceptable, Partially Acceptable and Unacceptable representing levels of knowledge in Table 7 above have been explained in footnotes of previous Tables.

This table details the effect of the differences in the race of community pharmacists on their levels of knowledge toward type II diabetes.

4.6.5 Association of different practice settings of community pharmacists with their level of Knowledge on General Diabetes Test

As illustrated in table 8 below, out of the 84 community pharmacists interviewed, 47 of them also practiced in either the hospital or clinic in addition to their practice in the community. Amongst the 43 community pharmacists practicing in hospital, 1(2%) had Acceptable levels of knowledge on the General diabetes test, 25(58%) had Partially Acceptable levels of knowledge and 17(39.5%) had Unacceptable levels of knowledge on General Diabetes Test. Only 4 community pharmacists practiced in the clinic and 1(25%) had Acceptable levels of knowledge and 2(50%) had Partially Acceptable levels of knowledge.

There is a slight statistically significant difference in the levels of knowledge on the General Diabetes Test among respondents in different practice settings other than the community pharmacy ($\chi^2 = 4.666, \rho = 0.097$)

Table 8: The effect of different practice settings of community pharmacists on their level of knowledge towards type II diabetes

Practice Setting	General Diabetes Test			Total
	Acceptable	Partially Acceptable	Unacceptable	
Hospital	1	25	17	43
Clinic	1	2	1	4
Total	2	27	18	47

($\chi^2 = 4.666, \rho = 0.097$)

Table 8 illustrates the effect of different practice settings of community pharmacists on their level of knowledge toward type II diabetes.

4.6.6 Relation between level of education attained by community pharmacists with their Knowledge toward type II diabetes

There was a statistically significant difference on the overall knowledge scores amongst the different levels of education (other than bachelor of pharmacy degree) attained by community pharmacists. Only one respondent whose levels of overall knowledge on diabetes was unacceptable had special training in diabetes. Out of the 13 community pharmacists with masters degrees in medical related fields, 10(77%) had knowledge which was partially acceptable, 3(23%) had unacceptable levels of overall knowledge.

There was a statistically significant difference in the overall levels of knowledge among community pharmacists with different levels of education, other than bachelor of pharmacy degree: ($\chi^2 = 14.875, \rho = 0.005$) as shown in table 9 below.

Table 9: Effect of Education attained by community pharmacists on their knowledge towards type II diabetes

Demographic Variable	Overall Knowledge score			Total
	Acceptable	Partially Acceptable	Unacceptable	
Special Training	0	0	1	1
Master's Degree	0	10	3	13
Any other	11	13	31	55
Total	11	23	35	69

($\chi^2 = 14.875, p = 0.005$)

Table 9 above shows the association between the overall knowledge score and the level of education (in addition to bachelor of pharmacy degree) attained by community pharmacists. Overall knowledge score comprise the scores in both general test and insulin use test.

4.6.7 Association between Year of Graduation of community Pharmacists and Knowledge towards type II diabetes

There was no statistically significant difference on the levels of overall knowledge on type 2 diabetes among the different years of graduation of community pharmacists engaged in the study ($\chi^2 = 7.963, p = 0.241$) as illustrated in table 10 below.

Table 10: The impact of the year of graduation of community pharmacists on their level of knowledge toward type II diabetes.

Year of Graduation	Overall Knowledge(out of 23 questions)			Total
	Acceptable	Partially Acceptable	Unacceptable	
2000	9	22	39	70
1990	2	6	3	11
1980	1	1	0	2
1970	0	1	0	1
Total	12	30	42	84

($\chi^2 = 7.963, p = 0.241$)

Table 10 above gives the impact of the year of graduation of community pharmacists on their level of knowledge towards type II diabetes. The figures under the heading: overall knowledge represent the number of community pharmacists having graduated that particular year exhibiting a particular level of knowledge.

4.7 Associations between the Attitude of community pharmacists with their demographic variables

4.7.1 The Association between Gender of community pharmacists with their Attitude towards the “need for special training on type II diabetes”

The attitude of community pharmacists on the need for special training in type 2 diabetes shows a higher percentage (32%) of both male and female respondents being neutral(not decided) in agreeing with the statement. A higher percentage of males 8(13.6%) strongly disagreed with the statement as compared to 1(4%) of female respondents. A comparatively lower percentage of males (10%) as compared to females (24%) strongly agreed with the statement. Table 11 below shows there was no statistical difference on attitude of community pharmacists towards the need for special training in type 2 diabetes based on differences in gender: ($\chi^2 = 4.094, \rho = 0.393$).

Table 11: The effect of Gender of community pharmacists on their Attitude towards the “Need for Special Training in type II diabetes.”

Gender	Need for Special Training in Type 2 Diabetes					Total
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
M	8	6	19	20	6	59
F	1	3	8	7	6	25
Total	9	9	27	27	12	84

($\chi^2 = 4.094, \rho = 0.393$)

The table above details the effect of gender on the attitude of community pharmacists towards type II diabetes. The figures under the sub-headings of the attitude of community pharmacists on the need for special training in type II diabetes represent the frequency of female and male community pharmacists on each score of the likert scale ranging from strongly disagree(score of 1) to strongly agree(score of 5).

4.7.2 Relation between the Races of community pharmacists with their Attitude towards the “Seriousness of type II Diabetes”.

The perception of different races of community pharmacists on the seriousness of type II diabetes shows fewer agreeing and strongly agreeing with the statement. Most of the respondents either disagreed 25(30%) or remained undecided (neutral) 30(36%) on the statement. There was no significant difference among the different races of community pharmacists on their perception for the seriousness of type II diabetes ($\chi^2 = 6.036, \rho = 0.643$) as detailed in table 12 below.

Table 12: Effect of Race of community pharmacists on their Attitude towards “seriousness of type II diabetes”

Race	Seriousness of type ii diabetes					Total
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
African	3	20	24	16	6	69
Asian	0	5	5	2	1	13
Mixed	0	0	1	0	1	2
Total	3	25	30	18	8	84

($\chi^2 = 6.036, \rho = 0.643$)

The table illustrates the frequency of different races of community pharmacists on each score of the likert scale regarding their attitude towards the seriousness of type II diabetes.

4.7.3 Relation between practice setting of community pharmacists with their Attitude on the “need for patient autonomy in management of type II diabetes”

As detailed in table 13 below, there was no significant difference among different practice settings of community pharmacists on their perception on the need for patient autonomy in management of type 2 diabetes: ($\chi^2 = 0.985, \rho = 0.611$). A higher percentage of respondents disagreed 17(20%) and remained undecided 22 (26%) respectively with the statement.

Table 13: Effect of practice setting of community pharmacists (in addition to community pharmacy practice) on their Attitude towards the need for the “diabetic patient`s autonomy” in the management of the disease.

Practice Setting in addition to community pharmacy practice	Attitude Scale			Total
	Disagree	Neutral	Agree	
Hospital	15	20	8	43
Clinic	2	2	0	4
Total	17	22	8	47

($\chi^2 = 0.985$, $\rho = 0.611$)

The two (hospital and clinic) were considered as additional practice settings to the community pharmacies which formed the core of our study.

The table details the frequency of pharmacists of different practice settings (other than the community pharmacy) on each score of the likert scale regarding their attitude towards the need for the diabetic patients' autonomy in the management of type II diabetes. This was considered to determine if any exposure the community pharmacists under study had to the hospital and clinic other than community practice would cause any statistically significant difference on their knowledge and attitude towards type II diabetes.

4.7.4 Relation between the locations of practice of the community pharmacist with their attitude on the need for the value of tight glucose control in type II diabetes.

On the perception of community pharmacists on the value of tight glucose control, there was a generalized tendency towards disagreeing and indecision among respondents in different practice locations. Only four (4) out of 84 respondents strongly agreed with the statement on the value of tight glucose control in type II diabetes. There was a statistically significant difference among pharmacists in different practice locations on their perception for the value of tight glucose control in type II diabetes: ($\chi^2 = 18.204$, $\rho = 0.033$) as shown in table 14 below.

Table 14: The effect of the location of practice of the community pharmacist on their attitude towards the need for the value of tight glucose control in type II diabetes

Demographic Variable	Value of Tight Glucose Control				Total
	Disagree	Neutral	Agree	Strongly Agree	
Central Business Area	12	10	13	1	36
Shopping Mall	8	11	3	0	22
High Population Density Area	5	4	1	3	13
Low Population Density Area	4	6	3	0	13
Total	29	31	20	4	84

$\chi^2 = 18.204, \rho = 0.033$

Table 14 above details the frequency of community pharmacists of different location of practice on each score of the likert scale regarding their attitude toward the value of tight glucose control in the management of type II diabetes.

4.7.5 The association between the level of education of community pharmacists with their attitude towards the “value of tight glucose control” in type II diabetes

As shown in table 15 below, there was no statistical difference in the relation between levels of education of community pharmacists with their attitude towards the value of tight glucose control in type 2 diabetes: ($\chi^2 = 6.975, \rho = 0.323$).

Table 15: The effect of the level of education of community pharmacists on their attitude toward the value of tight glucose control in type II diabetes

Education Attained	Value of Tight Glucose Control				Total
	Disagree	Neutral	Agree	Strongly Agree	
Training in Diabetes	0	1	0	0	1
Masters Degree	7	5	1	0	13
Any Other	14	22	15	4	55
Total	21	28	16	4	69

Table 15 above gives the frequency of community pharmacists with different levels of education attained (in addition to bachelor of pharmacy degree) on each score of the likert scale regarding their attitude towards the value of tight glucose control in the management of type ii diabetes.

4.7.6 Relation between years of graduation of community pharmacists with their attitude toward “Psychological Impact of type II diabetes on the patient.”

There was a statistical difference in the association of the year of graduation of community pharmacists with their attitude towards “the psychological impact of type 2 diabetes on patients” ($\chi^2 = 44.027, \rho = 0.00$ using chi-square). Most pharmacists either remained neutral 39(46%) or agreed 26(30%) with the statement respectively as shown in table 16 below.

Table 16: The effect of the year of graduation of community pharmacists on their attitude towards the Psychological impact of the disease on the diabetic patient

Year of graduation	Psychological Impact of Type 2 Diabetes				Total
	Strongly Disagree	Disagree	Neutral	Agree	
2000	1	15	32	22	70
1990	0	2	5	4	11
1980	0	0	2	0	2
1970	1	0	0	0	1
Total	2	17	39	26	84

($\chi^2 = 44.027, \rho = 0.00$)

The table above shows the frequency of scores of community pharmacists on the likert scale with regard to the effect of the year of graduation on their attitude towards the psychological impact of type II diabetes on the diabetic patient.

4.7.7 Association between the levels of Knowledge of community pharmacists with their Attitude towards the “value of tight glucose control” in type II diabetes.

Amongst the respondents who had acceptable levels of knowledge, six (6) had a neutral perception on the “value of tight glucose control”, four (4) disagreed with the statement, and only one (1) strongly agreed with the need for the value of tight glucose control.

Individuals with partially acceptable and unacceptable levels of overall knowledge showed a higher tendency towards disagreeing and indecision on their perception on the value of tight glucose control in type II diabetes. There was no statistically significant difference in the association between the levels of knowledge of community pharmacists with their attitude towards the value of tight glucose control in type II diabetes ($\chi^2 = 5.642, \rho = 0.467$) as illustrated in table 17 below.

In general, the association of knowledge of community pharmacists with their attitude towards the five subunits of the attitude subscale showed no statistically significant difference with all ρ values greater than 0.05, using chi-square test and this was as follows: Association of knowledge with:

1. Need for special training in type II diabetes gave ($\chi^2 = 11.43, \rho = 0.178$)
2. Seriousness of type II diabetes gave ($\chi^2 = 5.166, \rho = 0.740$)
3. Value of tight glucose control gave ($\chi^2 = 5.624, \rho = 0.467$)
4. Psychological impact of type II diabetes gave ($\chi^2 = 9.645, \rho = 0.140$) and
5. Patient autonomy gave ($\chi^2 = 7.575, \rho = 0.108$).

Table 17: Effect of the level of Knowledge of community pharmacists on their Attitude towards the value of tight glucose control in type II diabetics

Level of Knowledge	Value of Tight Glucose Control				Total
	Disagree	Neutral	Agree	Strongly Agree	
Acceptable	4	6	1	1	12
Partially Acceptable	12	11	5	2	30
Unacceptable	13	14	14	1	42
Total	29	31	20	4	84

($\chi^2 = 5.642, \rho = 0.467$)

Table 17 illustrates the frequency of scores of community pharmacists on the likert scale based on their level of knowledge toward type II diabetes.

CHAPTER FIVE

DISCUSSION

5.0 Introduction

This part of the study restates in general terms the main findings of the study and the accompanying implications. It also indicates the consistency of the findings with findings of other researchers. It offers an explanation on the reasons behind the main findings of the study.

5.1 Overview of Discussion

In this study, we provide evidence that overall Knowledge of community pharmacists on type II diabetes was on average unacceptable (59.87%) and the Attitude score showed a tendency towards neutrality with an average score of 3.04 signifying some form of indecision on the part of the community pharmacists as far as their attitude towards type II diabetes was concerned. These results imply that the pharmaceutical care of type II diabetics in community pharmacies in Lusaka might need scaling up to enhance knowledge and attitude of community pharmacists that would ultimately culminate into desirable diabetic patients outcomes and improved quality of life in general.

5.2 Level of Knowledge of community pharmacists on type II diabetes

In this study, the level of knowledge of community pharmacists toward type II diabetes was unacceptable (59.8%) and the scores in the general diabetes test and insulin use test were unacceptable (38.95%) and partially acceptable (60.6%) respectively. Though these results on knowledge of community pharmacists towards type II diabetes cannot be inferentially generalised to all pharmacists in the country, they still give a baseline idea that education in diabetes has to be scaled up especially on community pharmacists since they are in a unique position to enhance desirable outcomes in patients with this chronic condition who are ever visiting community pharmacies for refills. The lack of knowledge could be attributed to unavailability of continuing education programmes in diabetes care that could foster efficient interventions by community pharmacists in terms of adequate

pharmaceutical care for the patients. The other main reason for these unacceptable results could be due to lack of deliberate policy by the policy makers(Ministry of Health) to engage community pharmacists as custodians of pharmaceutical care for diabetics, an exercise which would ultimately improve the quality of life of type II diabetics in our communities.

5.3 Attitude toward type II diabetes

Our results indicate that the average likert scale value for the respondent's attitude towards type II diabetes was 3.04. This is a neutral value meaning even when a positive attitude was supposed to be shown towards the patient, the pharmacist did not. This lack of positive thrust on attitude of community pharmacists towards type II diabetes would lead to a number of deleterious effects on the patient. One of the major ones could be poor compliance with medication by patients since it might deprive them of the much needed motivation especially that type II diabetes is a chronic condition that is debilitating thus therapy is of life-long setting. This would ultimately lead to poor outcomes. This poor attitude could be due to a number of factors some of which may be: 1. Lack of knowledge (though this study showed no relation between knowledge and attitude). 2. Lack of motivation on part of pharmacists due to number of factors 3. Poor practice settings (environment) 4. Very low number of Pharmacist to patient ratio (patient overload) and very long working hours.

5.4 Association between demographic variables of community pharmacists with their level of knowledge on type II diabetes

In this study we have shown that considering the associations between levels of knowledge and demographic variables of community pharmacists, there was a statistically significant difference between the race of community pharmacists with their level of knowledge ($\chi^2 = 10.911$, $p = 0.028$, using chi-square). The reason for this cannot be immediately known and it is worth undertaking another study to establish the cause. In this study we provide another evidence that there was a statistically significant difference in the education attained by community pharmacists with their level of knowledge ($\chi^2 = 14.875$, $p = 0.005$). On a general note, the differences in levels of knowledge, however, did not reflect the level of education attained. The possible cause of this could be due to

unevenness(big disparity) in the number of community pharmacists with either a masters degree in a medical related field/discipline(13 respondents), special training in type II diabetes(1 respondent)or any other qualification other than medical field(55 respondents).The respondents with any other qualification had significantly a highest percentage in both acceptable(20%) and unacceptable(56%) notches of the levels of knowledge. Surprisingly community pharmacists with masters degrees in medical related fields did not display any acceptable but only partially acceptable (76%) and unacceptable (23%)) levels of knowledge in type II diabetes. This goes to confirm that special knowledge in type II diabetes in spite of one`s levels of education attained might be a necessity in enhancing community pharmacists care towards diabetics. The associations between gender ($\chi^2 = 3.986$, $\rho = 0.136$), year of graduation ($\chi^2 = 7.963$, $\rho = 0.241$) with levels of knowledge respectively did not show any significant difference. This shows that differences in gender did not have any direct effect on levels of knowledge of community pharmacists towards type II diabetes. The year of graduation might mean the levels of experience in the community pharmacists acquired over a number of years but this equally did not have any visible effect on the levels of knowledge acquired towards type II diabetes by the respondents.

5.5 Association between demographic variables of community pharmacists with their attitude towards type II diabetes.

In this study we have found that, the associations between the demographic variables of community pharmacists with their perceptions towards the five (5) indicators of the attitude survey showed no statistically significant relationship. Exception to this view was the relation between the location of practice of community pharmacist with their attitude toward“the value of tight glucose control” ($\chi^2 = 18.204$, $\rho = 0.033$) and the relation between the year of graduation of community pharmacists with their attitude toward the “psychological impact of type 2 diabetes” ($\chi^2 = 44.027$, $\rho = 0.00$) which displayed a strong statistically significant relationship. Amongst the respondents who strongly agreed with the need for the value of tight glucose control, the highest percentage(23%) was from the high density population area and the lowest were from shopping malls and low density population area where non was recorded. Almost the same percentage of the community pharmacists in different practice settings ranging from 30 to 38% disagreed

with the statement on “the value of tight glucose control on type 2 diabetes.” This shows that different practice settings (environment) of community pharmacists have an effect on their attitude toward the value of tight glucose control on type II diabetes.

Our results also indicate that on the association of the year of graduation of community pharmacists with their attitude toward the psychological impact of type II diabetes, the disparity between 70 pharmacists graduating in the year 2000 and later compared to the 14 community pharmacists who had graduated in earlier years makes it statistically unreliable to compare the two categories.

5.6 Association between levels of Knowledge of community pharmacists with their Attitude towards type II diabetes

In this study, we provide evidence that there was no difference of statistical significance between the levels of knowledge of community pharmacists with their attitude ($\chi^2 = 5.642$, $p = 0.467$) toward type II diabetes and as to whether there is any association between the two important core concepts of this study it provokes the need for further research to establish any relation. This shows that levels of knowledge of community pharmacists might not have any effect on their attitude toward type II diabetes. This could be due to the varying social-cultural backgrounds, myths and beliefs, religious and spiritual beliefs and other societal norms that tend to unknowingly orient our perceptions (attitude) about this chronic metabolic disease.

5.7 Similar Studies done in other countries

In this study we have found that comparably, similar research has been done in sub-Saharan Africa which includes Libya, Nigeria and South Africa. Other countries where similar research has been undertaken include Taiwan, USA, Bulgaria and Brazil. In Nigeria (Sa’ab, 2013) at University of Maiduguri Teaching Hospital 65.5% of respondents (Pharmacists) had satisfactory / acceptable knowledge about pharmaceutical care ($\chi^2 = 71.32$; $p = 0.00$; $df = 2$) towards diabetes mellitus as compared to 14.28% (12 out of 84) respondents in Zambia ($\chi^2 = 3.986$, $p = 0.136$). Ninety Six percent (96.6%) had positive attitude towards pharmaceutical care for diabetes mellitus patients based on interest to know more and seeing the need and willingness to incorporate pharmaceutical

care into practice ($\chi^2 = 172.98$; $p = 0.00$; $df = 1$) as compared to 31.91% in community pharmacies in Lusaka, Zambia.

In Libya (Bisheya, 2011) only the knowledge of community pharmacists was assessed and the mean overall Knowledge score was 16/23(69.56%) compared to 13.77/23(59.87%) in this similar study in Zambia. In Libya the General diabetes information score was 9/15(60%) and for insulin therapy-specific questions was 7/8(87.5%) respectively compared to 8.96/15(59.7%) and 4.84/8(60.5%) respectively in this study in Lusaka, Zambia.

Looking at the above very similar studies done in Nigeria and Libya, a visible discrepancy of their results compared to those in this particular study can be noticed. To be specific, the levels of knowledge in this study are relatively lower compared to both Libya and Nigeria and the Attitude towards type 2 diabetes is more on the neutral side as compared to the positive attitude towards type 2 diabetes of pharmacists engaged in the study in Nigeria. The study in Nigeria looked at pharmacists confined to the hospital set up where as this study focused on community pharmacists only, the differences in environment which might include availability and accessibility to literature on type II diabetes might have some effects on their differences in terms of exposure to knowledge concerning type II diabetes and it invokes a thought as to whether this difference in knowledge might be contributing to the differences in their attitude. But in this study in Zambia there was however no relationship between knowledge and attitude ($\chi^2 = 5.642$, $p = 0.467$).

In short, this inconsistency with the results of other researchers could have been due to the different subject pool used in this research and also a slightly different procedure used in this research could have contributed to the discrepancy noticed. And in the analysis of the data, the test material could have changed in some way and all these could have had an effect on my results. These effects of discrepancies and variations are in some way an appreciation for limitation of this study which include a relatively smaller subject pool of 84 community pharmacists.

The practice of diabetic care has dramatically changed during the past two decades. Knowledge regarding diabetes pathophysiology has quickly accumulated and has led to the development of new medications. In addition to knowledge updates, the attitudes of health care professionals including community pharmacists toward current concepts about diabetes care are even more critical. The core philosophy of modern diabetes care puts emphasis on patient autonomy and optimal utilization of health care professionals' different specialties. Research evidence derived from clinical, economic, and humanistic outcomes also strongly supports the importance of patient autonomy and a team approach to diabetes care. Pharmacists' knowledge and attitudes toward diabetes can significantly influence patient outcomes and given the prevailing concept of a team approach toward diabetes care, only when all health care providers share the same high level of knowledge and positive attitudes could the quality of patient care be ensured, therefore, the need to enhance the knowledge and attitude of community pharmacists in Lusaka.

5.8 Limitations, Strengths and Weaknesses of the Study

This study had its own strengths, weaknesses and limitations that could have affected the results in both the positive and negative way. The main limitations of this study included: a relatively smaller sample size, an increased number of would be interviewees opting out, stringent ethical considerations which also contributed to the shrunk sample size, and the respondents could not manage to complete the bulky questionnaire in the standard prescribed 15 minutes for this validated tool. The weaknesses of this study is that it was confined to Lusaka and it is difficult statistically to make inferences and generalize the results.

The main strengths of this study is drawn from the fact that a validated questionnaire (with an alpha coefficient of 0.7) was employed in the study and it gives a near to a true reflection in terms of the actual knowledge and attitude of community pharmacists in Lusaka towards type II diabetes. The other factor adding to the strength of this study is that nearly all respondents answered almost all questions in the questionnaire.

This study could have been improved by involving more pharmacists including those working in hospitals and other towns of Zambia. The patients with type II diabetes could

have as well been engaged in the study to get their views on the pharmacists' attitude towards them. Having collected data on respondent's attitude and knowledge towards type II diabetes, this could have been used as baseline line data for a further research in which an intervention could have been designed and instituted on the same subjects and further results evaluated to determine an effect of the intervention. For future research to be profitably taken in this area, especially that we have baseline information, two arms of the sample population should be created in which one arm would be a control with another arm being subjected to an intervention, e.g. special training in diabetes, and then results compared and analysed. A further robust research can also evaluate if any, the existence of a tangible relationship between knowledge and attitude of pharmacists toward type II diabetes.

In conclusion, the study has revealed with consideration of all its possible limitations and strengths that: **a.** The levels of knowledge of community pharmacists in Lusaka are unacceptable on average. **b.** The Attitude of community pharmacists equally leaves much to be desired as it displayed a lot of indecision with its tendency towards the neutral, meaning that the patient's expected desirable outcome could not have a guarantee to be optimised and **c.** There is no statistically significant difference in the association between the levels of knowledge and attitude of community pharmacists towards type II diabetes in Lusaka, Zambia.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This chapter gives the summary, conclusion and recommendations concerning the findings and discussion of the levels of knowledge and attitude of community pharmacists towards type II diabetes in Lusaka. It gives an over view of the conclusion on each research objective of the study.

6.1 Summary

In our study,the main objective was to determine the levels of knowledge and attitude of community pharmacists towards type II diabetes in Lusaka,Zambia. In this study, the association of demographic variables of community pharmacists with their levels of knowledge and attitude toward type II diabetes was also evaluated.

6.2 Research objective 1

This research objective was focused on community pharmacists' knowledge and attitude towards type II diabetes

6.2.1 Summary of the findings

In this study, the level of knowledge of community pharmacists toward type II diabetes was unacceptable (59.8%) and the scores in the general diabetes test and insulin use test were unacceptable (38.95%) and partially acceptable (60.6%) respectively.

Our results indicate that the average likert scale value for the respondent's attitude towards type II diabetes was 3.04. This is a neutral value meaning even when a positive attitude was supposed to be shown towards the patient, the pharmacist did not. This lack of positive thrust on attitude of community pharmacists towards type II diabetes would leadto a number of deleterious effects on the patient.

6.2.2 Conclusion

The findings of this study empower one to conclude that the levels of knowledge of community pharmacists towards type II diabetes in Lusaka Zambia is on average unacceptable. The attitude of community pharmacists towards type II diabetes on likert scale was on average neutral (3.04) lacking the expected positive thrust.

6.3 Research Objective 2

The second objective was to identify demographic variables of community pharmacists associated with their levels of knowledge and attitude toward type II diabetes.

6.3.1 Summary of the findings

In this study we had shown that considering the associations between levels of knowledge and demographic variables of community pharmacists, there was a statistically significant difference in the relation between the race of community pharmacists with their level of knowledge ($\chi^2 = 10.911$, $\rho = 0.028$, using chi-square).

Our study showed that, the associations between the demographic variables of community pharmacists with their perceptions (attitude) toward the five (5) indicators of the attitude survey showed no statistically significant relationship.

6.3.2 Conclusion

We can conclude that there may be a relation between races of community pharmacists with their level of knowledge on type II diabetes.

6.4 Research Objective 3

The third objective was focused on the association of the levels of knowledge of community pharmacists with their attitude towards type II diabetes.

6.4.1 Summary of the findings

In this study, we provided evidence that there was no difference of statistical significance between the levels of knowledge of community pharmacists with their attitude ($\chi^2 = 5.642$, $\rho = 0.467$) toward type II diabetes and as to whether there is any association between the

two important core concepts of this study it provokes the need for further research to establish any relation

6.4.2 Conclusion

We can conclude that the levels of knowledge of community pharmacists did not have any effect on their attitude towards type II diabetes.

6.5 Recommendations

The unacceptable levels of knowledge and the lack of motivating (neutral attitude) community pharmacists toward type 2 diabetes in Lusaka underscores the need to come up with suggestions on how to potentially improve these two, among many other, virtues embodied in enhancing diabetic patient outcomes and quality of life.

6.5.1 Levels of Knowledge toward Type 2 Diabetes

The need to improve knowledge through well designed continued education programmes by the policy makers (Ministry of Health) cannot be over emphasized. This coupled with other relevant factors would in turn scale up pharmaceutical care towards type 2 diabetics in our communities. This specifically entails improvements in patient counseling regarding side effects, adherence and desirable benefits concerning anti-diabetic drugs. It equally addresses education and counseling regarding diabetes as a chronic progressive disease itself.

6.5.2 Attitude of community pharmacists toward type II diabetes

The Attitude of community pharmacists toward type 2 diabetes was below par. This would effectively affect the much needed pharmaceutical care of diabetics in our communities especially that they are in constant touch with their pharmacists for their much needed chronic refills for their diabetic medications. The need to motivate community pharmacists through improved practice environments, availability of drugs and other extended pharmacists services like blood sugar monitoring, blood pressure check-ups and measurements of body mass index etc. would motivate and empower community pharmacists towards their patients, instilling a sense of positive attitude in

them. This can be achieved with the help of Health professions council of Zambia, a body which regulates the practice of community pharmacists in Zambia.

6.5.3 Association of Demographic variables of community pharmacists with their Knowledge and Attitude on type II diabetes

Though without any inferential generalization, the few associations between demographic variables with knowledge and attitude respectively would foretell the need for the body that controls the premises for the business of community pharmacies (Zambia Medicines Regulatory Authority-Z.M.R.A) to streamline on the standards needed in terms of the location, size and other nit grits thereof demanded of one intending to establish the retail business.

6.5.4 Further Research on community pharmacists involvement in type II diabetes

The need for further research as highlighted in discussion is cardinal. To the pharmaceutical society of Zambia, Ministry of health and all other co-operating partners and policy makers, diabetes being a growing world pandemic in Sub-Saharan Africa, and community pharmacists being in a very unique position and ever in contact with patients having type II diabetes, a deliberate collaborative effort is needed to engage these carders in combating the complications associated with this growing pandemic. Based on the findings of this baseline study and worth noting is the need for well designed research to find ways and means of improving knowledge and attitude of community pharmacists toward type II diabetes. Further research on the means for the policy makers to involve community pharmacists in patient education regarding diabetes would profitably and out rightly benefit the diabetic patients in our communities. These initiatives would in the long run tremendously (as attested by some studies earlier quoted) improve diabetic patients' outcomes and enhance their quality of life which is one of the key aims of the World Health Organization's policy on diabetic care.

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APPENDICES

Appendix A: Information Sheet

The Chairperson,
Biomedical Research Ethics Committee,
Ridgeway Campus,
P.O Box 50110,
LUSAKA.

Researcher`s Details:

Gunet Mwalungali,
Tel: 255556,
Cell: 260977365292,
Link Pharmacy,
P.O. Box 73,
Manda Hill Shopping Mall,
Lusaka.

Information Sheet:

Introduction:

I am Gunet Mwalungali, pursuing a master of clinical pharmacy programme at University of Zambia, School of Medicine, and Department of Pharmacy. The purpose of this study is to evaluate the knowledge and attitude of community pharmacists towards type II diabetes. Participants who include all community pharmacists practicing in Lusaka will be expected to answer questions in the questionnaires.

Procedures

The study will involve asking participants questions using questionnaires and also their demographic data will as well be captured using the demographic characteristics tool.

Confidentiality

It is a very important of any research involving human (studies/research) participants like this to observe confidentiality of participants. Therefore, all participants will be assured of the highest form of confidentiality and all the information gathered will be treated as such. The participants will not be subject to divulge any specific details in the line of their names, physical address and any other information deemed to infringe on their privacy and confidentiality.

Risks/Benefits/Discomforts

There are no anticipated risks or discomforts on the would be participants in this study. The study might however reveal to the policy makers and participants the current levels of knowledge and attitudes of community pharmacists and if there could be any further need for implementation of diabetes education amongst these carders so as to serve the community even better.

Voluntary Participation

All the participants will be allowed in this study voluntarily. No single participants will be forced in the study against their will.

Right to withdraw or seek clarification

At any phase of the study, the participants will be free to withdraw if need be and seek further clarification before continuing in the study.

As the Investigator I have given my name, physical address and telephone number as well as UNZAREC contact details as above, in case any participant needs any/further clarification

Appendix B: Participant Consent Form

The Chairperson,
Biomedical Research Ethics Committee,
Ridgeway Campus,
P.O Box 50110,
LUSAKA.

Researcher`s Details:

Gunet Mwalungali,

Tel: 255556,

Cell: 260977365292,
Link Pharmacy,
P.O. Box 73,
LUSAKA.

Consent Form

1. If accepted the participant must give his/her signature or thumb print.
2. All consent procedures will be witnessed to assure voluntary participation.
3. The Investigator`s name, physical address and telephone number as well as UNZABREC contact details are given above, in case of any participant need for any/further clarification.
4. An Assent form would be available for participants below the age of 18.

Community Pharmacist

I hereby agree to participate in this research programme on the understanding that any and all personal information provided by me to the researcher will be provided in the interests of furthering this research and will remain confidential. Furthermore, I understand that I may withdraw from the research programme without prejudice at any time.

Signature Date

Researcher

I, Mwalungali Gunet being the researcher approved by the University of Zambia Biological Research and Ethics Committee(UNZABREC) , agree that any and all participant`s information provided to me in the course of this research will remain confidential.

Signature..... Date.....

Appendix C: Research Instruments

1.0 Demographic Characteristics of Participants

1. Gender:

Male.....	<input type="checkbox"/>
Female.....	<input type="checkbox"/>

2. Ethnicity

African.....	<input type="checkbox"/>
Asian.....	<input type="checkbox"/>
Caucasian.....	<input type="checkbox"/>
Mixed race.....	<input type="checkbox"/>

3. Practice setting (other than community pharmacy)

Hospital.....	<input type="checkbox"/>
Clinic.....	<input type="checkbox"/>

4. Location of Pharmacy

Central business area.....	<input type="checkbox"/>
Shopping Mall.....	<input type="checkbox"/>
High population density area.....	<input type="checkbox"/>
Low population density area.....	<input type="checkbox"/>

5. Education (other than bachelor of pharmacy)

Special training in diabetes.....	<input type="checkbox"/>
Masters degree.....	<input type="checkbox"/>
Any other.....	<input type="checkbox"/>

6. Year of graduation

1990s.....	<input type="checkbox"/>
1980s.....	<input type="checkbox"/>
1970s.....	<input type="checkbox"/>
1960s and earlier.....	<input type="checkbox"/>

2.0 Diabetes Knowledge Test (DKT) Questionnaire

1. The diabetes diet is:
 - a. the way most Zambian people eat
 - b. a healthy diet for most people
 - c. too high in carbohydrate for most people
 - d. too high in protein for most people
2. Which of the following is highest in carbohydrate?
 - a. baked chicken
 - b. Swiss cheese
 - c. Baked potato
 - d. Peanut butter
3. Which of the following is highest in fat?
 - a. Low fat milk
 - b. Orange juice
 - c. Corn
 - d. Honey
4. Which of the following is a “free food”?
 - a. Any unsweetened food
 - b. Any dietetic food
 - c. Any food that says “sugar free” on the label
 - d. Any food that has less than 20 calories per serving
5. Glycosylated hemoglobin (hemoglobin A1) is a test that is a measure of your average blood glucose level for the past:
 - a. day
 - b. week
 - c. 6-10 weeks
 - d. 6 months
6. Which is the best method for testing blood glucose?
 - a. Urine testing
 - b. Blood testing
 - c. Both are equally good

7. What effect does unsweetened fruit juice have on blood glucose?
 - a. Lowers it
 - b. Raises it
 - c. Has no effect
8. Which should not be used to treat low blood glucose?
 - a. 3 hard candies
 - b. 1/2 cup orange juice
 - c. 1 cup diet soft drink
 - d. 1 cup skim milk
9. For a person in good control, what effect does exercise have on blood glucose?
 - a. Lowers it
 - b. Raises it
 - c. Has no effect
10. Infection is likely to cause:
 - a. an increase in blood glucose
 - b. a decrease in blood glucose
 - c. no change in blood glucose
11. The best way to take care of your feet is to:
 - a. look at and wash them each day
 - b. massage them with alcohol each day
 - c. soak them for one hour each day
 - d. buy shoes a size larger than usual
12. Eating foods lower in fat decreases your risk for:
 - a. nerve disease
 - b. kidney disease
 - c. heart disease
 - d. eye disease
13. Numbness and tingling may be symptoms of:
 - a. kidney disease
 - b. nerve disease
 - c. eye disease

- d. liver disease
14. Which of the following is usually not associated with diabetes?
- a. vision problems
 - b. kidney problems
 - c. nerve problems
 - d. lung problems
15. Signs of ketoacidosis include:
- a. shakiness
 - b. sweating
 - c. vomiting
 - d. low blood glucose
16. If you are sick with the flu, which of the following changes should you make?
- a. Take less insulin
 - b. Drink less liquids
 - c. Eat more proteins
 - d. Test for glucose and ketones more often
17. If you have taken intermediate-acting insulin (NPH or Lente), you are most likely to have an insulin reaction in:
- a. 1-3 hours
 - b. 6-12 hours
 - c. 12-15 hours
 - d. more than 15 hours
18. You realize just before lunch time that you forgot to take your insulin before breakfast. What should you do now?
- a. Skip lunch to lower your blood glucose
 - b. Take the insulin that you usually take at breakfast
 - c. Take twice as much insulin as you usually take at breakfast
 - d. Check your blood glucose level to decide how much insulin to take
19. If you are beginning to have an insulin reaction, you should:
- a. exercise
 - b. lie down and rest

- c. drink some juice
 - d. take regular insulin
20. Low blood glucose may be caused by:
- a. too much insulin
 - b. too little insulin
 - c. too much food
 - d. too little exercise
21. If you take your morning insulin but skip breakfast your blood glucose level will usually:
- a. increase
 - b. decrease
 - c. remain the same
22. High blood glucose may be caused by:
- a. not enough insulin
 - b. skipping meals
 - c. delaying your snack
 - d. large ketones in your urine
23. Which one of the following will most likely cause an insulin reaction?
- a. heavy exercise
 - b. infection
 - c. overeating
 - d. not taking your insulin

3.0 Diabetes Attitude Survey Questionnaire

Below are some statements about diabetes. Each numbered statement finishes the sentence “In general, I believe that...” You may believe that a statement is true for one person but not for another person or may be true one time but not be true another time. Mark the answer that you believe is true most of the time or is true for most people. Place a check mark in the box below the word or phrase that is closest to your opinion about each statement. It is important that you answer every statement.

Note: The term “health care professionals” in this survey refers to doctors, pharmacists, nurses, and dietitians.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that:					
1. ...health care professionals who treat people with diabetes should be trained to communicate well with their patients.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that:					
2. ...people who do <u>not</u> need to take insulin to treat their diabetes have a pretty mild disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. ...there is not much use in trying to have good blood sugar control because the complications of diabetes will happen anyway.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. ...diabetes affects almost every part of a diabetic person’s life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. ...the important decisions regarding daily diabetes care should be made by the person with diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. ...health care professionals should be taught how daily diabetes care affects patients’ lives.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
In general, I believe that:					
7. ...older people with Type 2* diabetes do not usually get complications.					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. ...keeping the blood sugar close to normal can help to prevent the complications of diabetes.					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. ...health care professionals should help patients make informed choices about their care plans.					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. ...it is important for the nurses and dietitians who teach people with diabetes to learn counseling skills.					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. ...people whose diabetes is treated by just a diet do not have to worry about getting many long-term complications.					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
In general, I believe that:					
12. ...almost everyone with diabetes should do whatever it takes to keep their blood sugar close to normal.					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. ...the emotional effects of diabetes are pretty small.					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in the treatment. Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called "adult diabetes."

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
In general, I believe that:					
14. ...people with diabetes should have the final say in setting their blood glucose goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. ...blood sugar testing is not needed for people with Type 2* diabetes. <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. ...low blood sugar reactions make tight control too risky for most people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. ...health care professionals should learn how to set goals with patients, not just tell them what to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. ...diabetes is hard because you never get a break from it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
In general, I believe that:					
19. ...the person with diabetes is the most important member of the diabetes care team.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. ...to do a good job, diabetes educators should learn a lot about being teachers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. ...Type 2* diabetes is a very serious disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. ...having diabetes changes a person's outlook on life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in the treatment. Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called "adult diabetes."

Strongly Agree	Agree	Neutral	Disagree	Disagree	Strongly Disagree
In general, I believe that:					
23. ...people who have Type 2* diabetes will probably not get much payoff from tight control of their blood sugars.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. ...people with diabetes should learn a lot about the disease so that they can be in charge of their own diabetes care.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. ...Type 2* is as serious as Type 1† diabetes.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. ...tight control is too much work.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. ...what the patient does has more effect on the outcome of diabetes care than anything a health professional does.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Strongly Agree	Agree	Neutral	Disagree	Disagree	Strongly Disagree
In general, I believe that:					
28. ...tight control of blood sugar makes sense only for people with Type 1† diabetes.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in the treatment. Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called “adult diabetes.”†Type 1 diabetes usually begins before age 40 and always requires insulin as part of the treatment. Patients are usually not overweight. Type 1 diabetes is also called insulin-dependent diabetes mellitus or IDDM; formerly it was called “juvenile diabetes.”

	Strongly	Strongly	Agree	Neutral	Disagree	Disagree	
	Agree	Agree	Neutral	Neutral	Disagree	Disagree	
In general, I believe that:							
29. ...it is frustrating for people with diabetes to take care of their disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly	Strongly	Agree	Neutral	Disagree	Disagree	
	Agree	Agree	Neutral	Neutral	Disagree	Disagree	
In general, I believe that:							
30. ...people with diabetes have a right to decide how hard they will work to control their blood sugar.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly	Strongly	Agree	Neutral	Disagree	Disagree	
	Agree	Agree	Neutral	Neutral	Disagree	Disagree	
In general, I believe that:							
31. ...people who take diabetes pills should be as concerned about their blood sugar as people who take insulin.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly	Strongly	Agree	Neutral	Disagree	Disagree	
	Agree	Agree	Neutral	Neutral	Disagree	Disagree	
In general, I believe that:							
32. ...people with diabetes have the right <u>not</u> to take good care of their diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly	Strongly	Agree	Neutral	Disagree	Disagree	
	Agree	Agree	Neutral	Neutral	Disagree	Disagree	
In general, I believe that:							
33. ...support from family and friends is important in dealing with diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DAS3; Diabetes Research and Training Center
 © University of Michigan, 1998

Revised 12/18/9

Appendix D: Permission Letters

The following Permission Letters have been included in this proposal as attachments.

1. Letter from Zambia Medicines Regulatory Authority (ZMRA)
2. Letter from Head Pharmacy Department (University Of Zambia)
3. An application form for ethical approval by the University of Zambia Biological Research and Ethics Committee (UNZABREC)

Appendix F: Cover Letter

The cover letter has been included addressing all the concerns raised by the biological research and ethics committee.

Appendix E: Curriculum Vitae

1. Principal Supervisor

A. Personal Information:

- | | |
|---------------------------------|------------------------------|
| 1. Name: | Lungwani Tyson Makoye Muungo |
| 2. Date of Birth: | 17th October, 1954 |
| 3. Nationality: | Zambian |
| 4. Sex: | Male |
| 5. Appointment into University: | 19th October, 2009 |
| 6. Present Position: | Head Lecturer |

Present Address:

1. University of Zambia,
 2. School of Medicine,
 3. Department of Pharmacy,
 4. Main Pharmacy Building Block,
 5. P.O. Box 50110,
 6. Lusaka, Zambia
- a. Tel: +260 211 257635 (Work); +260 211 255852 (Home)
 - b. Mobile: +260 977775473
 7. Fax: +260 211 257635
 8. E-mail: lungwani.muungo@unza.zm; tmuungo@yahoo.com

A. Academic Qualifications:

1. 1993/1995: Doctor of Philosophy (Compounding Pharmacy)-PhD (Aberdeen, Scotland)
2. 1990/1992: Master of Philosophy (Pharmaceutics) – MPhil (Aberdeen, Scotland)
3. 1982/1987: Bachelor of Pharmacy (Pharmacy) - BSc Pharm (Aberdeen, Scotland)
4. 1977/1980: Diploma in Pharmacy (Pharmaceutical Technology) -Dip Pharm (Lusaka, Zambia)
5. 1975/1976: Full School Certificate (FormV) Hillcrest Technical High School (L/stone, Zambia)

B. Scholarship Awards:

1. 1990-1995: Joint Scholarship between Medical Stores Limited (Zambia) and Robert Gordon University (Zeneca Group funded research line at Robert Gordon University, Scotland) for Master/Doctor of Philosophy transfer.
2. 1982-1987: British Council Scholarship for Bachelor of Pharmacy

C. Professional Qualifications:

1. 1999 to Date Transferred to Specialist Register of Pharmacists under the Health Professions Council of Zambia (HPCZ)
2. 1995 - 1996: Pre-registration training at Pharmaco Limited (Manchester, UK) for Royal Pharmaceutical Society registration and membership as a Pharmacist in the U.K.
3. 1987-1988: Pre-registration training at UTH, NDC (Shops & Factory), GPL, MSL and Former Pharmacy and Poisons Board for Medical Council of Zambia as a Pharmacist in Zambia.
4. 1980-1981: Pre-registration at UTH (Lusaka) for Medical Council of Zambia as Pharmacy Technologist in Zambia

D. Relevant Work Experience:

1999 - Date: Lecturer and Postgraduate Coordinator for Pharmacy programmes:

Functions:

- Overall coordination of both some undergraduate and postgraduate courses in pharmacy
- Overall co-ordination of teaching sessions, laboratory sessions, research study activities in some of the undergraduate courses
- Giving technical guide, lectures and provide academic guidance during dry practical sessions for undergraduates and clinical sessions for postgraduates
- Actively formulate, contribute and give some guide to the structural framework and content of actual teaching materials in terms of teaching slides for most of the program courses in pharmacy (Biomedical sciences, Pharmaceutical sciences, Pharmacy Practice sciences) across all the learning streams (undergraduates and postgraduates).

Responsibilities:

- Administrative link of the postgraduate training for the department
- Coordinator of postgraduate programme training of the department for the university
- Coordinator of students' teaching and assessment for the department

1999 - 2012: Lecturer and Head for the Department of Pharmacy at University of Zambia

Functions:

- Overall supervision of both academic and non-academic staff in the Department of Pharmacy for the Dean
- Implementing administrative duties of the Dean in the department
- Overall co-ordination of teaching sessions, laboratory sessions, research study activities and other academic related areas for the department
- Giving technical guide, lectures and provide academic guidance during dry practical sessions when applicable in all the approved courses in pharmacy training
- Actively formulate, contribute and give overall guide to the structural framework and content of actual teaching materials in terms of teaching slides for most of the program courses in pharmacy (Biomedical sciences, Pharmaceutical sciences, Pharmacy Practice sciences) across all the learning streams.

Responsibilities:

- Administrative link of the department to the Dean
- Head of programme training unit for the university
- Coordinator of students' teaching and assessment for the Dean

2009 - 2011: Lecturer, clinical lead person for clinical training, and Head Advisor for the Department of Pharmacy at the College of Health Sciences for the University of Malawi:

Functions:

- Advised on overall administrative supervision of both academic and non-academic staff in the Department of Pharmacy for the College Principal
- Advising on the implementation of administrative duties of the college principal in the department

- Helping in the co-ordination of teaching sessions, laboratory sessions, research study activities and other academic related areas for the department
- Giving technical guide, lectures and provide academic guidance during dry practical sessions when applicable in all the approved courses in pharmacy training
- Actively formulate, contribute and give overall guide to the structural framework and content of actual teaching materials in terms of teaching slides for most of the program courses in pharmacy (Biomedical sciences, Pharmaceutical sciences, Pharmacy Practice sciences) across all the learning streams.

Responsibilities:

- Administrative advisor to the Acting head of the department
- Course coordinator for all physical pharmacy courses in the department
- Give guide to the departmental staff on students' teaching and assessment procedures in pharmacy training

Academic Service Contributions:

Teaching Experience at the University:

1. Drafting the training curriculum and implementing the Master Degree training program in Clinical Pharmacy (2010 – date)
2. Founding and current Postgraduate coordinator for the Department of Pharmacy (2011 – date)
3. Curriculum presentation & defense to UNZA senate (2000)
4. Co-ordinate Curriculum drafting for BPharm degree program (1999 – 2000)
5. Supervising and administering the departmental activities and the staff.
6. Preparation and administration of the course materials and assessing for both the undergraduate and postgraduate students in both physical and clinical pharmacy courses.
7. Co-ordination of some undergraduate and postgraduate courses for the pharmacy students during teaching and the examinations in both physical and clinical pharmacy courses.

Consultant Projects undertaken that have been funded:

1. Self-Assessment for Quality Assurance in Pharmacy education for Zambia, 2009 - WHO

2. Review of National Drug Policy document on Human Resource in 2009 – MOH, Zambia
3. Acceptability studies on microbicides formulation agents for HIV prevention in 2008 – IPM
4. Quality Assurance in Pharmacy Education in 2008 – WHO
5. Development of ECSA HIV / AIDS curriculum in 2006 – by MHS Plus Kenya
6. Pharmaceutical Sector Scan (PSS) for industrial sector in Zambia, 2006 – by UNIDO
7. Antibiotic Use and Resistance in 2005 – by MHS Plus Zambia
8. Regional and generic curriculum design and formulation for pharmacy training in Zambia in 2005 – MHS Plus Kenya
9. Designing and establishment of professional training program for pharmacists in Zambia (2004) – by DFID

Publications:

1. Annalene M. Nel, Lynne B. Mitchnick, Peter Risha, Lungwani Tyson Makoye Muungo and Pamela M. Norick. “Acceptability of Vaginal Film, Soft-Gel Capsule, and Tablet as Potential Microbicide Delivery Methods among African Women” *Journal of Women's Health*. August 2011
2. Muungo L.T.M. and Winfield A. J. “Effect of Polymer Matrix on the Dissolution rate of Sulphadimine Crystals (1992); *The Science of Rheology* – B.F. Goodrich.
3. Muungo L.T.M., Muntinta M. and Kanyimba S.N. “Assessment of local manufacturers in the provision of essential medicines in Zambia’ – *The pharmaceutical Journal of Zambia*, No. 1, 2009
4. Muungo L.T.M., Mwangana M. and Kanyimba S.N. “An assessment of adherence to the World Health Organization guidelines for drug donations by Non-Governmental Organizations in Lusaka” – *The pharmaceutical Journal of Zambia*, No. 1, 2009
5. Muungo L.T.M., Muntinta M. and Kanyimba S.N. “Assessment of the need for pharmacists in oncology care, case study at Malcom Watson Hospital and Ronald Ross General Hospital in Mufulira (Zambia) – *The pharmaceutical Journal of Zambia*, No. 1, 2009

Unpublished research undertaken and completed:

1. Bates I.; Muungo L.T.M. et al “Global Pharmacy Education Development Network – G-PhEd” 2008, funded and partnership with FIP / WHO / UNESCO
2. Kanyimba S. and Muungo L.T.M. “Study on the use of anti-malarial drugs at community level in two selected districts in Zambia” 2005, funded by Arch.
3. Kanyimba S., Muungo L.T.M. and Sipalanyambe N. “Ant-malaria drug utilization at household level in Livingstone district Zambia” 2002, funded by WHO
4. Kanyimba S. and Muungo L.T.M. “Anti-malarial drug utilisation at household level in Livingstone district, Zambia” 2005, funded by Arch.
5. Muungo L.T.M., Mutambo F. and Kampamba R. “Study on the availability and affordability of Antiretroviral (ARVs) drugs in Zambia” 2002, funded by British Council, Zambia.
6. Muungo L.T.M. and Smith P. “Use of Asthmatics Devices by asthmatic children and geriatrics” 1995, funded by local community group of Pharmacists in Manchester.
7. Muungo L.T.M., Daka D. and Smith P. “Effect of weaning-off procedure using methadone by drug addicts” 1995, funded by local community group of Pharmacists in Manchester.
8. Muungo L.T.M. and Preston S. “Assessment of quality of pharmaceutical care in Old Home and Nursing Home based patients” 1995, funded by local community group of Pharmacists in Manchester.
9. Muungo L.T.M. and Cummings R. “Dissolution rate of Co-precipitate Crystals between Carbopol 934 and Sulphadimidine” 1994, funded by B.F. Goodrich.
10. Muungo L.T.M.; Winfield A. J. and Cox J. “Release rate from different sizes of drug crystals” 1994, funded by B.F. Goodrich.
11. Muungo L.T.M. and Winfield A. J. “Similarities between Carbopol 974 and Carbopol 934P” 1994, funded by B.F. Goodrich.
12. Muungo L.T.M.; Winfield A. J. and Cox J. “Viscoelastic properties of Carbopol 934 on release of Sulphadimidine” 1993, funded by B.F. Goodrich and Robert Gordon University.

13. Muungo L.T.M.; Winfield A. J. and Cox J. "Co-precipitation effects on the release of Sulphadimidine from Polymer/Drug System" 1993, funded by B.F. Goodrich
14. Muungo L.T.M. and Cox J. "The shapes and sizes of Carbopol 934P and Sulphadimidine B.P. using X-ray Diffraction Method" 1993, funded by B.F. Goodrich.
15. Muungo L.T.M. and Angula, A, "Potency of paracetamol tablets imported from Former East German" 1990, funded by the Ministry of Health, Zambia.
16. Muungo L.T.M. and Late Mr. A. Patel, "Evaluation of storage conditions on Aspirin and Paracetamol tablets" 1990, funded by the Ministry of Health, Zambia.
17. Muungo L.T.M. "Palatability of Ammonia and Ipecacuanha cough mixture B.P." 1990, funded by the Ministry of Health, Zambia. .
18. Muungo L.T.M. and Angula, A, "Stability of Aspirin Tablets (75mg) punched from imported granules" 1988, funded by the Ministry of Health, Zambia.

Prospective Research / Grant projects that have been proposed pending funding:

1. Muungo L.T.M. and Kampamba R. "The impact of the pharmaceutical waste on the environment" - Research study.
2. Muungo L.T.M. and Kampamba R. "The pharmaceutical care and management system in the public sector hospitals in Zambia" - Research study.
3. Muungo L.T.M. and Mwale B. "The impact of dispensing procedure on the overall effect of selected antibiotics" - Research study.
4. Muungo L.T.M. "Availability, accessibility and affordability of antiretroviral drugs in Zambia" - Research study.
5. Muungo L.T.M. and Kanyimba S. "Pilot study on the effect of adding Tetra silver Tetroxide (TST) to standard drug therapy in patients with aids and related opportunistic infections in Lusaka" - Grant study.
6. Muungo L.T.M. "Herbal Medicines Identification, Formulation and Clinical Use Assessment (HENOMIFOCUS)" - Grant study.
7. Muungo L.T.M. "Human resource development and needs for the Department of Pharmacy" - Grant study.

8. Muungo L.T.M. “The impact of ARVs on the treatment of HIV/AIDS in Zambia” - Grant study

E. Service Life at UNZA, LAMU and Zambia, the Country:

Membership to the Academic committees:

1. Designate Dean for Lusaka Apex Medical University, 2011 to date.
2. Member of the Senate Committee for Lusaka Apex Medical University, 2011 to date.
3. Member of the Management Committee for School of Medicine, 2008 to date.
4. Representative Member of Board of Studies, School of Engineering, 2001 to date.
5. Member on University of Zambia Library Committee, University of Zambia, 2001 to date.
6. Member and Chair of Department of Pharmacy staff Committee meetings, 2000 to date
7. Member of the Board of Studies, School of Medicine, 2000 to date.
8. Member of Research Ethics Committee (REC) for the University of Zambia, 2000 to date.
9. Member of Curriculum Committee, School of Medicine, 2000 to date.
10. Member of the Dean’s Advisory Committee, School of Medicine, 2000 to date
11. Member of School of Medicines Academic Promotions Committee, 2000 to date
12. Member of Joint Appointment and Promotions Committee, School of Medicines, 2000 to date
13. Graduate Studies committee, School of Medicine, 2001 to date
14. Member of Constituted Investigative Committee Body on the “ Problems and difficulties faced by the University community on accommodation of the students and the staff” – 2005
15. Member and Co-Chair of the Adjunct Interviewing Panel for the intern and overseas trained pharmacists professional registration on behalf of the Medical Council of Zambia, 2004 to date

Professional Affiliations:

1. Member of Health Professions Council of Zambia (HPCZ) under Specialist Register
2. Life Member of The Pharmaceutical Society (PSZ) of Zambia
3. Member of University of Zambia Lecturers and Researchers Union

4. Eastern and Central African Pharmacy training Institutions
5. Commonwealth Countries Pharmaceutical Associations
6. International Federation of Pharmacists (FIP)
7. Member of Institute of Directors, Zambia (IoD)

Referees:

Prof Munkonge Dr. Esther Nkandu

School of Medicine Head-Department of Physiotherapy
 University of Zambia University of Zambia
 P.O. Box 50110 P.O. Box 50110
 Lusaka Lusaka
 Tel: +260 211 252641 Tel. +260 211 252641

2.0 Co-Supervisor

Yassa Pierre Y'oniene

Woodland Chalala/Lusaka/Zambia
 Plot no 12244
 Cell phone: 00260977496894
 Email: perets31@gmail.com

Curriculum Vitae

Education

1. PhD in Leadership, International Institute of Church Management Inc, Florida, USA, April 2013
2. Certificate in HIV Management, University of Washington, Seattle, May 2013.
3. Howard College, University of Kwazulu Natal, Durban, South Africa. Postgraduate Diploma. in Health Promotion (2010), Supervisor visor: Prof. Meyer-Weitz A
4. Master 'Degree in Dermatology & Sexually Transmitted Diseases, University of Lubumbashi, 1990
5. Degree in General Medicine , university of Kinshasa, 1982

6. . Certificate of participation on Health Negotiation for African Health Leaders organized by Conflict Management Group(CMG), WHO, Benin, 1997
7. Honorary Doctorate of Humanity, International Institute of Church Management Inc, Florida, USA, 2010.
8. Certificate on Biostatistics, UK, Peoples-uni, 2009
9. Certificate on Evidence Based Practice, UK, Peoples-uni, 2009
10. Certificate on Health policy , UK, People-uni 2010
11. Certificate HIV Drug Chain Management, WHO, Jaipur, India, 2008
12. University of The Witwatersrand Faculty of Health sciences, School of Postgraduate studies, Johannesburg, South Africa
Certificate in Research Methodology Training Course in The field of HIV/AIDS, Tuberculosis and Malaria, 29 November to 10 December 2004
13. .University of The Witwatersrand Faculty of Health sciences, School of Postgraduate studies, Johannesburg, South Africa
Certificate in Proposal Writing Training Course in the Field of HIV/AIDS, Tuberculosis and Malaria, October to November 2004.
14. University of Washington Center for AIDS and STD, Seattle, USA
Certificate in Principles of STD/HIV /TB Research, Seattle, July, 2004.
15. National Institute of Social and Economic Development, UNADES, Kinshasa, Congo DR
16. Diploma in Social Development (1999-2001).Congo DRC

Teaching Experience

Honorary Lecturer in the field of Dermatology, SDT/HIV, Research for Undergraduate and Postgraduate Students (2002 to date)

National Facilitator of Ministry of Health in the field of HIV and STIs from 2004 to date.

Lecturer in the field of Dermatology, SDT/HIV for Undergraduate and Postgraduate Students (1990-2001) at University of Lubumbashi, Congo DRC

Chreso University from 2012 to date: Research methodology to PhD, MPH, BSc, & health Promotion.

Professional Affiliations

1. MEMBER OF AMERICAN SOCIETY FOR MICROBIOLOGY, USA
2. WHO Afro European Medical Research Networking, Bern
3. Board of Members of Treatment Care and Support Technical Working Group
National AIDS Council of Zambia
4. Board Member of International Union against Sexually Transmitted Infections
Africa (IUSTI)
5. Alliance for the Prudent use of Antibiotics (APUA), USA.
6. International Dermatology Association
7. Zambia Psoriasis Association

Professional Experience

- Examiner for PhD candidates at the School of Medicine, University of Zambia, June 2013
- Examiner for Masters Dissertations at the School of Medicine, University of Zambia, May 2013 to date
- Dean of Health Sciences at Chreso University, Lusaka Zambia from 2012 to date.
- Associate Professor at Chreso University at Lusaka Zambia from 2012 to date,
- Honorary Lecturer, School of Medicine, Upper Level Course, University of Zambia, Lusaka, Zambia, 2005 to present
- **Principal Investigator** of Center for Disease Control and Prevention, (US) Cooperative Agreement Number U62/CU023189, Expansion of Reference Laboratory Infrastructure to Support HIV/AIDS/STD/TB from 09/30/2003 to 03/31/2011 at UTH, audited and cleared by CDC Atlanta.
- Head of National STIs/HIV Reference Lab and Research intervention University Teaching Hospital of Lusaka, Zambia 2003-Present
- Chairperson of Zambia Research Working Group of CODESRIA at Chreso University from May 2013 to date
- Site coordinator online course Principles of STD/HIV Research from the University of Washington Department of Global Health from 31st May 2013 to date

- Member of the Editorial board of the news letter entitled “AIDS UPDATE” a publication of the Mahatma Gandhi Mission’s (MGM) University of Health Sciences Navi Mumbai and the University of Texas-Houston, USA from 2011 to date
- HIV Advisory board Chairperson of CHRESO Ministries, Lusaka, Zambia from 2011 to date
- Staff member of STIs SADC board,2010 to date
- Coordinator of six year students at University of Zambia at School of Medicine from 2011 to present
- Post Graduate Coordinator in Medicine Department, UNZA, 2003 to 2006
- National Trainer of Ministry of Health workshops of The Use of anti retroviral and the use of Syndromic Management of STD to Government , Private , Military Health workers in Zambia, 2003 to date.
- Head of Dermatology and Venereology and HIV department, University Teaching Hospital of Lubumbashi, 1990 to 1991.
- Head of Dermatology and Venereology and HIV department, Ngaliema Clinic at Kinshasa/Congo DRC, 1991 to 2001.
- Member of Zambia drug formulation, Pharmacy Department, Ministry of Health from 2004 to date.
- Chairperson of ART Board Member of Chreso Ministry in Lusaka/Zambia from 2009 to date.
- Board member and Country Representative of International Union against Sexually Transmitted Infections (USTI), Africa from 2010 to date.
- Head of Health Sciences at Chreso University in Zambia from 2010 to date
- Staff member of Global Fund Committee at Ministry of Health of Zambia 2003 to date.
- Member of Technical Team of HIV,STIs,TB Treatment and Care at NAC of Zambia, 2004 to date.

Honors:

- Grants from Center for Disease Control and Prevention, Cooperative Agreement Number U62/CU023189, Expansion of Reference Laboratory Infrastructure to Support HIV/AIDS/STD/TB from 09/30/2003 to 03/31/2010.

Consultancy

2011 to date Member of GLG Councils (Gerson Lehrman Groups, Inc.)

2010 to 2001 Kara Counseling Center of Zambia: Teaching HIV intervention workshop using Behavioral and Biomedical intervention/ CDC funded.

2009: Designing the Training workshop for FHI

2008: COMESA: HIV/STIs workshop in Nairobi for COMESA country

2007: HSSP/Zambia. Minimum Package of HIV/AIDS services provided in Zambia: Evaluation study.

2007: MOH; TB strategic plan workshop

2006: MOH/Zambia; STI treatment guideline

Language

- Conversation French, write and translate
- Advanced level in English

Computer Skills

- Power-point, Microsoft Word, Microsoft Excel, Internet Explorer4
- SPSS 20, Epi-Info

Publications:**Articles**

1. Mananga Lelo G 1, Mampunza Ma Miezi S 1, Longo-Mbenza B 2, Verbanck P 3 , Nyirenda S 4, Yassa P4 [Emedpub,Psycho-Social Determinants Of Progression To Aids Among Black Africans In Kinshasa, Democratic Republic Of Congo. [Original Research– Psychiatry & Mental Health: Vol 2:1] [Date Of Publication: 01.28.2012] Issn 2231-6019
2. Yassa P. Prevalence Of Sexually Transmitted Infectious In Zambia, Iusti Africa, 2007,2

3. Yassa P. Treatment of Uncomplicated Genital Gonorrhoea with Cotrimoxazole Double Strength Table, *Medicine D' Afrique Noire*, 1985, 6.
4. Yassa P. Clinical Observations of Chancroid, *Medicine D' Afrique Noire*, 1990-25-28.
5. Yassa P. Results of Treatment of Genital Warts with Fluorouracil 5% Cream, *Medicine D' Afrique* 1990.
6. Yassa P: *Cordylobia*. *Anthropophaga* Infection In Zaire, *Afrique Medicale*, 1986,33, 339-401
7. Yassa P Differential Diagnosis Of Leprosy In Zaire: *Polskitygodsk Lekarshi*, Pologne, 1985, 40,23,661-669
8. Yassa P: *Pediatric Dermatology* in Zaire, *Polskitygodsk Lekarshi*, Poland, 1985, 40, 23,500-505.
9. The Role Of Health Workers In Poor Access To Antiretroviral Drugs By People Living With HIV/AIDS In Sub-Sahara Africa, *Faith Fabulous And Favored Magazine*, USA, Launch In July 2000

Abstracts:

1. Recent Sensitivity Patterns Of *Neisseria* Gonorrhoea Among Men With Dysuria And/Or Urethral Discharge Attending Five Urban Clinics In Lusaka, Zambia, 10 The last World Congress, July 2007, Seattle, USA.
2. Yassa P., Luhana C.F., Malibata C., Macuacua R., Kangwa L., Matembo T., Kimbinyi W., Mwila J.K., Chama G.C.. Routine counselling for HIV testing among STI clinic attendees: pilot study at University Teaching Hospital, 4th IAS Conference on HIV, Sydney, Australia (2007), Lusaka, Zambia [Abstract TUPEC018].
3. Yassa P., C.Malibata, F.C. Luhana, F.C., Linda Kangwa. .Recent sensitivity patterns of *Neisseria gonorrhoea* among men with dysuria and/or urethral discharge attending five urban clinics in Lusaka, Zambia, IUSTI - ISSTD joint meeting, Seattle, USA (2007), [Poster - 443].

4. Yassa P. Impact Of Kaposi Sarcome On Hiv In Patients Attending Clinic Ngaliema In Kinshasa, Vii International Conference Of Aids In Africa, Yaoude/Cameroon ,1996.
5. Yassa P. Prevalence Of Herpes Zoster on HIV In Patients Attending Dermatology Clinic In Lubumbashi, Vii International Conference Of Aids In Africa, Kinshasa/ Congo DRC, 1990.

Research studies approved and submitted publications

- Evaluation of the Rapid Treponemal Point of Care Test Introduced in Zambia in 2012
- Isolation and Identification of Fungi from Suspected Fungal Skin Infections in Patients attending the Dermatology Clinic at UTH
- Trichomonas Vaginalis and the Human Immunodeficiency Virus (HIV): A Prevalence Study of Co – Infections or Trichonomas Vaginalis and HIV in Women Seeking Health Services in Lusaka, Zambia

Completed research

1. Impact of the number of sexual partners on HIV infection in clients attending UTH Clinic 3/VCT Center in Lusaka (2010)
2. An investigation of the psychosocial and contextual risk factors for HIV/AIDS among female STI clinic attendees at University Teaching Hospital, Lusaka (2011)

Research Supervision

1. Master's students at University of Zambia

Ongoing from 2013 to date

1. Assessment Of Prescribing And Administration Errors In Medication Use Process At University Teaching Hospital
2. Antibiotic Prescribing Patterns Among Physicians At The University Teaching Hospital, Lusaka, Zambia
3. Safety In Hiv/Aids Patients Failing First Line Art On Atazanavir/Ritonavir Fixed-Dose Combination At University Teaching Hospital

4. Effects Of Hydroxyurea Therapy In Sickle Cell Children With History Of Stroke At The University Teaching Hospital-Zambia
5. Association Of Timing Of Administration Of Surgical Antibiotic Prophylaxis And Hospital Wound Infection At Kitwe Central Hospital

Completed Research

1. Trichomonas Vaginalis and the human immunodeficiency virus (HIV): prevalence study of co-infections of Trichomonas Vaginalis and HIV in women seeking health services in Lusaka.

2. Bachelor's students at University of Zambia

Completed in 2013

1. Evaluation of the Rapid Treponema Point of Care test introduced in Zambia in 2012
2. Screening for Hepatitis B surface Antigen using rapid diagnosis test in HIV positive patients attending STI services at UTH clinic 3.
3. Determination of the Use of Quantitative RPR Test as a Guide for the Diagnosis and Treatment of Syphilis in Zambia.
4. Isolation and Identification of fungi from suspected fungal skin infections in patients attending the Dermatology Clinic at the University Teaching Hospital

3 Further Study

Effects of knowledge, attitude and practices towards the health and financial status on men and women who engage in the use of topical bleaching agents in Lusaka.(May 2013)

Books

1. Development of STI Syndromic Management Guideline of Zambia 2006(Ministry of Health Zambia, 2006
2. Development of TB Guideline of Zambia 2006(Ministry of Health Zambia, 2005
3. Development of the learning resource package for managing opportunistic infections (Ministry of Health Zambia),2005
4. Development of the learning resource package for antiretroviral therapy management for Zambia (Ministry of Health Zambia), 2005.

Conferences

2009. An Investigation Of HIV-Related Risk Practices Among Female STI Clinic Attending At University Teaching Hospital Of Lusaka, Cape Town, November 2009/ Iusti Africa.

2007 Gonorrhoea resistance in Lusaka urban. International Conference of Dermatology, STI and HIV at KCMC, Moshi, Tanzania, 18-20 January

2006 22nd IUSTI-Europe Conference on Sexually Transmitted Infections
19-21 Octobre 2006 Palais des Congres Versailles, France

2006 Presented Paper on Routine Counseling and HIV testing to all patient attending STI Clinic at International Conference of Dermatology, STI and HIV at KCMC, Moshi, Tanzania, 18-20 January

2005 Attended the Biennial meeting of the International Society for Sexually Transmitted Diseases Research (ISSTD) .Amsterdam,10-13 July.

2004 Attended the Conference on Sexually Transmitted Infections in Greece (Myconos Island). 7th October to 9th October.

2004 National STD Prevention Conference, 7-12 March, Philadelphia, USA

2004 Capacity Building in Management of Symptomatic HIV/AIDS with a focus on ARV's organized by Zambia Medical Association (ZMA), February 19-21, Lusaka Zambia as facilitator.

1996 Participation at the 49th World Gathering of WHO to Geneva since 20 - 25 May.

Participation at 46th Regional Committee of WHO at Brazzaville since 4th September until 11th September in Congo

Reference

Rev Pastor Reuter

President of Chreso University

Cell 00260977784702

Dr. Somwe

Head of Pediatric department

School of Medicine Zambia

P.O Box UTH 91/ Lusaka/Zambia

00260211257218

Dr. Theresa Kafula

Consultant gynecologist

260955857938

Department of Gynecology

University of Zambia