

# **DEVELOPMENT, IMPLEMENTATION AND EVALUATION OF A DIABETES EDUCATIONAL OUTREACH INTERVENTION FOR PHARMACISTS**

**Emmanuel Molosiwa**

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**Supervisor: Dr A Bheekie**

**School of Pharmacy, UWC  
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# **Development, implementation and evaluation of a diabetes educational outreach intervention for pharmacists**

## **Key words**

Diabetes

Pharmacists

Guidelines

Outreach intervention



## DECLARATION

I, the undersigned, hereby declare that the work included in this research project is my original work and has not been previously submitted to any other University for the purpose of obtaining a degree.

Emmanuel Molosiwa

Signature .....

Date 20 August 2007



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## **DEDICATION**

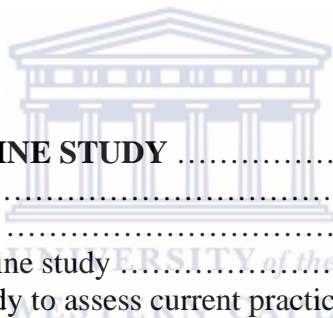
I dedicate this thesis to my late father, Rasedisa and mother Gaofshwepelo Molosiwa for their emphasis on education.



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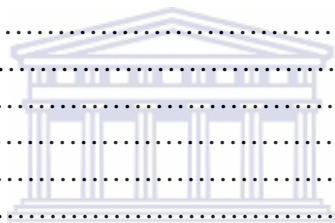


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## ACRONYMS

ARV	Antiretroviral
AIDS	Acquired Immune Deficiency Syndrome
CHC	Community Health Centre
CHD	Coronary Heart Disease
CPD	Continuing Professional Development
DCCT	Diabetes Control and Complication Trial
DHS	District Health System
FBG	Fasting Blood Glucose
HbA1c	Glycosylated haemoglobin
HDL	High Density Lipids
HIV	Human Immunodeficiency Virus
IDDM	Insulin-Dependent Diabetes Mellitus
IDEALS	Introduction, Discover, Explain, Ask, Leave and Seek
IDF	International Diabetes Federation
IGT	Impaired Glucose Tolerance
IMCI	Integrated Management of Childhood Illnesses
WHO	World Health Organisation
IMCSA	International Marketing Council of South Africa
LDL	Low Density Lipids
MIC	Medicine Information Centre
MDHS	Metropole District Health Services
MOU	Midwife Obstetric Unit
NIDDM	Non-Insulin-Dependent Diabetes Mellitus
OSCE	Objective Structured Clinical Examination
OSDE	Objective Structured Dispensing Examination
PBL	Problem Based Learning
PHC	Primary Health Care Services
RBG	Random Blood Glucose
RDU	Rational Drug Use
SEMDSA	Society for Endocrinology, Metabolism and the Diabetes of South Africa.
SPSS	Statistical Package for Social Sciences
UCT	University of Cape Town
UKPDS	United Kingdom Prospective Diabetes Study
UWC	University of the Western Cape

## SUMMARY

Increasing diabetes prevalence rates (SEMDSA 1997), poor involvement of and limited knowledge among health care professionals in disease management, (Goodman, 1997) and poor implementation of guidelines (Levitt, 1996) are barriers to quality diabetes care.

This thesis aimed to develop, implement and evaluate an on-site diabetes pharmacotherapy program for public sector pharmacists.

### **Methods**

Qualitative and quantitative research methods were used in the pre- and post-intervention study. Current dispensing practices were identified from an observation study and a self-administered questionnaire survey. The results indicated that practice patterns were suboptimal and that knowledge on diabetes management was limited.

Specially designed educational materials consisting of a five-part desk folder which highlighted key up-to-date management principles and a pen which served as a reminder were provided to a purposive sample of pharmacists. A trained pharmacotherapy facilitator (myself) visited intervention pharmacies to implement the intervention. Unobtrusive unstructured interviews and structured self-administered questionnaire surveys were used to evaluate the acceptability of the educational program.

### **Results**

Nine pharmacists received the intervention. There seems to be a pattern that indicates fair acceptance of the intervention amongst the pharmacists.

Qualitative results indicated that all pharmacists were in favour of the outreach intervention. Some pharmacists (3; 33%) suggested that the educational program be extended to other chronic diseases, while for others (3; 33%) it served reminder when dispensing medication to patients. Quantitative findings indicated improvements in knowledge which were attributed to the educational intervention. Knowledge translation into routine practice was not evident.

**Conclusion**

Although the outreach visit may not have resulted in imminent practice change, it brought about more awareness and vigilance on good management of diabetes. Continual on-site educational programs are required to translate knowledge into routine practice. An audit of diabetes management among pharmacists is essential. Further studies are needed among public sector primary care facilities to evaluate the quality of pharmaceutical care provision in chronic disease management.



# CHAPTER 1

## INTRODUCTION

An estimated 140 million individuals worldwide have diabetes (Preston, 1998; Van Rooijen, 2004). Diabetes prevalence (1958 to 1989), ranged between 0.1 to 3.8% across the African population (McLarty, 1991) and the rates differ between urban (5.3 %) and rural (1.5 %) populations (Aspray, 2000). Diabetes Atlas, third edition shows that diabetes prevalence is rising rapidly throughout the world. In South Africa, it has been estimated that there is at least more than one million known diabetics, and possibly an equal number undiagnosed (Bonnici, 1997) with the highest prevalence in the Indian population (13.5 %), (Levitt, 1993; Kalk, 1998).

In South Africa diabetes accounted for up to 11.4% of the recorded 213 279 deaths (National Department of Health, 1994). Groenewald (2003) found that in Cape Town alone (2001), diabetes contributed to 5.3% of the total number of reported deaths (23 185). The complications associated with diabetes such as retinopathy, peripheral neuropathy and amputations, result in loss of personal income, which can impact negatively on economic well-being (Chale, 1992). This is realized in increased hospitalization costs and a heavy burden on health and welfare services especially in developing countries. Private sector healthcare is expensive, consequently most patients attend public sector healthcare centres (Bradley, 1999; Distiller, 2004).

Problems associated with the management of diabetes include lack of access to guidelines and limited knowledge among health providers (Goodman, 1997). As a result patients receive limited guidance on health promotion and medication use. In primary care facilities, guidelines are not properly implemented (Levitt, 1996; Daniels, 2000) leading to inappropriate care provision. In addition, the lack of full participation by pharmacists in chronic disease management such as diabetes has serious implications in quality care provision. Patients suffering from diabetes and



other chronic diseases are not adequately monitored and advised appropriately by pharmacists.

Since pharmacists are the last port of call in the health care chain, they play a pivotal role in identifying poorly controlled patients, ensuring the appropriate use of medication and reinforcing preventive care (Nau, 2000). Guideline implementation interventions that are multifaceted and tailored for healthcare practitioners have been found to be effective in the provision of guideline-based care (Avorn, 1983; Grol, 1995: 1999) and have resulted in positive health outcomes (Chen, 2004). Diabetes educational outreach interventions for pharmacists have yet to be implemented in South Africa.

### **1.1 Aim**

The aim of this study is to design, implement and evaluate a diabetes educational outreach intervention for pharmacists working in the Metropole District Health Services (MDHS).

The main objectives of the study were:

- to assess current practice patterns and identify barriers encountered by pharmacists with regard to care of diabetes patients.
- to design, implement and evaluate a multifaceted educational outreach intervention to address identified practice gaps in diabetes management.

### **1.2 Chapter description**

**Chapter 2** provides background on the scope of problems regarding diabetes management in primary care. In addition a review of educational outreach programs is provided as a strategy to implement guidelines for pharmacists.

**Chapter 3** provides an overview of research methods and how these were applied in the study.

**Chapter 4** focuses on the qualitative and quantitative assessment of pharmacists' pharmacotherapeutic skills with regard to prescribed drug therapy and health promotion. In addition, pharmacists' views regarding need for educational interventions are explored.

**Chapter 5** discusses the development and implementation of a guideline based multifaceted educational outreach intervention. The contents of the educational materials, the training of the educator and the implementation process are discussed.

**Chapter 6** provides the results of the implementation of the intervention. Pharmacists' responses were assessed using both qualitative and quantitative methods which involved use of unobtrusive in-depth interviews and questionnaires to gain deeper insight into acceptability of the intervention.

**Chapter 7** discusses whether the outreach intervention was acceptable amongst the pharmacists. It assesses the extent to which the different intervention materials and methods used influenced acceptability. Further it evaluates whether improvement in knowledge in diabetes management principles was actually translated into practice.

### **1.3 Use of personal pronoun**

In this thesis I use the personal pronoun, rather than “the researcher” or “the author” to capture my experiences to closely resemble that of the real situation.

### **1.4 Referencing**

The bibliography follows the Vancouver style of referencing. Referencing is by first author and year of publication in parenthesis in the text. When a study is mentioned in the narrative, only the first author is cited without *et al.*

## CHAPTER 2

### LITERATURE REVIEW

This chapter provides an overview of the morbidity, prevalence and mortality rates for diabetes as well as its economic impact. The primary care management of diabetes is discussed, with emphasis on pharmaceutical practice, and the status of continuous professional training and development programs for pharmacists in South Africa. Further, the implementation of outreach programs, more especially those designed for pharmacists with regard to diabetes management, is reviewed.

#### 2.1 Overview of diabetes

Diabetes is a term used to refer to a group of different diseases (heterogeneous syndrome) resulting from impaired insulin secretion (SEMDSA, 2003). One of the primary signs and symptoms of the disease is hyperglycaemia but patients may also exhibit other body function abnormalities, for example, dyslipidaemias. Diabetes is associated with serious complications (Lundstrom, 2004), including comas, sepsis, and microvascular disease (involving the eyes, kidneys and nerves) as well as macrovascular disease (concerning the coronary, cerebral and peripheral arteries).

There are three main groups or classes of diabetes, namely: Type 1 also known as insulin-dependent diabetes mellitus (IDDM); Type 2 or non-insulin-dependent diabetes mellitus (NIDDM); and impaired glucose tolerance (IGT), (Knight, 1997). Patients with type 2 diabetes do not depend on insulin but may require it during the disease progression to control blood glucose. IGT signifies an 'at-risk' status rather than a disease and can only be diagnosed using an oral glucose tolerance test (ibid). Diagnosis depends on measuring the plasma glucose levels using tests such as random blood glucose (RBG), fasting blood glucose (FBG) and glycosylated haemoglobin (HbA1c) while serum fructosamine is recommended for screening elderly populations (ibid).

According to Greene (1993), Type 1 diabetes is genetically determined and results from the destruction of the islet beta-cells in the pancreas by the auto-immune process. Type 2 diabetes may be caused by reduced insulin secretion, relative insufficiency (lack of insulin secretion for the increased metabolic needs e.g. obesity), insulin resistance and hyperinsulinaemia. This leads to poor utilisation of endogenous insulin in the liver, muscle, and adipose tissue.

## **2.2 Prevalence of diabetes**

An estimated 140 million individuals worldwide have diabetes (Preston, 1998; Van Rooijen, 2004). According to the World Health Organisation (1997), the rise in diabetes prevalence is expected to be highest in Africa, mostly due to an ageing population, unhealthy diets, and obesity.

The diabetes prevalence rate (analysed from 1958 to 1989), ranged between 0.1 % to 3.8% across the African population (McLarty, 1991) and the rates differ between urban and rural populations. A Tanzanian study showed that diabetes was more prevalent in urban communities than in rural ones. Whereas prevalence rate was 5.3% in urban communities, it was only 1.5% in rural communities (Aspray, 2000). In South Africa, it has been estimated that there is more than one million known diabetics, and possibly an equal number undiagnosed (Bonnici, 1997). Prevalence figures of 6.0% and 4.8% for urban and rural populations respectively, have been reported (Mollentze, 1995). It has also been shown that prevalence rates show variation within ethnic groups and across age groups (Knight, 1997). For example, in South Africa's KwaZulu-Natal province, black females (5.2%) were twice more likely to have diabetes compared to black men (2.3%), (Omar, 1993). In the Western Cape province, prevalence rates vary across the population groups - Indian origin (13.5%), Coloured (8%), Black (6-8%) and Whites (5%), (Levitt, 1993; Kalk, 1998). Among the low socio-economic Coloured community, diabetes is common among those aged 65 years and over (8 % - 28%), (SEMDSA, 1997). Studies point towards a dual burden comprising an increasing prevalence of

diabetes and associated infections leading to serious complications amongst black South Africans (Levitt, 1997; Kalk, 1998).

Optimal diabetes management requires concerted efforts by health care professionals to help reduce the morbidity and complications associated with the condition.

### **2.3 Complications associated with diabetes**

Persistent high blood glucose levels could result in the glycosylation of proteins resulting in the irreversible damage of tiny blood vessels and nerve endings in the areas furthest from the heart, retina, renal glomerulus, the nerve sheath and the cellular membranes (Lundstrom, 2004; White, 2004).

Macrovascular complications (which affect the larger blood vessels in the body), are common among Type 2 diabetic patients. These patients are more likely to suffer from coronary heart diseases including hypertension, atherosclerosis and thrombosis. About 75% of macrovascular diabetic mortality is due to coronary heart disease (CHD); the remaining 25% results from a combination of accelerated cerebral vascular disease, peripheral vascular disease, or both (Sowers, 2001). Research has shown that tight control of blood sugar levels minimizes the risk of complications (DCCT, 1993).

### **2.4 Diabetes mortality in South Africa**

According to the National Department of Health (1994), diabetes accounted for up to 11.4% of the recorded 213 279 deaths in South Africa. Groenewald (2003) found that in Cape Town alone (2001), diabetes contributed to 5.3% of the total number of reported deaths (23 185). Kalk (1998) has estimated that amongst women, death from diabetes accounted for 18.2% of deaths amongst Asians, 7.1% amongst the Coloureds, 4.3% amongst the Blacks and 3.0% amongst the Whites. Mortality rate amongst Black, Coloured and White men due to diabetes ranged between 2.0 -

2.5%, with a two-fold rate among Asians at 4.9%. Groenewald (2003) has made several recommendations that could be considered in an attempt to curb increasing mortality rate due to diabetes. These include an increase in public awareness, improving patient detection and an efficient management and follow-up system. Through these efforts, pharmacists too can play an important role in counselling patients about their drug therapy and in helping patients manage the disease optimally. However, to make an effective contribution, they must be knowledgeable about the pharmacotherapeutic management of diabetes.

### **2.5 The economic impact of diabetes**

Jönsson (1998) estimated that globally, diabetes consumes 2 to 3% of the total country's health care budget. Increases in diabetes incidence and prevalence, therefore have a significant impact on a country's economy. At household level, diabetes complications such as retinopathy, peripheral neuropathy and amputations, result in loss of personal income, which can impact negatively on economic well-being (Chale, 1992). The overall effect of this is increased hospitalization costs and a heavy burden on health and welfare services. This is especially so in developing countries where health expenditure is high.

In South Africa, private sector healthcare is expensive (Bradley, 1999; Distiller, 2004). Consequently, most patients attend public sector healthcare centres. In 2002, the average annual cost of managing an outpatient in the hospital sector was R1050 (Hamdulay, 1996). This average was shown to be generally higher for tertiary hospitals compared to the costs incurred in community health centres (CHC's) (Hamdulay, 1996; van Zyl, 2002).

Successful treatment of diabetes involves life-style changes for the patient [e.g nutrition, physical activity, self-monitoring of blood and possibly urine, and/or taking medication] (Steil, 1999). The goal of the diet plan for Type 1 patients is to build a healthy daily nutrition intake into a regimen that allows flexibility in insulin

therapy and home monitoring. The emphasis for Type 2 patients should be placed on achieving blood glucose, lipid and blood pressure goals (ibid).

## 2.6 Management of diabetes

Detection of diabetes is essential because complications can begin early in the course of the disease, even before symptoms develop (White 2004). Lipid disturbances, obesity and hypertension are common in Type 2 diabetes, and probably contribute to the high prevalence of vascular disease. Type 2 diabetes mellitus, is a “silent disease” that can go undetected for about 10 years and will often present with neuropathy and/or vascular complications. The first signs of diabetes may present as thirst, polyuria, nocturia, genital itchiness, tiredness and visual blurring (Steil, 1999).

According to the Guidelines for the Management of Diabetes (2003), diabetes is determined from the following:

- fasting blood glucose levels (FBG): greater than ( $>$ ) 7 mmol/L normal (4.0 to 7.0 mmol/L)
- random blood glucose (RBG) plasma levels: normal greater than or equal to ( $\geq$ ) 11.1 mmol/L

In asymptomatic patients a single random blood glucose  $>11.1$  mmol/L and fasting blood glucose levels greater than  $> 7$  mmol/L is inadequate for diagnosis. The abnormal value must be confirmed at least once before diabetes is diagnosed. If the results are uncertain the patient requires a glucose tolerance test with ingestion of 75 grams of oral glucose after an overnight fast. The diagnosis of diabetes is established if the fasting blood glucose  $\geq 7.8$  mmol/L and/or 2 hours post load blood glucose  $\geq 11.1$  mmol/L.

There is a need for caution when interpreting blood glucose concentration because normal whole blood glucose values are approximately 15% lower than plasma glucose values. Drug treatment should be initiated at a random blood glucose level greater than ( $>$ ) 15 mmol/L or FBG greater than or equal to ( $\geq$ ) 10 mmol/L.

Pharmacists should be able to understand and interpret blood glucose levels, so that they can assess and refer poorly controlled patients with diabetes.

## **2.7 Treatment**

The therapeutic objectives are to maintain blood glucose within normal limits without causing dangerous hypoglycemia, to keep urine as free as possible of glucose and to prevent or delay the long-term complications associated with diabetes.

Pharmacologic intervention is necessary if an appropriate diet and exercise program (weight reduction) does not adequately improve glycaemic control (Steil, 1999). Drug treatment includes hypoglycaemic agents and may include antihypertensives, lipid-lowering drugs, anti-clotting medication, sexual dysfunction drugs, antidepressants and analgesics (White, 2004). Treatment is individualised according to blood glucose levels, age, nutritional status, activity level and/or other disease conditions. Drug therapy, diet and exercise help control blood sugar levels.

Dyslipidaemia and hypertension are co-morbid conditions closely associated with diabetes and they also require close monitoring. If a routine diabetes management plan including diet, weight loss, and improved glycaemic control do not successfully achieve these goals within three to six months, lipid-lowering drug therapy should be considered. Therapy must be started immediately if the patient has established cardiovascular disease. Diabetes dyslipidaemia and hypertension are co-morbid conditions closely linked to diabetes. Type 1 patients have an absolute lack of insulin, so diet, exercise, self-monitoring of blood glucose, and insulin are necessary for proper management (Greene, 1993; Steil, 1999).



### 2.7.1 Insulin

There are numerous types of insulin regimens, from one to two injections a day, to multiple daily injections or a continuous subcutaneous insulin infusion with an insulin pump (Yang, 2004). Insulin is a polypeptide hormone that controls the storage and metabolism of carbohydrates, proteins and fats. It reduces blood glucose levels and if found in excess, can cause life-threatening hypoglycaemia.

Insulins are differentiated on their duration of activity and the route of administration of insulin is subcutaneous (SC). The South African Medicines Formulary, edited by Gibbon (2005) provides an overview about the pharmacotherapeutic and pharmacodynamic profiles of the different insulins and serves as a useful reference tool for pharmacists. Insulin is given intravenously only in emergencies and only fast/ ultra fast insulin is given by this route. In most cases, combination insulin therapy is recommended to achieve optimal control of blood sugar level.

International colour codes have been used to differentiate insulin therapy of different duration of action (Bonnici, - personal communication-16<sup>th</sup> October, 2004). The short acting insulin is yellow, medium-acting green, long-acting blue, and the biphasic insulin is coded brown. Such colour coding enable patients to identify the type of insulin being used especially when combination therapy is prescribed.

### 2.7.2 Oral hypoglycaemic agents

The oral hypoglycaemic agents are classified into the sulphonylureas, biguanides and a newer group of compounds.

i) *Sulphonylureas* e.g. glibenclamide (Daonil®; Clamide®), gliclazide (Diamicon®), glipizide (Minidiab®; Glibenese®), glimepiride (Amaryl®).

These agents act by stimulating the release of endogenous insulin from  $\beta$  cells of the pancreas, and increase binding of insulin to target tissues and receptors. However they are not insulin sensitizers and therefore do not address the problem of insulin resistance.

ii) *Biguanides* e.g metformin (Diabetmin®; Glucophage®; Dextrin®)

These agents act by decreasing hepatic glucose production and glucose absorption from the gastrointestinal tract. They produce beneficial changes in the lipid profile by decreasing triglycerides, low density lipids (LDL) cholesterol and total cholesterol but have no significant effect on high density lipids (HDL) cholesterol. Metformin often causes some welcome weight loss and is recommended in obese patients. It is best to avoid concurrent alcohol consumption.

iii. The newer groups of drugs include the :

Thiazolidinediones e.g Pioglitazone (Actos®) and rosiglitazone (Avandia®).

Meglitinides e.g Repaglinide (Novonorm®) and nateglinide (Starlix®)

Alpha-glucosidase inhibitors e.g acarbose(Glucobay®) and miglitol(Glyset®).

### **2.7.3 Aspirin and heart disease**

Aspirin is used as a secondary prevention therapy in individuals who have evidence of large vessel disease e.g angina or myocardial infarction (MI). It is also used in individuals with diabetes type 1 and 2 with cardiovascular risk factors. Low dose aspirin has antiplatelet effects which help to reduce the risk of adverse events such as coronary artery disease (CAD). The adverse effects of aspirin are gastric irritation which may cause abdominal pain, nausea, vomiting, and hidden mucosal bleeding.

### **2.8 Health care in the Western Cape**

The South African health system aims to provide equitable and accessible health care (Ntuli, 2004). The health system consists of a large public sector, which is under-resourced, overused, and serves 80% of the population. A smaller private sector caters for the remaining 20% of the population - the middle and high-income earners who belong to medical schemes (ibid). Sixty percent of doctors and more than 70% of pharmacists work in the private sector (Padarath, 2003/4). In 2004, it was estimated that there were about 10 891 registered South African pharmacists of which 17% (1 855) served the Western Cape (Health Statistics, 2006). Attempts have been made to increase pharmacist

intern posts in the Western Cape public sector from 14 to 25 (M. von Zeil, e-mail communication 16 May, 2005).

The decentralised public health system divides the province into four health regions: Cape Metropole, West Coast Winelands, South Cape/Karoo and Boland/Overberg which are further sub-divided into 25 health districts (McCoy, 1999). In the Cape Metropole, there are 11 health sub-districts, serviced by the Department of Health through the Metropole District Health Services (MDHS), the primary health care services (PHC), and the secondary and tertiary hospitals (Haynes, 2002).

### **2.9 Primary health care (PHC) services and the district health system (DHS)**

Primary health care (PHC) is the foundation of the health system, which is a municipal-based district health system (DHS), (Haynes, 2002). The two primary service providers consist of the City Health (Local Authority) and the Provincial Administration of the Western Cape (PAWC). District authorities manage primary health care clinics while provincial authorities control hospitals.

City Health provides offers services such as immunization, nutrition, reproductive health (family planning), tuberculosis and sexually transmitted disease management while PAWC provides other services such as the regular emergency patient consultations for various common and minor diseases and management of chronic conditions.

PHC centres provide a range of services, which include immunization, communicable and endemic disease prevention, maternity care, integrated management of childhood illnesses (IMCI) and child health care, health promotion, youth health services, counselling services, chronic diseases, diseases of older persons, rehabilitation, accident and emergency services, family planning, and oral health services (South African Year book, 2000/01). Many Western Cape citizens do not have health insurance (Internet Department of Health, 2006) therefore they rely on health care from the public sector MDHS facilities.

## **2.10 Metropole District Health Services (MDHS)**

MDHS facilities offer primary health care services which are managed by medical officers, nurses and pharmacists (Human, 1998; South African Year book, 2002/03). The services offer curative health care, midwife obstetric unit services (MOU), trauma/emergency and minor surgery (ibid). Provision of care adheres to national and provincial guidelines and standard treatment guidelines. South Africa's essential drugs program is aligned with the primary health care concept of universal access to cost effective and affordable health care for all citizens. Rational pharmacotherapy is the cornerstone of the public sector health service.

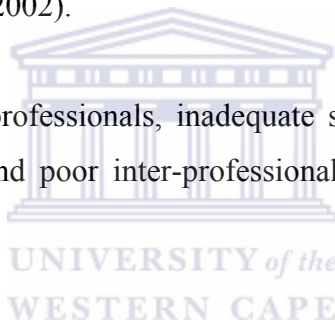
## **2.11 Health services barriers to diabetes management**

According to Goodman (1997) gaps between knowledge and practice contribute to poor management of diabetes in primary health care facilities. The lack of full participation by pharmacists in chronic disease management such as diabetes is likely to compromise the quality of care. Nau (2000) has suggested that the involvement of pharmacists in diabetes care services will help to identify patients who are not reaching the desired therapeutic end points. Anderson (2003) found that pharmacists sometimes react only to patients' questions rather than giving them proactive advice when counselling.

Primary care management of diabetes is crucial if morbidity, mortality and the economic burden are to be reduced. A study by Levitt (1996) showed that up to 50% of diabetic patients in Cape Town primary health care centres were not attending clinics. It was also found that between 75 to 90% did not have their medications changed although there were indications that their conditions were not well controlled by the existing treatment regime. Shankar (2001) has recommended the use of additional hypoglycaemic agents to maintain good control of blood glucose levels.

Diabetes is a complex disease that requires concerted efforts by all health care professionals especially in primary care facilities where specialist care is inaccessible. A team approach to diabetes management is therefore essential if patients are to benefit from primary care (Donnelly, 1990; Levitt, 1996; Kalk, 2000). Some MDHS centres have diabetic clinics or “diabetic clubs” once or twice a week (Goodman, 1997). These clubs are staffed by doctors, primary health care nurses, registered nurses, staff nurses and pharmacists. Their collaborative efforts offer different perspectives, skills and knowledge for the benefit of the diabetic patient. However, very few pharmacists actively participate in these teams, resulting in under-utilisation of an available resource. Pharmacists compartmentalize their roles and see themselves only as dispensers of drugs rather than full participants and view health care provision to be the domain of doctors, nurses and dietitians (Hibbert, 2002).

Poor remuneration of health professionals, inadequate space and resources, time constraints, lack of training and poor inter-professional communication are also barriers to care (Mays, 1994).



## **2.12 Pharmacy practice in South Africa**

Pharmacists are recognized as the custodians of medicine - they guard its safety, quality and efficacy (Kotze, 2000). One of the guiding principles of the South African National Drug Policy (1996) is that pharmacists should take responsibility for medicine-related issues to ensure that care is effectively managed to achieve health gains. Pharmaceutical care underpins appropriate medication use aimed at improving the patient’s quality of life, one that involves a focus change for the pharmacy from product to patient (Management Sciences for Health (MSH) and WHO, 1997; van Mil, 2004). However, South African pharmacists have been slow in adopting the basic principles of pharmaceutical care (Futter, 1998).

The Good Pharmacy Practice Manual (1997) lists some of the activities guiding the scope of pharmaceutical practice in South Africa as:

- management of the pharmaceutical services;
- manufacture, compounding and distribution of pharmaceuticals;
- dispensing and ensuring the quality use of medicine;
- providing pharmacist initiated therapy;
- providing medicine information and education;
- promoting public health;
- promoting communication; and
- conducting research and the development of new drugs.

The role of the pharmacist in diabetes could assist overburdened nurses and doctors in identifying poorly controlled patients by monitoring therapy and counselling on lifestyle modification in accordance with local guideline recommendations.

### **2.13 Role of the pharmacist in diabetes management**

In the USA and UK, there is a shift towards greater pharmacist involvement in patient orientated services in diabetes management (Campbell, 2002; Meece, 2003; Till, 2003; Simpson, 2004; Undeberg, 2005).

Decker (1988) asserted that pharmacists are a greatly underutilized resource in diabetes management, this is despite the fact that they play a pivotal role in counselling and disseminating information on drug and non-drug treatment. Pharmacists can encourage patient self-management (Daniel, 2005) by monitoring therapy, in accordance with laboratory data. For example, glucose and glycosylated haemoglobin (HbA1c) levels, lipid profile and blood pressure measurements can be monitored and reviewed along with monthly prescription refills. Equally important, is their involvement in encouraging patients to care for their eyes and feet (Anderson, 2003; Pray 2003). This requires that they have good pharmacotherapy skills to identify patients who have poor control and recommend appropriate strategies that would prevent complications and a diabetic checklist would serve as a useful reminder.

## 2.14 Diabetes checklist for pharmacists

Knight (1997) has recommended the use of a time-saving checklist that could help pharmacists engage in a therapeutic plan for the management of diabetes. The checklist may include:

- Encouraging patients' self-monitoring of blood glucose levels through random testing and recording of blood glucose levels.
- Encouraging regular cholesterol screening; the monitoring of blood pressure Should be should be < 130/80 or 140/90 mmHg), eye and foot examinations, checking heart status and/or risk (electrocardiogram), dermatological and dental assessment;
- Encouraging annual to quarterly testing and recording of glycosylated (glycated) haemoglobin A1c (HbA1c). Good control level is (less than)  $\leq 7\%$ .
- Taking regular urinalysis to test for microalbuminuria, proteins and ketones;
- Maintaining ideal body weight;
- Checking appropriateness of antidiabetic regimen and aspirin use;
- Checking adherence to nutrition and exercise plan.

Patient adherence to therapeutic plans depends on active involvement of pharmacy staff. Short-term continuing education programs have resulted in improved knowledge and attitudes in the management of diabetes (Chen, 2004).

## 2.15 Continued professional development programs for pharmacists

Continuous professional development programs (CPD) in South Africa are endorsed by the South African Pharmacy Council (SAPC). The Pharmaceutical Society of South Africa (PSSA) mentors and facilitates CPD programs that are usually sponsored by pharmaceutical companies. However, attendance of public sector pharmacists at these courses is limited (Margaret von Zeil – personal communication, 2005). It has been seen that continuing medical education (CME) is not a very effective way of changing performance in practice because little

attention is given to overcoming specific barriers to change (Haynes, 1984; Davies, 1995). Generally CME's are conducted away from the workplace. This necessitates the use of alternative educational strategies when implementing professional programs. In-service tailored educational meetings may be an alternative approach to update pharmacists on therapeutic approaches.

Pharmacists at individual institutions are encouraged to attend lectures and other forms of professional development at their facilities. In the Western Cape, the University of Cape Town (UCT) circulates course notices to MDHS pharmacies on behalf of the Medicine Information Centre (MIC). An independent service provider offers a hypertension course that is conducted off-site for health professionals such as pharmacists, doctors and nurses (Perkin, personal communication, 2005 and 2006). An on-site diabetes educational program tailored for pharmacists working in the public sector has yet to be implemented.

### **2.16 Educational courses for pharmacists in diabetes management**

The quality of care in some clinics and hospitals in South Africa, does not meet the recommendations as stated in the current diabetes guidelines (van Zyl, 2004). In the Western Cape, an audit of four MDHS facilities' use of diabetes and hypertension guidelines showed that these were not systematically implemented (Clark, 1999; Levitt, 1999; van Zyl, 2004). This may mean that health care professionals might need educational training or support to adhere to guideline recommendations.

Private service-providers usually offer training programs for community pharmacists on the management of diabetes. Wallis (1996) in collaboration with Technipharm, developed a training program designed for diabetes care by community pharmacists in South Africa. This patient oriented program, which was in line with the country's legislative requirements, has been endorsed by the SAPC. However, low attendance at these training programs could be attributed to the high course fees and the cost of traveling to the venue. Such programs are not directed to pharmacists working in the public sector.



In order to minimize travel costs and locum fees, on-site educational programs may be an option. Such outreach programs have been shown to improve knowledge and change professional practice (Soumerai, 1990; Grol, 1999; Grimshaw, 2005). The National Drug Policy (1996) recommends that drug products be handled by adequately qualified personnel who can be held responsible and accountable. It further supports the implementation of in-service training programs to address on-the-job requirements of health care professionals. Educational outreach programs that offer patient-centred care may be considered as a viable option. Therefore, an educational outreach program for pharmacists could result in improvements in knowledge, attitude and practice patterns (Soumerai, 1990; Gerstein, 1999; Grol, 1999; Grimshaw, 2005).

### **2.17 Guideline implementation strategies**

The Oxford dictionary (2002) defines a guideline as a general rule, instruction, or piece of advice. Clinical practice guidelines describe different aspects of the patient's condition and the care to be given in a convenient readily usable format (Eddy, 1990; Field, 1990; Grol, 1995; Hutchinson, 1999). Guidelines can be used for promoting quality and rational drug use (James, 1997; Grol, 1995). However, the development and availability of guidelines do not guarantee good practice (Lomas, 1991). Implementation of guidelines is a universal problem amongst health care practitioners. Factors that limit the use of guidelines include: their perceived usefulness; the conflict with clinical freedom; the preference to perform routine activities; and poor access to the guidelines (Conroy, 1995; Watt, 1999). To overcome these barriers, Grol (1995) suggested the use of an intervention package consisting of educational reminders on the latest therapeutic approaches and whose content is peer reviewed.

For the effective implementation of guidelines, Baker (1999) and Watt (1999) have suggested several strategies. These include: audit and feedback; educational outreach; academic detailing; use of opinion leaders; and sharing clinical guidelines

with patients. Their success, however, depend on behaviour change by the relevant health care professional. Positive attitudes and perceptions of the health providers towards the guidelines are critical for successful implementation (James, 1997; Mohammed, 2001). Successful implementation of guidelines is also dependent on what they are used for and how they were developed (Grimshaw, 1995; Grol, 1995). In South Africa some hospital staff do not follow clinical guidelines in the management of chronic lifestyle diseases (Clark, 1999; Levitt, 1999; Kalk, 2000; Mohammed, 2001; van Zyl, 2004). Face-to-face education with individual instruction, computer reminder systems and peer review with practice visiting, has been shown to work well in changing professional practice (Conroy, 1995; Grimshaw, 2005).

Since people with diabetes encounter pharmacists more than any other health care provider (Taylor, 2003) for prescription refills, it is important for the pharmacists to know how to interpret monitoring parameters (Brown, 2002). They can then counsel and guide patients on how to self-monitor blood glucose (SMBG). Therefore, providing educational programs that would help them understand and interpret blood glucose levels, increase their awareness, and equip pharmacists with the skills to encourage self-management among patients. Educational outreach programs that address these needs could change professional practice.

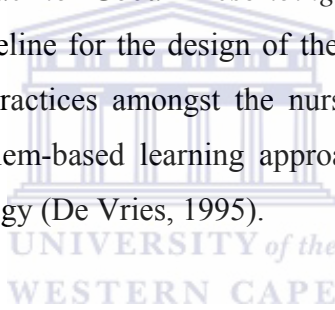
### **2.18 Educational outreach programs**

Educational outreach is a program in which a trained health care professional conducts brief face-to-face meetings with health care providers in their practice settings, with the aim of changing their clinical performance (Avorn, 1983). In this approach, emphasis is placed on providing health care professionals with relevant, localized, up-to-date information on therapeutic approaches.

Generally, educational outreach programs have been shown to be successful in developed countries. For example, in a study by Fedder (1988), pharmacists demonstrated improvement in professional practice after an intervention that helped

them to systematically follow-up and monitor hypertensive patients. In Chen's study (2004), pre- and post-intervention measurement tests showed improvement in pharmacists' attitudes and an increase in knowledge of the management of diabetes. There have been improvements in knowledge, attitude and self-reported practice patterns among physicians who participated in educational outreach programs (Gerstein, 1999). Such programs can also be adapted in resource-poor countries, to enable pharmacists to fulfill their professional roles.

Educational outreach programs have been conducted for conditions such as asthma (Bheekie, 2001), malaria (Tavrow, 2003), tuberculosis (Fairall, 2005) and for upper respiratory tract infections (Meyer, 2001). These studies underpin the effectiveness of outreach programs in improving practices among health care professionals. Meyer (2001) used the *Guide to Good Prescribing* manual (World Health Organisation, 1995), as a guideline for the design of the training programs which led to improved prescribing practices amongst the nurses. Outreach educational programs also include a problem-based learning approach (PBL) as part of the guideline implementation strategy (De Vries, 1995).



### **2.19 Problem-based learning**

Problem based learning (PBL) is described as learner-centred, it involves choosing a relevant problem that mimics a real-life situation and developing appropriate knowledge and skills (Hmelo, 1998) to solve it. PBL strategies include the use of learning cases, small group discussion and cooperative activities (ibid).

Some studies have demonstrated successful outcomes with the problem-based approach during pharmacotherapy training, (De Vries, 1995; Akici, 2003). These include knowledge retention and the ability to apply their newly acquired skills (the transfer effect). Problem-based training in pharmacotherapy is one of the several activities that have proved very useful and effective in promoting rational drug use (Laing, 2001).

Undergraduate modules employ the PBL technique to prepare students for their on-site pharmacotherapy / clinical programmes (UWC, School of Pharmacy course outline, 2005). The objective and structured clinical examination (OSCE) is used to assess student performance under controlled conditions on campus. This assessment tool has been modified to assess their pharmacotherapeutic skills during service-learning. Such a tool could also be used to monitor or assess the pharmacist's pharmacotherapy skills at the pharmacy outpatient counter. This would enable pharmacists to become aware of potential deficiencies in the practice pattern, especially in chronic disease management where therapeutic monitoring is essential.

### **2.20 Education of the patient**

Diabetes is a lifelong disorder which always requires adherence to a specialized diet and often needs compliance with various pharmacological interventions (Knight, 1997). Patients will not, on their own, be able to manage their condition without being given the appropriate knowledge and understanding as to why they have to do things differently (Naidoo and Willis, 2000). To encourage patient adherence to treatment (pharmacological or non-pharmacological), they must be informed about the disease and its consequences to minimize the onset of complications (Roberts, 2004).

Pharmacists are in the ideal position to teach patients the importance of complying with their drug treatment to achieve glycaemic control which is within recommended levels (DCCT, 1993; UKPDS, 33; 34; 35 1998) and good blood pressure control (UKPDS, 38; 39 1998; Hypertension Optimal Treatment (HOT) trial, 1998). Such monitoring has been found to minimize the progression of diabetes and reduce the risk for developing complications.

Doctors and pharmacists seem to explain too little about the use of medicines. Even though pharmacists have the knowledge, they are not very eager to share their knowledge with the patients to assist them to better manage their condition,

including diabetes (Hexheimer, 1993). It seems this unwillingness may be entrenched in past practice habits. Also, lack of enough knowledge prevented them from proactively sharing the information while counselling patients. Pharmacists should ensure that both the patients and their caregivers understand the factors that may lead to poor control of diabetes.

Pretorius (2003) explained that it is the duty of the pharmacists to warn patients about harmful side effects. The SAPC regards this duty as sufficiently important to reproduce it as an ethical rule. There is a need for educational programs that can encourage pharmacists to proactively share drug information (Anderson, 2003). Concerns about being “intrusive” in offering potentially unwelcome health advice predisposes one to a reactive stance (ibid).

## **2.21 Conclusion**

Diabetes incurs substantial morbidity in South Africa. It places a huge burden on the public sector health services where adherence to guideline recommendations is limited. Primary care diabetes management requires the concerted efforts of all health care professionals, especially the pharmacist. The implementation of a diabetes educational outreach program could improve the knowledge and subsequently change current practice patterns.

A review of the research methods to design, implement and evaluate an outreach program for pharmacists would be useful.

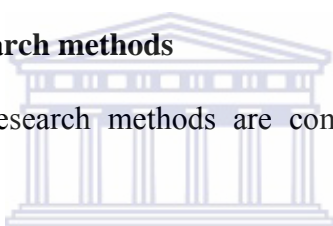
## CHAPTER 3

### RESEARCH METHODS USED IN STUDY

I provide an overview of research methods (Section A), and describe how these were applied in the study (Section B). In this exploratory study, both qualitative and quantitative methods were used. The study was directed at pharmacists working in purposively selected community health centres of the Metropole District Health Services (MDHS) in the Western Cape province. A pre- and post-test design was used to assess receptivity of the diabetes educational outreach intervention (Bless, 1995).

#### 3.1 Section A: Review of research methods

Qualitative and quantitative research methods are commonly used in health service research.



##### 3.1.1 Qualitative research and triangulation

Qualitative research explores people's subjective understandings of their everyday lives. Its methods include direct observation, interviews, the analysis of texts or documents, recorded speech or behaviour, and audio/video tapes (Neuman, 2000; Pope, 2000). Qualitative research involves giving a thick description of events. Patton (1990) argues that sufficient description and direct quotations should be included so that the reader can enter into the situation and thoughts of the people. This involves detailed portrayals of participants' experiences, uncovering feelings and interpreting the meaning of their actions (Holloway, 1996; Merriam, 1998).

Several qualitative methodologies can be used concurrently to bring about better understanding of the research topic. The use of more than one method to understand the topic under investigation is called triangulation (Creswell, 2004). Triangulation embraces multiple data sources and methods. For example, data can be obtained by using both a questionnaire and interviews. This has the advantage of producing

insight and understanding in ways that one method alone cannot achieve (Bernard, 1994).

### 3.1.2 Quantitative research methods

Quantitative research methods involve the collection of facts to study their relationship to each other. The methods use techniques that are likely to produce quantified and, if possible generalisable conclusions (Bell, 1993). Data is converted into numbers which are analysed statistically to test hypotheses (Armstrong, 1990).

Table 3.1 below summarizes some of the fundamental attributes of qualitative and quantitative methodologies.

**Table 3.1: Summary of Qualitative and Quantitative research attributes (Cook, 1979)**

Qualitative research	Quantitative research
<p>Concerned with understanding human behaviour from the actor's own frame of reference.</p> <p>Valid; "real," "rich," and "deep" data that shows "insider" perspective.</p> <p>Assumes a dynamic reality.</p>	<p>Seeks the facts or causes of social phenomenon with little regard to the subjective states of individuals.</p> <p>Reliable; "hard," and replicable data that shows "outsider" perspective.</p> <p>Assumes a stable reality.</p>

### 3.1.3 Mixing of research methods

Many researchers combine both qualitative and quantitative methodologies to bring together complementary information in order to best understand the research topic. Mixing different methods of investigation involves the integration of quantitative and qualitative data collection and analysis into a single study. The two approaches can be combined in several ways. There are four ways that quantitative and qualitative methods might be integrated (Steckler, 1992). Firstly, qualitative methods can be used to help develop quantitative measures and instruments. For example, the results of an interview survey can be used to help formulate a questionnaire. Secondly,

qualitative methods can be used to help explain quantitative findings. Thirdly, quantitative methods can be used to enhance the results of a primarily qualitative study. Lastly, qualitative and quantitative methods can be used equally and parallel to each other. Depending on the nature of the problem under investigation, one method might be given more weight than the other or they might be used in balance. Data is integrated, related, or mixed at some stage of the research process, yielding a more complete analysis (Creswell, 2004).

### **3.2 The research design**

Research design has two meanings. It can be understood as the planning of any scientific research from the first to the last step or a set of guidelines and instructions to be followed in addressing the research problem (Mouton, 1996). It enables the researcher to anticipate what appropriate research decisions should be made. There are various types of data recording and collection instruments used in quantitative and qualitative research.

### **3.3 Data collection instruments**

In *quantitative* research, survey instruments consist of interviews, self-administered questionnaires, structured record reviews, and structured observation (Fink, 1995).

#### **3.3.1 Interviews**

The interview is the most commonly used qualitative technique in healthcare settings (Pope, 2000). Interviewing involves direct contact with persons who are capable of providing information. The researcher must establish a good working relationship with the informant (DePoy, 1994; Denzin, 1998; Merriam, 1998; Neuman, 2000; Babbie, 2001).

An interview has the advantage of flexibility (Darling, 1986). For example if an interviewees misinterprets a question the interviewer can clarify it and make sure that the (s)he understands. Many people are more willing to take part in an interview than to sit down on their own and complete a questionnaire (Darling, 1986). Personal reaction between interviewer and interviewee may be positive or negative due to



voice projection, the way questions are read or phrased and appearance, dress or accent (ibid).

Interviews can be expensive in time and travel if the study is on a wide geographical basis (Darling, 1986). The analysis of interviews can be time consuming for example if notes are made during the interview some comments may be missed and the notes have to be read and analysed (ibid).

Table 3.2 below summarizes the advantages and disadvantages of interviews

**Table 3.2: Summary of the advantages and disadvantages of interviews (Darling, 1986)**

Advantages	Disadvantages
<p>In-depth information can be obtained</p> <p>Can explore unexpected and interesting topics and is flexible</p> <p>Personal rapport build up</p> <p>High response rate</p>	<p>Analysis of open ended responses to questions is lengthy</p> <p>Transcription of information can be costly</p> <p>Possible interviewer bias</p> <p>Time consuming to conduct</p>

There are four types of interviews; unstructured, structured, semi-structured and in-depth. A structured interview entails the preparation and use of the same questions to interview a number of people (Bernard, 1994; Morse, 1994). For in-depth interviews the questions are based on what the interviewee says and one or two issues are covered in great detail (Pope, 2000).

Unstructured and semi-structured interviews are characterized by a minimum of control over the interviewee's responses (Bernard, 1994). The idea is to get people to open up and let them express themselves in their own terms, and at their own pace. In an unstructured interview, the researcher introduces a theme or topic. The

interviewee develops his or her ideas. Both semi-structured and unstructured interviews allow interviewees to use their own words and develop their own thoughts. Sometimes the interviewing style is curious rather than investigative and encourages the interviewee to do most of the talking (Rollnick, 1999).

Unstructured interviews are used primarily in naturalistic research and exploratory type studies (DePoy, 1994). The researcher initially presents the topic of the interview to a respondent and then uses probing questions to obtain information. The interview begins with an explanation of the study purpose. For example, if the aim is to identify practice experiences, the researcher may start by asking an open-ended question such as, “could you please describe your daily experiences as a care giver?” Other probing questions emerge as a consequence of the information provided by this initial query (DePoy, 1994).

### **3.3. 2 Questionnaires**

Questionnaires are one of the most widely used social research techniques. They can be mailed, administered telephonically or face-to-face with the respondent. Another method is the drop-and-collect technique. A self-administered questionnaire is left with the respondent and collected later (Bernard, 1994).

The type of questions and the layout of the questionnaire are important parameters when conducting a survey study.

A self-administered questionnaire contains the sender’s details and focused questions. The questions can either be closed or open (Armstrong, 1990). Closed questions can be answered with *yes-no* or *true-false* responses, or by selecting an answer from a list of suggested responses. The respondent places his or her answer within a given range of choices (Armstrong, 1990; Harding, 1990). Some exploring questions to measure change in practice use response alternatives such as: all the time, about 1 out of every 10 patients, about 1 out of every 30 patients, about 1 out of every 50 patients and never. Some questions are based on the Likert type rating scale and may comprise four response alternatives such as *strongly agree/ agree/ disagree/strongly disagree* (Singleton, 1993).

The layout of the questionnaire must appear neat, clear and attractive. Linking phrases are necessary to ensure a smooth link-up between sections. Finally, the questionnaire must be tested in a pilot study which helps to remove any ambiguities (Armstrong, 1990).

Strategies to improve response to questionnaires include telephone reminders, offering respondents monetary incentives and enhancing the colour of the questionnaire paper (Bernard, 1994).

The advantages are that all respondents receive the same questions thereby eliminating interview bias. Further, self-administered questionnaires use more complex questions than in an interview. Study participants find it easier to report socially undesirable behaviours and traits when completing questionnaires (Bernard, 1994).

The disadvantage of a questionnaire is that there is no control over how people interpret questions: for example, in a self-administered questionnaire, a respondent can read subsequent questions before hand thereby influencing the response (Bernard, 1994).

In *qualitative* research focus groups and participant observations are commonly used methods of enquiry.

### **3.4 Focus groups**

The focus group is an interview style designed for small groups (Berg, 2001). It relies on interaction within the group based on the topics that are supplied by the researcher who typically takes the role of a moderator. The distinctive feature of a

focus group is the explicit use of group interaction to produce data and insights that would be less accessible without the interaction found in a group (Morgan, 1998).

### **3.5 Participant observation**

Fieldwork can involve two quite different roles, where the researcher is a participating observer and/or an observing participant (Bernard, 1994). There are two common types of observations; simple observation and participant observation (Pope, 2000). The former involves the unobtrusive and systematic observation of the phenomenon of interest while the latter requires that the researcher joins the group of people who are being studied in order to observe interactions and better understand their behaviour, feelings, attitudes or beliefs (Stein, 1980; Bless, 1995; Pope, 2000). Most studies are based on the former, but in some studies, researchers who start as participating observers, find that they are completely drawn into the participants' lives and thus become observing participants.

Field notes consist of any written account of the observation, which are analogous to the interview transcript (Merriam, 1998). It is a technique for remembering and recording the specifics of an observation. Denzin (1998) states that field notes are constructed representations of experience. During participant observation interviews, field notes, check-lists and questionnaires can be used in data collection.

### **3.6 Validity and Reliability**

Validity refers to the degree to which a survey instrument assesses what it purports to measure, whereas reliability refers to whether or not you achieve the same answer by using an instrument to measure something more than once (Bernard, 1994).

### **3.7 Sampling**

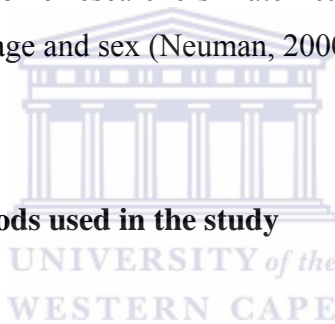
Sampling is the process of selecting a number of individuals for a study in such a way that the individuals represent a larger group from which they were selected (the study population), (Bernard, 1994). The two basic types of sampling are probability and non-probability sampling. Simple random sampling is based on the principles of

probability theory (Bernard, 1994). It is a method used for assigning cases randomly to groups for the purpose of making comparisons (Neuman, 2000). There are four basic types of non-probability convenience sampling: purposive or judgement sampling, snowball sampling and quota sampling (Bernard, 1994; DePoy, 1994). The disadvantage of non-probability, non-random purposive sampling is that such studies have very low external validity and generalizability is limited to the sample (Bernard, 1994). However, when backed up by ethnographic data, studies based on these sampling methods are frequently highly credible (ibid).

### **3.8 Matching**

Matching is an alternative to random assignment. In matching one forms pairs of members having identical characteristics considered as relevant for the research (DePoy, 1994; Bless, 1995). Some researchers match cases in groups according to certain characteristics, such as age and sex (Neuman, 2000).

### **3.9 Section B: Research methods used in the study**



The hypothesis of this study is that implementation of the diabetes educational outreach intervention should result in an improvement in knowledge and practice pattern of pharmacists.

The study design and research methods are outlined in Table 3.3. For this pre- and post-intervention study qualitative and quantitative research methods were employed. Qualitative research methods were selected to generate rich, detailed data that is imbedded in context. Data was collected by means of unstructured depth interviews, field notes and questionnaires. During implementation of the outreach intervention the researcher recorded participants' actions and responses as part of the field notes to evaluate pharmacists' receptivity.

**Table 3.3: Outline of study design and research methods used**

<p><b>Stage one: Pre-intervention / Baseline study</b> (Chapter 4)</p> <p><i>Aim:</i> Identify and assess current practice patterns</p> <p><i>Research methods</i></p> <ul style="list-style-type: none"><li>• Qualitative – observation using a checklist to assess current dispensing pattern (Appendix A)</li><li>• Quantitative – self-administered questionnaire survey to obtain views of an educational programme (Appendix B)<ul style="list-style-type: none"><li>- self-administered questionnaire to assess pharmacists' knowledge of diabetes management ( Appendix C)</li></ul></li></ul> <p>Results from this study were used to design and develop the diabetes pharmacotherapy educational outreach intervention</p> <p style="text-align: center;">↓</p>
<p><b>Stage two: Intervention: Implementation of diabetes educational outreach</b> (Chapter 5)</p> <p>Trained outreach educator used specially designed folder (Appendix D) to highlight key diabetes management principles with pharmacy staff</p> <p style="text-align: center;">↓</p>
<p><b>Stage three: Post-intervention study</b> (Chapter 6)</p> <p><i>Aim:</i> To assess pharmacists' receptivity of the outreach intervention</p> <p><i>Research methods</i></p> <ul style="list-style-type: none"><li>• Qualitative – unobtrusive observations. Researcher took mental notes of actions, responses and / or attitudes towards educator and folder during first and second pharmacy visits</li><li>• Quantitative – self-administered questionnaire to assess knowledge and change in practice pattern in diabetes management (Appendix J)</li></ul>

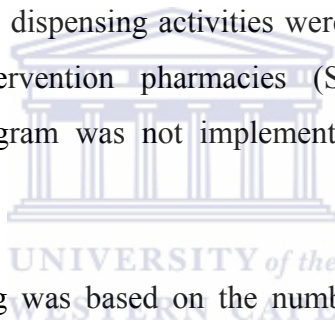
The self-administered questionnaire surveys (pre- and post-intervention) provided quantitative data, which, after analysis, produced generalisable patterns that were used to test the hypothesis. The questionnaires assessed pharmacists' knowledge, attitudes and application of diabetes principles in providing patient-centred care.

### 3.10 Sampling

For the baseline study ten MDHS pharmacies were selected from a total of forty-five in Cape Town. Nineteen (n = 19) pharmacists who worked in these MDHS pharmacies constituted the study sample. Non-probability, purposeful sampling (Bernard, 1994) was used to identify five MDHS pharmacies described in the present study as intervention pharmacies where the diabetes outreach was to be implemented. These pharmacies are established pharmacotherapy learning sites for the final year pharmacy students' service-learning program and are in close proximity to the university. Nine pharmacists worked in these pharmacies. The same five pharmacies were included in the post-intervention study.

#### 3.10.1 Matching

Five pharmacies where routine dispensing activities were carried out were matched and referred to as non-intervention pharmacies (Sinclair, 1999) since the pharmacotherapy training program was not implemented there. Ten pharmacists worked in these pharmacies.



The criteria used for matching was based on the number of pharmacists and the number of patients served at the pharmacy (the patient load per pharmacist). The pharmacies served on average 6 000 patients per month. Sites with equivalent numbers were paired. We assumed that a month is 28 days or 4 weeks. Pharmacies in these facilities operate a five-day week, and are closed on weekends. For example, if a pharmacy served 6 200 patients a month, and it employed two pharmacists, it therefore serviced 1550 patients per week (6200/4 weeks); 310 patients per day (or 1550/5 days in a week). Each pharmacist served (310/2) 155 patients per day. All this can be reduced to:

$$\frac{6200}{4 \times 5 \times 2} = 155 \text{ patients per day}$$

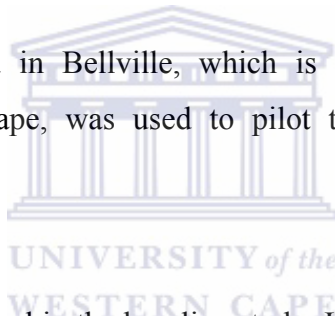
The MDHS staffing level and patient attendance data (2002 - 2003) were used to match the facilities and these are summarized in table 3.4.

**Table 3.4: Matching profile of intervention and non-intervention pharmacies**

<i>Intervention sites (n = 5)</i>	Number of patients	Number of pharmacists	Number of patients /day	<i>Non-intervention sites (n = 5)</i>	Number of patients	Number of pharmacists	Number of patients /day
Delft	6814	2	170	Heideveld	6850	2	171
Parow	3923	1	196	Belhar	3900	1	195
Bishop Lavis	6778	2	169	Hanover	6800	2	170
Vanguard	6800	2	170	Retreat	6780	2	169
Athlone	6701	2	167	Elsies River	6720	2	168

N.B figures in the table are based on averages.

An MDHS pharmacy located in Bellville, which is of close proximity to the University of the Western Cape, was used to pilot the questionnaires and the intervention.



### **3.11 Baseline study**

Nineteen pharmacists participated in the baseline study. It comprised non-participant observation (Bernard, 1994) and the administration of two survey questionnaires.

The aim of this observation study was to assess pharmacists' dispensing patterns. A modified objective structured dispensing examination (OSDE) check list was used (see Appendix A) as the observation schedule. It was designed to assess pharmacists' therapeutic counselling skills applied during dispensing. These include appropriate use of the prescribed drug(s); alerting patients to side effects and how to deal with them; warning patients not to share their medicines; keeping medicines out of reach of children; and general handling of medicines.

When observing the pharmacist at the dispensing window, I stood about one and a half metres on either the left or right side. This was done to minimise disrupting and



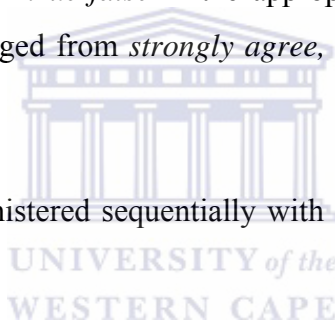
influencing the pharmacists interaction with the patients The observation was followed by the administration of two questionnaire surveys.

### **3.12 Questionnaire survey**

The aim of the first survey was to obtain pharmacists' views and perceptions of their working environment (Appendix B). This questionnaire had both closed (*yes/no*) and Likert-type questions. Data obtained from the first questionnaire was used to structure questions for the second survey.

The aim of the second survey was to assess pharmacists' knowledge of diabetes management. The questions were similar in format to those in the first questionnaire. The closed questions sought to assess the pharmacists' knowledge and required them to respond by ticking *yes-no* or *true-false* in the appropriate spaces provided. The Likert-type scale questions ranged from *strongly agree, agree, disagree to strongly disagree*.

The questionnaires were administered sequentially with a month's interval between the administrations.



### **3.13 Post-intervention questionnaire survey**

The aim of the post-intervention questionnaire (Appendix J) was to assess pharmacists' receptivity of the outreach intervention. It was similar in format to the previous two questionnaires and contained additional questions that were meant to assess if there was some change in practice resulting from acceptance of the intervention by pharmacists. The questions contained alternatives such as; all the time, about 1 out of every 10 patients, about 1 out of every 30 patients, about 1 out of every 50 patients and never.

All the questionnaires used in the pre- and post-intervention study were checked for content and construct validity by two experienced researchers who were knowledgeable about pharmacy practice patterns in the Western Cape. Discussions

with these researchers allowed further modification and rephrasing of items before the questionnaires could be used.

### **3.13.1 Administration of the questionnaires**

In view of the busy workload of pharmacists, I hand-delivered the questionnaires to the participants at the pharmacies to secure their delivery and completion. The questionnaires were self-administered. On average, pharmacists took 30 minutes to complete the two baseline questionnaires and for the post-intervention questionnaire it took about forty minutes.

Response rates for the post-intervention questionnaire were initially low (33 %). Other pharmacists agreed to complete the questionnaire upon receipt of certificates of acknowledgement for participation in the study (Appendix I).

### **3.14 Unobtrusive Interviews**

Interviews were conducted unobtrusively during and immediately after implementation of the diabetes educational outreach intervention as part of the evaluation process. These unstructured interviews were conducted with pharmacists at the intervention sites to obtain in-depth perceptions and views of receptivity of the intervention. Unstructured interviews would help minimize intrusion on the practice pattern and provide an authentic account of receptivity of the intervention.

### **3.15 Data presentation and analysis**

#### *Qualitative analysis*

For the qualitative analysis, responses were categorized into positive and negative responses. This helped to identify significant patterns and themes.

#### *Quantitative analysis*

Questionnaire responses were collated as either positive or negative feedback. Questions marked *strongly agree, agree or yes* were identified as positive feedback, while those responses with *strongly disagree, disagree or no* were identified and

collated as a negative feedback. Recurring patterns to the responses were identified and presented as general observations. Data from the questionnaires were coded and entered into a Statistical Package for Social Sciences (SPSS), version 12.0 and frequency counts were obtained.

Results obtained from a questionnaire survey were compared with those from interviews. In some instances the results complemented each other (Creswell, 2004).

### **3.16 Ethics**

The Senate Ethics Research Committee of the University of the Western Cape authorized the proposed study. A letter of permission to conduct the study was obtained from Cape MDHS (see Appendix K).

### **3.17 Conclusion**

In this chapter research methods were reviewed and the study design was discussed. I demonstrated how qualitative and quantitative research methods were used in the pre- and post-intervention study. Findings obtained from the baseline study were used to design the diabetes educational outreach intervention.

## CHAPTER 4

### BASELINE STUDY

The first aim of the baseline study was to identify current practice patterns of pharmacists working in the public sector Metropole District Health Services (MDHS) facilities. The focus was to assess their pharmacotherapeutic skills in monitoring prescribed drug therapy and in counselling patients on health promotion. The second aim of the baseline study was to explore pharmacists' views on implementing an educational program and to assess their knowledge of diabetes management.

#### 4.1 Methods

During the qualitative observation study a checklist was used (Appendix A). This was followed by two self-administered questionnaire surveys (Appendix B and C). The study was conducted over a three month period, from May 2004 to July 2004. It involved the selection of MDHS pharmacies using convenience sampling. An approval letter to conduct the study was obtained from the Metropole District Health Service (MDHS) management (see Appendix K). Participation in the study was completely voluntary and data obtained from the study was coded and kept confidential.

#### 4.2 Selection of pharmacies

Five community health centre pharmacies located in the suburbs of Parow, Bishop Lavis, Vanguard, Delft, and Athlone were selected as intervention sites (see Table 3.4). These were matched with other five pharmacies located in the suburbs of Belhar, Elsie's River, Heideveld, Hanover and Retreat and identified as non-intervention sites.

### **4.3 Participants in the baseline study**

Nineteen (n = 19) pharmacists who worked in ten MDHS pharmacies constituted the study sample. They participated in both the observation study and the two questionnaire surveys.

### **4.4 Part A: Observation study to assess current practice patterns**

I used a checklist to assess pharmacists' pharmacotherapeutic skills. The checklist consisted of an objective structured dispensing examination, OSDE, (Frieslaar, 2004) modified from the Objective Structured Clinical Examination (OSCE) which is a tool used to assess a learner's ability to solve a clinical problem (Harden 1975). The checklist comprised three main sections (see Appendix A):

- i) Establishing contact with the patient or care giver
- ii) Dispensing: giving information, instructions and warnings about the medicines
- iii) Communication style

All the sections of the checklist were weighted equally, where each observed parameter was graded subjectively. A score of one was assigned whenever a relevant counselling point as described in the checklist, was communicated. For example, when a pharmacist greeted the patient I allocated one (1) mark whereas if he/she did not greet the patient, zero (0) was allocated. I regarded this as a sign that they failed to establish contact. Percentages were calculated for each parameter that was observed from OSDE checklist.

### **4.5 Data analysis**

The score allocated to each pharmacist was coded and fed into SPSS, (package version 12.0), in order to obtain frequencies.

#### 4.6 Results

All pharmacists (19; 100%) agreed to be observed while dispensing.

Staff distribution across the intervention and non-intervention pharmacies was similar. The intervention facilities consisted of nine pharmacists (5 male and 4 female) and fifteen pharmacist's assistants (3 male and 12 female). Staff distribution in the non-intervention facilities consisted of ten pharmacists (5 male and 5 female) and fourteen pharmacist's assistants (3 male and 11 female).

**Table 4.1: Profile of pharmacists in the observation study (n = 19)**

Gender	Number of pharmacists	Percentage	Age range (years)
Male	10	(53%)	25-67
Female	9	(47%)	25-50

**Table 4.2: Results of pharmacists (n = 19) current dispensing patterns**

	Scores allocated for each parameter (n=19)	Percentage (%)
<i>Pharmacists who established contact with the patient or care giver such as...</i>		
1. Greeting (establishing language used)	19	100
2. Verifying folder number	19	100
3. Verifying name of patient	18	95
4. Verifying for whom medicine is issued	18	95
5. Getting attention of patient	18	95
<i>Pharmacists who gave patients information on:</i>		
1. clinical indication	19	100
2. generic name	6	32
3. strengths	2	11
4. administrative form	2	11
5. instruction (when to take and dosage)	19	100
6. total amount/special instructions	14	74

<i>Pharmacists who advised patients on drug effects which include the following...</i>		
1. side effects (described what to do)	6	32
2. duration of therapy (onset)	0	0
3. storage/ safety	2	11
4. adverse effects /warnings/ cautions	2	11
<i>Pharmacists who informed patients about the suitability of their medications in terms of ...</i>		
1. contra-indications	0	0
2. drug interactions	0	0
3. convenience	0	0
<i>Pharmacists who informed patients about their follow up dates for...</i>		
1. the next appointment	12	63
2. when to return earlier	2	11
<i>Pharmacists whose communication...</i>		
1. was clear (i.e. audible, pronounced properly and understandable)	19	100
2. was structured logically	19	100
3. allowed patients to express themselves	6	32
4. ensured that patients understand and even asked them to repeat drug information.	3	16
<i>Pharmacists who counseled patients about non-drug measures</i>		
1. described the rationale for non-drug treatment	3	16
2. gave instructions and warnings for example, about the importance of stopping smoking	4	21

All nineteen pharmacists (100%) had structured the conversation logically and communicated clearly during counselling. They greeted and verified the patients' folder number and informed patients of the dosage frequency and the condition being treated. Two-thirds (12; 63%) had informed patients of their follow-up appointment.

Some pharmacists seemed not to inform patients about drug details. One third of the pharmacists (6; 32%) mentioned the generic names of drugs and side-effects, while only two (11%) of the pharmacists mentioned strengths, administrative form, storage and safety, as well as adverse effects/warnings/cautions.

A third (6; 32%) of the pharmacists allowed patients to express themselves, but only two (11%) had asked them to return if problems arose after they had taken their medicines. Advice on health promotion was limited. One-fifth of the pharmacists (4; 21%) offered advice on health promotion (e.g. stopping smoking). Few pharmacists (3; 16%) had mentioned non-drug measures such as adherence to a diet, or alcohol avoidance when taking prescribed medication.

All the pharmacists (100 %) seemed not to counsel patients on contraindications, drug interactions and onset of action of drug therapy.

#### **4.7 Discussion**

The aim of the baseline observation study was to gain insight into pharmacists' current dispensing patterns. In this study pharmacists seemed proficient in mechanical dispensing, namely informing patients about the dosing frequency and the condition being treated. However, as custodians of medicines, their pharmacotherapy skills seemed sub-optimal.

Limited counselling on side effects, warnings and safety was evident, and this finding concurs with that found elsewhere. Bissell (1997) similarly found that pharmacists provided limited counselling to patients on drug therapy. Patients should receive adequate counselling, especially with regard to potential unwanted effects which could lead to non-adherence to therapy. Roberts (2004) suggested that pharmacists should properly counsel patients so that patients can manage their condition and minimize the effects of the disease on their lifestyle. Limited counselling on side effects impacts negatively on patients who take medication long-term. Shuster (2005) emphasised that adherence to drug treatment is crucial in chronic care. Research has shown that the longer the patient takes a complex combination of medicines, the poorer the adherence (Anderson, 2003). For a chronic condition like diabetes, adherence to prescribed medication is crucial to control blood glucose levels. Therefore patients need to be consistently counselled by pharmacists as they are usually the last link in care provision at public sector facilities.



Overall, pharmacists' dispensing practice seemed sub-optimal when assessed with the OSDE criteria. The high patient load and understaffing at pharmacies result in pharmacists working under enormous pressure at the out-patient counter. As a result very little time is available to monitor and counsel patients fully. Other studies have shown that due to lack of time, pharmacists and physicians have not provided enough counselling to patients (Shabbir, 1999).

Airaksinen (1998) found that pharmacists dispensing patterns were unsatisfactory, but that their counselling improved after an intervention, which in turn encouraged patients to ask questions about their medicines.

The small sample size limits generalisability of this study's findings. While this study attempted to assess current practice patterns, a study to investigate patients' views and perspectives about the counselling they receive from pharmacists, would be equally useful. The practice pattern evident in this study may well imply that pharmacists in the public sector require educational programs to improve their pharmacotherapy skills in chronic disease management.

The second aim of the baseline study was to obtain pharmacists' views on implementing an educational program (Part B) and to assess their knowledge on diabetes management (Part C) using self-administered questionnaire surveys respectively.

#### **4.8 Part B: Questionnaire survey to obtain views for an educational program**

The second part of the baseline study used a questionnaire survey to obtain pharmacists' views of an educational program.

#### 4.9 Methods

The survey was conducted with the same sample selected for the observation study. I made appointments with each pharmacist telephonically to arrange for a suitable time to administer the questionnaire. However, due to time constraints experienced with some pharmacists, I followed the drop-and-collect technique, with fifteen out of the nineteen pharmacists, as only 4 pharmacists could complete the questionnaire while I waited. The methods used to design the questionnaire have been described in Chapter 3, section 3.7. Data from the questionnaires was coded and entered into a Statistical Package for Social Sciences (SPSS), version 12.0.

#### 4.10 Results

The profile of the pharmacists was the same as that of the observation study (n = 19) nineteen. Table 4.3 below shows the results of the pharmacist's views concerning the need for an educational program.

**Table 4.3: Results of pharmacists' views about an educational program (n = 19)**

	Score allocated for each parameter (n=19)	Percentage (%)
1) <i>Pharmacists who estimated daily average of the number of patients receiving medicines at the facility was...</i>		
<100	0	0
100-199	0	0
200-299	2	11
300-399	17	89
400-499	0	
2) <i>Pharmacists who perceived that the dispensing window was...</i>		
too small	13	68
there is no privacy	19	100

3) <i>Pharmacists who perceived that external sources of interference when counselling patients were...</i>		
noise	15	79
constant patient queries	19	100
angry patients	17	89
telephone calls	15	79
4) <i>Pharmacists who felt that patients preferred a private counseling area when collecting medication</i>		
Yes	6	32
No	2	11
Up to half of the patients	11	58
<b>Barriers when dispensing and counselling</b>		
5) <i>Pharmacists who noted that barriers to good dispensing are...</i>		
Shortage of staff	17	89
Heavy work load	17	89
No privacy	15	79
Patients are impatient	17	89
Language and communication problems	11	58
Lack of space	11	58
Lack of proper equipment	0	0
Friends and family members collect medicines for patients who are at home/work	19	100
Other	6	32
6) <i>Pharmacists who felt the following about rational drug use...</i>		
that they are familiar with the concept	19	100
that they have been trained in it	8	42
that they have tangible results proving application of concept	2	11
7) <i>Pharmacists who felt that...</i>		
-based on their experience there was a need for patients to have more information about their medicines	19	100
-there is a need to improve the quality of dispensing information	8	42

<i>Pharmacists who felt a pharmacotherapy-training program at the pharmacy would enable them to improve...</i>		
dispensing skills	17	89
knowledge about side-effects of drugs	15	79
alertness to identification of drug	17	89
interactions and contra-indications	17	89
alertness to correct drug dosages	17	89
8) <i>Pharmacists who felt that the pharmacotherapy training should be part of a continuing education program.</i>	19	100
9) <i>Pharmacists who felt they need pharmacotherapy training in the following areas...</i>		
antiretroviral therapy (ARV)	15	79
central nervous system (CNS)	11	58
antidiabetic drugs	9	47
drugs acting on cardiovascular system	9	47
antiasthmatic drugs & antituberculosis drugs	7	37

A high response rate (100%) was obtained as a result of several follow-up telephonic reminders to ensure completion of the questionnaires. All except two pharmacists (in Parow and Belhar), estimated that they served an average of 300-400 patients per day, indicative of a high patient load.

Pharmacists identified that external sources of interference were: angry patients (17; 89%); noise (15; 79%); telephone calls (15; 79%); and constant patient queries (19; 100%).

All nineteen pharmacists (100%) reported that friends and family members collect medicines for patients who are either at home or at work. Most pharmacists (17; 89%) said they have experienced a high workload and limited time for counselling. Fifteen pharmacists (79%) believed that there was lack of privacy. More than four-fifths (17; 89%) believed that patients preferred a private counselling area and

slightly more than half (11; 58%) felt that language and communication problems hindered pharmaceutical care provision.

Over one third (7; 37%) of the pharmacists were of the view that patients seemed not to understand the drug information that they are given and that pharmacies lack access to a direct telephone line to offer follow-up care.

All nineteen pharmacists (100%) seemed familiar with the concept of rational drug use (RDU) but less than half of them (8; 42%) claimed to have received such training. However, only two (11%) felt that they have tangible results that could prove the application of RDU.

Most pharmacists (17; 89%) agreed that a pharmacotherapy training program at the pharmacy would enable them to improve their dispensing skills, alert them to identify drug interactions/contraindications and enable them to give correct drug dosages. Most pharmacists (15; 79%) also believed the program could help enhance their knowledge of side-effects. Pharmacists felt that they need pharmacotherapy training in antiretrovirals (15; 79%); central nervous system (11; 58%); antidiabetic and cardiovascular (9; 47%); antimycobacterial/antituberculosis (TB) and antiasthmatic (7; 37%) drugs. All (19; 100%) pharmacists felt that such training should form part of a continuing education program.

#### **4.11 Discussion**

All pharmacists (19; 100%) agreed that constant patient queries are a common external source of interference that resulted in poor adherence to good pharmacy practice. Tietze (1997) has pointed out that pharmacists must have good interpersonal relationships to be able to address constant patient queries and the needs of angry patients.

Only a few pharmacists (2; 11%) claimed to use the rational drugs concept which is one of the fundamental goals of the South African National Drug Policy. Levitt (1996) established that diabetes care in public sector health facilities was not given the attention it deserves as care givers did not systematically adhere to guidelines. Patients were only treated for specific complaints and that there was evidence of polypharmacy. Laing (2001) has recommended the use of pharmacotherapy as an approach for promoting the effective rational use of drugs.

All the pharmacists (19; 100%) expressed the need for a pharmacotherapy training program to increase their awareness of drug interactions/contraindications, side-effects and correct drug dosages. This may imply their willingness to receive an educational intervention that would enable them to improve professional practice.

All the pharmacists (19; 100%) believed that there is a need for pharmacotherapy training programs for the management of common conditions and three-quarters of the pharmacists (15; 79%) opted for training in ARV's. During the time of this study (2004) this was not possible since the South African government did not offer drug therapy to treat human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) patients in MDHS facilities. Over half of the pharmacists (11; 58%) opted for training in CNS pharmacotherapy. This pharmacological group could not be considered since it consists of varied drug classes and would have involved an extensive educational program beyond the time frame of this study. Almost half of the pharmacists (9; 47%) stated their preference for a diabetes educational programme. Consequently, a diabetes pharmacotherapy program was considered, because it is a common chronic disease in South Africa, which places a severe burden on the health services, and incurs substantial morbidity (Bradshaw, 2006). It was also perceived as a manageable intervention for this study's time frame.

#### 4.12 Part C: Questionnaire survey to assess pharmacists' knowledge of diabetes management

Appointments were made with the pharmacists telephonically to arrange for a suitable time to administer the questionnaire. I used similar methods to those described in section 4.9 of Part B in this chapter.

Data presentation and analysis were done as described in section 4.9.

#### 4.13 Results

Findings from the questionnaire are summarized and tabulated (refer to Table 4.4). The table contains an additional column (2) where the number of pharmacists who did not respond to specific questionnaire items are noted.

The profile of pharmacists who completed the questionnaire survey is the same as that noted in the observation study (refer to section 4.6 table 4.1).

**Table 4.4: Results of pharmacists' knowledge of diabetes management (n = 19)**

	3 Strongly agree, agree, or yes (%)	2 # of subjects (%) who did not respond	1 Strongly disagree, disagree, or no (%)
1) <i>Pharmacists who were familiar with the national diabetes guidelines for adults and children</i>	8(42)		11(58)
2) <i>Pharmacists who were of the opinion that ...</i>			

Thirst and weight loss are the 2 most common symptoms that diabetes patients present with in hypoglycaemia	2 (11)	13 (68)	4(21)
Thirst and weight loss are the 2 most common symptoms that diabetes patients present with in hyperglycaemia	4 (21)	13(68)	2(11)
3) <i>Pharmacists who identified the recommended fasting blood glucose level range to be...</i>			
4 (≤) and less than or equal to 7 mmol/L	17(89)	2 (11)	
16 (≤) and less than or equal to 20 mmol/L		0	
22 (≤) and less than or equal to 25 mmol/L		0	
4) <i>Pharmacists who believed that hypoglycaemia can be due to drug effects</i>	15(79)	4 (21)	
5) <i>Pharmacists who believed that some side effects of bezafibrate are muscle wasting and abdominal pain</i>	11(58)		8(42)
6) <i>Those pharmacists who felt that they advised patients on...</i>			
a) foot care	2(11)	2	15(79)
b) eye care	4(21)		15(79)
7) <i>Pharmacists who felt that they should reduce the dose by 50% when introducing bedtime insulin for a patient on the maximum dose of sulphonylurea</i>	11(58)	4 (21)	4(21)
8) <i>Pharmacists who reported that their responses to glycosylated hemoglobin (Hb A1c) level above 12%</i>			
a) to let it pass	4(21)		
b) do not have time to look at it closely		11(58)	
c) refer the patient to the doctor	4(21)		
9) <i>Pharmacists who perceived that the ideal lipid profile of a diabetic is ...</i>			
i) total cholesterol < 5 mmol/L	15(79)		4(21)
ii) triglyceride < 1.5 mmol/L	11(58)		8(42)
10) <i>Pharmacists who felt that a diabetes management program should include:</i>			



a) counselling patients on how to control blood sugar levels	19(100)		
b) monitoring blood sugar levels	19(100)		
c) monitoring long-term blood sugar control levels (HbA1c)	15(79)		4(21)
d) monitoring side effects of insulin treatment	17(89)		2(11)
e) monitoring side effects of oral hypoglycaemic agents	17(89)		2(11)
11) <i>Pharmacists who advised patients on weight control measures</i>	11(58)		8(42)

Less than half of the pharmacists (8; 42%) were familiar with the national diabetes guidelines for adults and children (2003).

Pharmacists' ability to differentiate between the signs and symptoms of hypoglycaemia and hyperglycaemia seemed limited. Only one fifth (4; 21%) of them believed that thirst and weight loss were some of the most common symptoms associated with hyperglycaemia. The same number said they were familiar with the use of glycosylated hemoglobin (HbA1c) as a monitoring parameter and seemed to be aware of the appropriate action to be taken if a patient has HbA1c level above 12%.

Over half (11; 58%) of the pharmacists knew that: the maximum dose of sulphonylureas must be reduced by half when introducing bed time insulin; hypertension accelerates the development of diabetic retinopathy; and muscle wasting and abdominal pains are some of the side effects of bezafibrate and that the ideal lipid profile for triglycerides is 1.5 mmol/L or less.

All pharmacists (19; 100%) felt that a diabetes management program should include information on how to monitor and control blood sugar and counselling. More than

three quarters of the pharmacists (15; 79%) believed it is important to include information on HbA1c, side effects of insulin and oral hypoglycaemic agents (17; 89%).

#### **4.14 Discussion**

This section is a discussion of the findings from assessing pharmacists' knowledge on diabetes. The few local studies available have been used to improve the discussion.

Of concern in this study is that less than half of the pharmacists (8; 42%) were familiar with the national diabetes guidelines for adults and children. Possible reasons are that these guidelines may not be easily available to the MDHS or that pharmacists may not be able to understand or apply key recommendations in practice. A study by Kalk (2000) found that among nine community and secondary hospitals only five used guidelines for the four chronic disease conditions which they managed. This is in line with Steyn, (1999) who found that guidelines were not systematically implemented in four community health centres in the Western Cape. Lack of use of guidelines by pharmacists may be a contributing factor to both the low awareness and knowledge of diabetes. Implementation of a diabetes educational program tailored to the needs of pharmacists could help to address this practice gap.

Only four pharmacists (21%) responded appropriately to knowledge-based questions. The rest of the pharmacists could not clearly differentiate between symptoms of hypoglycaemia or hyperglycaemia and the use of HbA1c to monitor patient care. This suggests a limited understanding of diabetes management amongst the pharmacists working in MDHS pharmacies. This finding is similar to Goodman's (1997) study which found that MDHS staff involved in diabetes management did not know the pathophysiology including the signs and symptoms of diabetic emergencies. HbA1c evaluation is an accepted standard of care for assessing diabetes control (Sicard, 2005). Ensuring that it is always within recommended levels is vital to the prevention and reduction of diabetes-associated complications (DCCT, 1993; UKPDS, 1998).

#### **4.15 Conclusion**

The data collection instruments used in the baseline study provided insight into pharmacists practice patterns, their educational needs and knowledge on diabetes management. The observation checklist provided insight into the pharmacotherapeutic skills of pharmacists. An additional parameter that could be included in the checklist is the monitoring of drug therapy with clinical data, especially for the management of chronic diseases. Focus group discussions may have been an alternative method in view of the concerted efforts that were required to ensure completion of the self-administered questionnaires.

Pharmacists' knowledge of diabetes management seems to be sub-optimal. They seemed to lack familiarity with important monitoring parameters such as HbA1c, and they lacked the ability to differentiate between the signs and symptoms of hypoglycaemia and hyperglycaemia.

Educational programs that can encourage pharmacists to become proactive in pharmaceutical care provision are needed. Specially designed pharmacotherapy educational programs can help enhance pharmacists' knowledge and skills to engage with diabetic patients in controlling blood glucose and preventing complications (Anderson, 2003; Pray, 2003).

## CHAPTER 5

### DESIGN AND IMPLEMENTATION OF AN EDUCATIONAL OUTREACH INTERVENTION FOR DIABETES MANAGEMENT

This chapter provides the rationale that underpins the development of a diabetes educational outreach intervention. Findings from the baseline studies that identified knowledge deficiencies which could be addressed through an outreach intervention, were primarily considered. The contents of the educational materials, the training of the educator and the implementation process are discussed. Structural, regulatory and social factors could not be addressed in this intervention even though they influence practice patterns (Grol, 1995).

#### 5.1 Summary of findings from the baseline studies

Data obtained from the baseline studies indicated that pharmacists had knowledge deficiencies and perceived numerous barriers in the management of diabetes, especially when dispensing.

Findings from the observation study indicated that pharmacists seemed not to have enough knowledge on how to articulate drug details. Few pharmacists (2; 11%) mentioned the strengths, administrative form, storage and safety, and adverse effects/warnings/cautions of drugs to patients. None of the pharmacists seemed to inform patients about, contraindications (0), drug interactions (0) and onset of action of drugs (0). Pretorius (2003) and Lamb (2005) explained that it is the duty of the pharmacists to warn patients about harmful side effects.

Only a third (6; 32%) of the pharmacists allowed patients to express themselves during counselling, an indication that active patient involvement was limited. Provision of

advice on health promotion was limited. Only a few pharmacists (3; 16%) described non-drug measures (diet, alcohol use) and gave instructions about health promotion e.g. the cessation of smoking (4; 21%). Disease management through lifestyle modification seemed to be given little priority among pharmacists.

Educational programs that can encourage pharmacists to proactively share drug information, and enable them to monitor therapeutic outcomes, could help improve pharmacists' pharmacotherapy knowledge and skills.

## **5.2 Pharmacist's views on the need for an educational program**

Findings from the survey showed that less than half of the pharmacists (8; 42 %) had received training and were familiar with the concept of rational drug use. Further, all pharmacists (19; 100%) sought a pharmacotherapy training program to update their knowledge and also expressed the need for a training program to increase their awareness concerning important counselling points such as drug interactions/contraindications, side-effects and correct drug dosages. This indicates that an educational program that will sensitize pharmacists on how to apply pharmacotherapeutic principles was deemed necessary.

## **5.3 Pharmacist's knowledge of diabetes management**

Less than half of the pharmacists (8; 42%) were familiar with the national diabetes guidelines for adults and children which may indicate either poor implementation of the guidelines or that guidelines have not been adapted for use at MDHS pharmacies. Pharmacists seemed to make little differentiation between symptoms of hypoglycaemia or hyperglycaemia because only one-fifth of the pharmacists (21%) responded appropriately when identifying common symptoms associated with hyperglycaemia. Further, about half of the pharmacists (9; 47%) knew that the maximum dose of sulphonylureas must be reduced by half when introducing bedtime insulin

Pharmacists are expected to familiarize themselves with monitoring parameters so that therapy can be optimized. Findings from baseline study indicated that pharmacists seemed unaware of the importance of reading and interpreting glycosylated haemoglobin levels (HbA1c). Few pharmacists (4; 21%) could relate to the referral criteria for patients with glycosylated hemoglobin (HbA1c) levels which were out of range. Similarly, about half of the pharmacists (58%) knew the recommended level values for triglycerides (TG) and total cholesterol levels. A few pharmacists seemed to advise patients about preventative care for the feet (2; 11%), eye (4; 21%) and slightly over a half (11; 58%) of the pharmacists claimed to counsel patients on the importance of lifestyle management such as weight control.

The monitoring aspect of the pharmaceutical role seems limited possibly because of the lack of regular on-site educational programs to keep them abreast of guideline based pharmacotherapeutic principles of diabetes.

All pharmacists (19; 100%) expressed the need for a diabetes management program. Almost all of the pharmacists (17; 89%) wanted a program that will cover the side effects of insulin and oral hypoglycemic agents. Furthermore, most pharmacists (15; 79%) wanted a program that will alert them to the importance of measures used to monitor blood sugar levels such as glycosylated hemoglobin( HbA1c). Pharmacists' willingness to participate in an educational program clearly demonstrates that gaps in knowledge and practice require attention. Locally adapted guideline recommendations may provide pharmacists with the knowledge and skills needed to improve professional practice.

#### **5.4 Summary of contextual factors which modified the intervention**

In view of the knowledge barriers and the skills deficiency which prevent good dispensing, the use of a single intervention would have been unlikely to achieve a meaningful outcome for pharmaceutical care provision. A multifaceted approach seemed most appropriate to address the identified barriers using an outreach intervention (Sharp, 2004). Structural, social and regulatory constraints were beyond

the scope of this study. The indirect effects of contextual issues were taken into account as modifying factors (Bheekie, 2001). For example time constraints, and the perceived high patient load, were considered. The perceived high patient load also influenced the choice for an on-site educational outreach intervention. Researchers have obtained positive health outcomes from multifaceted educational outreach programs (Fedder, 1988; Hendryx, 1998; Fairall, 2005).

Pharmacists usually receive updated clinical and drug information from pharmaceutical drug representatives. However, such information may be biased towards product promotion and may lack salient information about undesirable effects (Grimshaw, 2005).

To address the knowledge gap an intervention that provides up-to-date, unbiased, and practical therapeutic recommendations was deemed appropriate. An intervention that enables pharmacists to recognize potential signs and symptoms of diabetes provides advice on the treatment of hypoglycaemia and hyperglycaemia and emergency care, interpret monitoring parameters such as HbA1c to control blood glucose, being alert to blood pressure and cholesterol levels, prevent the onset of complications and provide advice on drug therapy and preventative care would be useful to practice.

## **5.5 Development of the intervention materials**

As a practicing pharmacist from Botswana, I had to familiarize myself with diabetes care in South Africa. I consulted with local medical experts and familiarized myself with hospital pharmacy practice in the Western Cape. I consulted with a locally renowned diabetes expert, Professor F Bonnici. I also attended a diabetes workshop on 24 August, 2004 which he facilitated entitled “An update on diabetes management and the role of the pharmacists in patient care”. During the workshop he highlighted the need for pharmacists to be closely involved in monitoring diabetic patients and intervening appropriately in order to prevent the development of complications, emphasising the pharmaceutical care role of pharmacists. He reiterated that pharmacists could educate and support people to prevent complications associated

with diabetes. I also observed another diabetes expert Dr A Philotheou. She was consulting and monitoring diabetic children at Red Cross Children's hospital on the 15th September 2004. Further, I interacted with diabetes educators at Red Cross and Groote Schuur Hospitals to obtain insight into their teaching approaches. I worked for two days at Groote Schuur and Red Cross Children's hospital pharmacies filling in prescription folders for diabetic patients to obtain insight into local practice patterns. In addition, I facilitated pharmacotherapy practicals for final year pharmacy students for three months at a service-learning site in Parow. I visited the Diabetes Society of South Africa Western Cape branch in Cape Town where I learnt about its functions, and the importance of education and support groups for the management of diabetes.

### **5.6 Printed and support materials for the outreach intervention**

The intervention materials consisted of an accordion folder, practice scenarios and a pen. I used these as teaching aids during my meetings with pharmacists. Information in the accordion folder (Appendix D) was obtained from the guidelines for the management of diabetes type one in children less than 18 years and the guidelines for the management of diabetes type one and two in adults (2003), the standard treatment guidelines and essential drugs list for primary health care (2003), the South African medicines formulary (6<sup>th</sup> edition) and consultations with a diabetes medical expert. Information from the national guidelines and standard treatment guidelines was systematically reviewed (Eccles, 1999) to arrive at a format suitable for use by practising pharmacists. It was intended to serve for use as a reminder at the outpatient counter.

### **5.7 Design of the folder and illustrations**

The presentation style of the folder aimed to draw pharmacists' attention to key management principles. Illustrations were used to depict symptoms of hyperglycaemia and hypoglycaemia as well as adverse effects observed with insulin and the use of oral hypoglycaemic agents.



The layout was designed in consultation with a graphic artist to achieve a professional appearance and to compete with pharmaceutical sales promotional materials that are provided for pharmacies. The Coreldraw graphics program was used when designing the folder which was made of an ivory coloured smooth thick card, laminated on both sides and folded in an accordion style. The panels were colour-coded to attract the pharmacists' attention and enhance recall. In designing the printed support material we considered the fact that it must be catchy to the eye, easy to handle, durable, conserve space, be able to support itself on top of the desk and above all contain enough information that could be used to influence change in practice. The best design was to make it an accordion style folder. Bheekie (2001) used a 3-part folder and poster as printed and support materials for an asthma outreach intervention.

The content was comprehensive and was approved by a diabetes medical expert. The aim was to colour-code salient counselling points for quick reference. For example, red messages highlighted the problem of hypoglycaemia, yellow was used to indicate hyperglycaemia, turquoise was used to indicate adverse effects observed with oral antidiabetic tablets and light green indicated drug interactions resulting from oral antidiabetic tablets. An illustration outlining a human figure shows the site of action of antidiabetic agents.

The five-part accordion folder contained information on diabetes, the co-morbidity of dyslipidaemia, the hypertension associated with it, the diagnosis based on symptoms and biochemical tests, the importance of monitoring parameters, the influence of drugs on diabetes, drug treatment and associated pharmacotherapy factors, emergency care and additional antidiabetic agents. The information was printed on an ivory coloured smooth thick card. The outreach educators's name and the University of the Western Cape (UWC) logo were printed on the last panel of the folder to indicate association with a neutral academic institution

## **5.8 Contents of the different pages of the folder**

A pictogram of people in a team pulling simultaneously on a rope, signified the importance of teamwork in addressing the problem of diabetes (page one). Explanations covering the aetiology, causes, the diagnosis, the diagnostic criteria and the diagnostic stages of diabetes, were also highlighted.

Colourful eye-catching illustrations were used to enhance recall of symptoms, namely, hyperglycaemia (yellow) and hypoglycaemia (red) which appeared on page two. An adverse effect such as hypoglycaemia, which is associated with insulin therapy, was coloured red, while that observed with oral hypoglycaemic drugs was coloured turquoise. Drug interactions were highlighted in blue. These colour codes linked identical and sometimes similar concepts and were repeated in different sections throughout the folder.

The glycosylated haemoglobin (HbA1c) test which is used as a parameter for blood glucose levels was outlined and interpreted in tabular form on page three. Insulin resistance and some risk factors appeared on a purple background and aimed to highlight the importance of the concept in the development of diabetes.

The acute and late signs and symptoms of hyperglycaemia (yellow background) and hypoglycaemia (red background), the co-morbidity of dyslipidaemia and hypertension associated with diabetes, are highlighted on page four.

A table on page five referred to cholesterol levels in adults. Poorly controlled blood sugar levels also tend to cause the blood levels of fatty substances to rise, resulting in accelerated atherosclerosis, the build up of plaque in blood vessels, (Berkow, 1997). The same page contains information describing the damage to blood vessels, nerves, tissues and organs resulting from hyperglycaemia, and a description of the damage and a review of medications that interfere with diabetes control. Further, the antiplatelet role of aspirin in heart disease, was included.

The therapeutic objectives, treatment and the different types of insulin therapy are tabulated for easy reference on page six. The adverse effects of insulin which are usually associated with hypoglycaemia, appear on a red background. The international colour codes used for insulin therapy with different duration of action, was followed: short-acting was indicated in yellow, medium-acting in green, long-acting in blue, and biphasic in brown.

The sulphonylureas were tabulated on page seven and the biguanides on page eight. A different colour code was used to represent the adverse effects (turquoise) and drug interactions (light green). Adverse effects and drug interactions affect diabetic control. Throughout the folder the key therapeutic reminders were linked using the designated colour-coding.

A reminder to encourage pharmacists to offer patients advice about the use of oral hypoglycemic agents was shown on page eight. In addition, a pharmacist's checklist to aid approaches to emergency care, was added.

The common complications of diabetes, hyperglycaemic and hypoglycaemic emergencies and their management, which were linked through colour codes to other parts of the folder, also appeared on page nine.

The newer anti-diabetic agents were outlined on page ten. These are medicines that are used for the treatment of diabetes in the private sector and internationally as opposed to the limited list prescribed for the public sector. A pictogram of an attentive listener was followed by a counselling reminder for the pharmacist and was phrased thus: "Have you provided the following information to your patients?" This included the name of the medicine, drug effects (effects of the medicine on the body), instructions on how to use the medicines, adverse effects/ warnings/ cautions. Further, the pharmacist was prompted to enquire about the patient's understanding of the instructions. Pharmacists were encouraged to counsel patients by emphasising a message which read as follows:

*“even though you work as a team, do not assume other team members have done appropriate counselling on your behalf. Play your part, discuss drug use and preventive care e.g. the importance of stopping smoking, reducing alcohol use and encouraging exercise”.*

The message further asks,

*“have you talked to your patient about the importance of stopping smoking and the fact that there is an increased chance of amputation if you are a smoker?*

*Have you given them leaflets on tips to stop smoking”?*

These reminders served to prompt the pharmacist to initiate discussions with the patient.

To encourage pharmacists to engage with patients about controlling their glucose and blood pressure levels, ensuring a cholesterol check, maintaining a healthy diet, exercising regularly and advising on low-dose aspirin, the following statement was included in the folder:

*“Make it your habit to talk about all of the above with your patients”*

Having realized from the pilot study that one of the pharmacists was interested in taking the folder home to read, I photocopied the folder into the form of a booklet. I gave the booklets to the pharmacists at the end of the meetings to enable them to internalize the key concepts and use it as a reference tool when working on the practice scenarios and to also encourage them to read on their own.

## **5.9 Implementation of educational outreach intervention**

The educational outreach intervention favoured a multifaceted approach because no single approach fits all prospects (Soumerai, 1990; Hutchinson, 1999). It consisted of a trained outreach educator (myself) using a social marketing technique to highlight key management principles on diabetes. Four matters deserve a final check by the

salesperson as part of the approach: physical appearance, mental attitude, equipment, and a plan for how the activity would be carried out (Kirkpatrick, 1981).

### **5.10 The outreach educator**

Successful implementation of an educational outreach intervention depends on the educator's knowledge, skills and attitude. I was to be the outreach educator, a black male pharmacist from Botswana. I have extensive (20 years) practical experience as a hospital pharmacist in the public sector with background training in Essential Drug Management and Rational Drug Use (1992). Part of the training included teaching methods and how to present a lecture under time constraints. A trained pharmacist (myself) conducted outreach visits to the pharmacies. This would be in contrast to the intrinsic suspicion of a non-health care professional, whose information might be more likely to be distrusted and ascribed to a purely commercial motive (Bheekie, 2001).

I dressed in professional attire and carried the printed materials in a brochure holder during the visits to the MDHS pharmacies. I recorded my appointments with the pharmacists and captured detailed accounts of each visit in my diary. During the visits to the pharmacies, I wore a UWC identity badge which indicated the organization I represented.

In response to the time constraints experienced among public sector health care facilities, the use of educational reminders consisting of an accordion folder and a pen, formed part of the diabetes outreach package.

### **5.11 Access to pharmacies**

Gaining access to a study site involves a style which explicitly minimizes the disruption which the researcher might cause to routine activities (Bernard, 1994; Baker, 1999). Appointments were made with pharmacy staff telephonically to secure a meeting time. I adopted a flexible approach by negotiating meeting times with the participants, and was sensitive to the time constraints, patient overload and

understaffing at the pharmacies. Visiting pharmacists at the work setting was interpreted as a mark of respect for their work, and the scarcity of their time. Implementation of the intervention aimed to minimally disrupt the pharmacists daily work schedule.

### **5.12 Implementation of the diabetes pharmacotherapy educational outreach program using the IDEALS approach**

Implementation was done at the five intervention pharmacies using a social marketing technique commonly used by drug company representatives (Soumerai, 1990; Baker, 1999). I used the IDEALS approach during the educational meeting. IDEALS is an acronym for: introduction, discover, explain, ask, leave and seek. In practice this worked as follows:

- I→ Introduction: I introduced the purpose of my meeting with staff
- D→ Discover: I explored their experiences with diabetes management.
- E→ Explain: I explained information contained in the diabetes educational program – an accordion folder and a pen.
- A→ Ask: I asked the pharmacists if they had any concerns about diabetes management and engaged them with the information contained in the folder.
- L→ Leave: I placed the folder in a plastic sleeve which was subsequently mounted on the wall next to the dispensing window so that pharmacy staff could easily retrieve it when dispensing.
- S→ Seek: I finally asked for a commitment from the pharmacists to use the folder as a reference tool when engaging with diabetic patients.

### **5.13 Interviews**

Unstructured interviews were conducted with pharmacists at the intervention sites as part of the assessment. This was done during and immediately after implementation of the intervention process in order to minimize intrusion into their routine practice pattern, and to obtain in-depth perceptions and views about the receptivity of the program.

I gave a brief outline of the purpose of my visit and explained various elements of the accordion folder. Furthermore, I guided pharmacists on how information in the folder could be applied to solve three practice scenarios. Each pharmacist subsequently received a photocopied booklet of the folder to assist with solving the scenarios and to enable them to work at their own pace.

I describe the framework of my three visits to the pharmacies.

#### **5.14 First visit**

The first visit was planned to last thirty minutes, and was aimed at introducing and explaining the various elements of the folder. At the end of the discussion I handed three practice scenarios which mimicked real-life diabetic conditions to the pharmacists to assess their knowledge and application of the pharmacotherapeutic principles. The scenarios were an application of a problem-based learning (PBL) approach (De Vries, 1995; Akici, 2003). The aim of the scenarios was to help pharmacists gain familiarity with the use of the folder in order to manage diabetes. Solutions to the practice scenarios were to be discussed during the second visit. Towards the end of the visit, I enquired about my role as an educator using the probing question, “*What are your views about my presentation style*”? I concluded the first visit by seeking approval for a second visit.

#### **5.15 Second visit**

The aim of this visit was to reinforce and maintain the adoption and application of information on diabetes management. Further, the aim was to discuss the three practice scenarios (Appendices F, G and H) that would provide an indication of the pharmacists’ engagement with the folder.

I arranged for a second visit, three to four weeks after the first one. Appointments were made with the pharmacist telephonically. Responses to practice scenarios were not graded, instead I read through them to deduce if pharmacists used the folder to

arrive at the solutions. Although the questions were easy, they were structured in such a way that one had to refer to the folder to identify the answers. In this way the folder was used as a reference guide.

To assess the visit, I used unobtrusive depth interviews, observations, and made notes. This was done to obtain realistic responses, and to avoid the Hawthorne effect (Pope, 2000). Pharmacists were asked about their experiences with the use of educational materials and I also probed them about what they had attempted to do differently when engaging with diabetic patients.

### **5.16 Third visit**

The third visit aimed to quantitatively evaluate receptivity of the program among the pharmacists. As was done with the second visit, appointments were made telephonically. Pharmacists were asked to complete the structured, self-administered post-intervention questionnaire containing 38 questions. The questionnaire aimed to assess knowledge, attitudes and the pharmacists' application of key diabetes concepts and explored their ability to make changes in practice (Appendix J). For example the perceived frequency of occurrence was indicative of potential change when a particular behaviour was explored: *How frequently do you advise diabetic patients to stop smoking ?*

one out of every ten patients

one out of every thirty patients

To assess acceptance or resistance towards solving the practice scenarios, unstructured in-depth interviews were used.

### **5.17 Pen**

A flat translucent pen with a blue top, connected with a clip to a jelly bean plastic lanyard(chain) that could be used around the neck (See annex E), served as a gift incentive (Grol, 1995). It was given to each pharmacist for participating in the



intervention. A blue inscription on the pen: “*I am a diabetes educator*” served as a reminder and an inspirational message. This reminder was linked to information appearing on the bottom part of the last page of the accordion folder, to emphasise the important role which the pharmacist could play as a diabetes educator.

### **5.18 Practice scenarios**

The scenarios were structured to enable pharmacists to apply and reinforce adoption of the information that was discussed during the visits. It served to ease them with key diabetes concepts that could be applicable in practice. Responses to the questions were not graded, instead I reviewed them to deduce if pharmacists had actually engaged with the folder.

#### **5.18.1 Practice scenario 1** (see Appendix F)

The aim of the scenario was to raise pharmacists’ awareness of signs and symptoms of diabetes and for them to be able to differentiate between symptoms showing hypoglycaemia and those for hyperglycaemia. In the scenario, the sugar levels are below the recommended goal (between 4 – 7mmol/L) thus suggesting hypoglycaemia, which may manifest as irritability in the patient. Furthermore, using the folder, pharmacists had to identify common dosing schedules. Lack of proper monitoring of dosages such as giving glibenclamide three times a day instead of a maximum of two times a day can result in hypoglycaemia, as is the case in the scenario. Therefore the close monitoring of treatment is critical.

#### **5.18.2 Practice scenario 2** (see Appendix G)

The aim of this scenario was to encourage pharmacists to identify the classic symptoms of hyperglycaemia and identify appropriate treatment options. Furthermore the aim was to alert pharmacists to counsel patients on the side effects of oral hypoglycaemic drugs (e.g. gastrointestinal disturbances and nausea) and insulin (e.g. hypoglycaemia, lipodystrophy or hypertrophy).

#### **5.18.3 Practice scenario 3** (see Appendix H)

The aim of this scenario was to alert pharmacists to engage with patients about the proper use of their medicines, and to check contraindications and drug interactions which are factors that influence therapeutic outcomes. The scenario also aimed to alert pharmacists to apply the HbA1c monitoring parameter of blood sugar level and to avoid developing diabetic complications (e.g. a rash from the sugary urine). Another aim of the scenario was to sensitize pharmacists to the risk factors which complicate diabetes such as lipids and cholesterol levels which are above the recommended goals. Outlining the lipid monitoring parameters was meant to encourage pharmacists to advise patients about the importance of lifestyle modification (e.g. exercise and following a diet plan).

Pharmacists readiness in responding to the scenarios as well as their experiences captured during the interviews, during the two visits was assessed qualitatively to determine the receptivity of the intervention (Rollnick, 1999).

### **5.19 Summary**

Findings from the baseline study contributed to the design and development of the multifaceted educational outreach intervention. The intervention was designed to fit into the pharmacists' routine duties and was to be conducted in a professional manner to address knowledge and skill deficiencies. The intervention aimed to be non-threatening and allowed pharmacists the opportunity to engage with the outreach educator on diabetes care. A flexible approach was considered in order to respond to the different educational needs required among the pharmacists. A problem-based learning approach and the use of pictograms (Dowse, 2003) aimed to reinforce the adoption of key management principles for diabetes care.

## CHAPTER 6

### RESULTS

#### PHARMACISTS RECEPTIVITY OF THE DIABETES EDUCATIONAL OUTREACH INTERVENTION PROGRAM

In this chapter the qualitative (Part A) and the quantitative (Part B) assessments of pharmacists acceptability of the educational outreach intervention are discussed.

##### **Part A: Qualitative assessment of outreach visits**

For the qualitative assessment I discuss my meetings with pharmacists during the first and second visits to the five intervention pharmacies.

##### **6.1 Visit 1**

The aims of the first visit to the pharmacies were to:

- introduce the outreach intervention
- explain the various elements of the accordion folder
- assess the pharmacists' responses to the outreach educator (myself) and the printed material and
- obtain responses to the question:

“What did the intervention mean to the pharmacists”?

##### **6.2 Scheduling of appointments to meet with pharmacy staff**

Telephonic access to the pharmacy was possible when the switchboard was informed that I was calling from the University of the Western Cape. My telephonic conversation to initiate the first meeting was as follows:

E: Is that the responsible pharmacist?

Ph1: Yes, what can I help you with?

E: I am Emmanuel Molosiwa from the University of the Western Cape, School of Pharmacy. Last year I visited your facility to

complete a questionnaire. As a result I have developed an educational program which I would like to discuss with the pharmacy staff. Can you spare some time for me any day this week when you and one of the pharmacist's assistants may attend a meeting at which I discuss diabetes management. It will take about 30 minutes.

Ph1: We are always busy but let me talk to some of the staff members first. Do you mind holding on or do you prefer to call later?

Usually I preferred to hold on for a minute or two. Some pharmacists asked me to call back 15-30 minutes later to confirm the appointment.

E: What time would be suitable?

Most pharmacists arranged to meet in the afternoon usually between 2:30 p.m and 3:30 p.m. because of a decrease in patient load. It was necessary to include pharmacist assistant (PAs) in the meeting as they are key support personnel for pharmacists and to avoid a sense of discrimination among pharmacy staff. However, PAs were not the focus of this study.



### **6.3 Length of waiting times at pharmacies**

The waiting times ranged from 10 minutes to about 3 hours. Pharmacists who failed to meet me at the appointed time, apologised and arranged for another meeting. The longest wait was 3 hours due to the fact that pharmacist (Ph7) had not communicated my intended visit to the rest of the pharmacy staff, and the meeting was rescheduled.

The venue for our meetings ranged from the staff tearoom, the pharmacist's office, the central floor space in the dispensary or a small quiet back room in the pharmacy. Participants occupied their seats randomly at the start of the presentation.

#### 6.4 Number of pharmacists per facility

Nine pharmacists, of whom four were females and five males, received the intervention.

The number of pharmacists in each pharmacy location is outline in Table 6.1.

**Table 6.1 Number of pharmacists per facility**

<b>Location of facility</b>	<b>Number of pharmacists</b>
Bishop Lavis	2
Delft	2
Parow	1
Athlone	2
Vanguard	2

Variables such as age of the pharmacists and number of years of experience were obtained from analysis of the questionnaires and are reported in part B of the results.

Even though some of the community health centres (CHC's) offer services seven days a week, pharmacies involved in this study did not operate on Saturdays and Sundays.

I used the IDEALS approach (Chapter 5, section 5.12) to introduce the diabetes program. I explained the use of the folder and how these could be used with the case scenarios to obtain relevant key information. At each site, the outreach intervention was implemented at the same time for both the pharmacists and the pharmacists' assistants since they work as a team.

Even though the educational intervention was aimed at pharmacists, pharmacist's assistants were invited to attend as they are an integral part of the pharmaceutical service. Therefore it was important to ensure that my discussion was pitched at a level that would be meaningful to pharmacist's assistants as well.

## **6.5 Assessment of Visit 1**

*Key for meeting with pharmacy staff*

Ph: represents a pharmacist

Ph1: represents the first pharmacist I had met

Ph2: represents the second pharmacist I had met. This consecutive order is followed for all the subsequent pharmacists with whom I interacted.

E: represents Emmanuel Molosiwa (myself)

The first visit to the intervention sites i.e. MDHS pharmacies, took place over a four week period from 6<sup>th</sup> April 2005 to 3<sup>rd</sup> May 2005.

## **6.6 Pharmacists' responses**

The three main themes identified from the first visit were pharmacists who responded positively, those who had negative perceptions and those that seemed confused.

Almost all the pharmacists were fairly comfortable and relaxed throughout the meeting. The social marketing approach generated hospitality and friendliness amongst almost all the participants and a comfortable learning environment was created through rapport-building and interactive discussions.

## **6.7 Positive responses to the outreach intervention**

Pharmacists (Ph1; Ph4; Ph5 and Ph7) responded positively and perceived the visit as worthwhile. They responded positively to the folder and seemed enthusiastic about the adoption of key diabetes concepts. Further they felt there was a need for more of these interventions.

Ph7: I wanted something like this and you have definitely provided it.

E: (smiling)...I appreciate it that some of you like the program and realise its value.

When discussing some of the risk factors associated with diabetes, I explained that, *“about 30% of women with gestational diabetes will develop permanent type two diabetes in later life and that pancreatic diabetes is due to chronic alcohol damage”*. One pharmacist responded as follows:

P1: mmhhh, mmmhh, Yeah, Yeah, ehe! [acknowledging understanding]

One pharmacist was impressed by the layout of the folder and expressed interest to in purchasing it.

Ph4: Where can I buy such material [referring to the folder in my hands] because I do not mind spending on it?

E: (Smiling)...I am going to leave this folder in the pharmacy so that you can always refer to it. Moreover, I have the folder photocopied into a booklet form so that you can read it whenever you feel like it.

Pharmacists who agreed with and displayed keenness towards the educator's role were very friendly and enjoyed a humorous and relaxed atmosphere throughout the meeting. One pharmacist's (Ph7) enthusiasm implied that (s)he did not need a lot of encouragement to accomplish tasks despite the constraints under which he/she had to work. Furthermore, some pharmacists (Ph3; Ph5; Ph8) tried to minimize interruptions by checking the urgency of the queries so as to retain their focus on the meeting.

### **6.7.1 Pharmacists who wanted the outreach intervention to be extended to other health professionals**

Some pharmacists (Ph1; Ph4) perceived the importance of the educational meeting and indicated that it should be extended to nurses, doctors and community pharmacists.

- Ph4: Why not arrange for a mixed audience which includes nurses so that they could appreciate the reasons behind what they are doing daily to diabetic patients?
- E: For now I am intending to only work with pharmacists. However pharmacists' assistants have been allowed in our meetings but they are not the focus of my study.
- Ph1: Why don't you take this educational program to the community pharmacies as well?
- E: Currently I have planned to work with public sector pharmacists only.

### **6.7.2 Pharmacists who requested the extension of the outreach intervention to other chronic diseases**

Some pharmacists were very complimentary and further expressed their need for educational material such as the folder for the management of other chronic diseases.

- Ph1; Ph2; Ph5: It would be useful if you had this type of folder for the management of hypertension and other chronic diseases.
- Ph1: What is the next program that you will educate us on?
- E: We want to see how much the current program is accepted first, and then the decision will be based on what you expressed as your needs during the baseline study.
- Ph1: I have definitely improved, in fact all of us.
- E: Smiling... a small improvement is good enough, even 1%!

The positive responses towards the educational program were also reflected in the findings from the questionnaire survey where all pharmacists (9; 100%) were of the opinion that the short and educative programs on diabetes should be extended to the management of other chronic conditions.



Pharmacists who enjoyed the session supported the need for more educational sessions.

Ph4: Services should encourage educational sessions. These should be considered and allowed during working hours.

Some pharmacists used this opportunity to enquire and to further clarify pharmacotherapeutic principles on diabetes management.

Ph1: We see that some diabetics are put on carbamazepine treatment, do you have an idea on this?

E: This could have possibly been indicated for some neuralgia that possibly results from the complications of diabetes.

### **6.7.3 Pharmacists who agree but were passive**

Some pharmacists (Ph2; Ph3; Ph5; Ph8) seemed to agree with the information in principle but their commitment patterns seemed to be limited.

One pharmacist (Ph2) felt that the diabetes club provided patients with information on the management of the disease, while others (Ph3; Ph5) feared that information overload might be deemed disadvantageous to the patients.

E: Have you ever thought about giving patients more information on the management of diabetes disease?

Ph2: I do not have time and do not think it's necessary because patients will get that information from the diabetes club.

Ph3; Ph5: I do not want to scare patients away from taking their medicines by giving them too much information

One pharmacist (Ph8) felt that extensive counselling of patients was time-consuming.

Ph8: If you tell patients about control of sugar and cholesterol, foot care, the importance of stopping smoking, then you will be in the pharmacy until past midnight or even up to 1:00

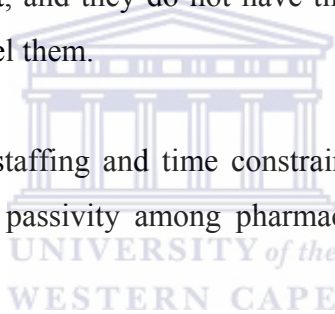
a.m. Further, (s)he said, “Intellectuals don’t live in the real world, sometimes I think you are looking for a perfect world”.

E: Our aim is to work together even though we know very well there are many barriers and situational constraints.

Another pharmacist (Ph 4) felt that their undergraduate training could not be applied easily in practice due to lack of staff.

P4: What we do in practice is different from what we were taught or what we know to be good practice. When you come out to real life practice, you realise the aim is to give patients their medications as quickly as you can. Patients are impatient, and they do not have time to listen when you try to counsel them.

While patient overload, understaffing and time constraints remain a challenge to public sector health facilities, passivity among pharmacists could further hinder optimal care provision.



## **6.8 Negative responses to the outreach intervention**

Even though pharmacists had welcomed me, some either seemed reluctant to spend their time in our meeting or were deliberately non-participatory.

One locum pharmacist (with 40 years service experience) presumed that my visit was to have the pharmacy staff complete questionnaires, and commented negatively:

Locum Pharmacist: Honestly, the last time you made us fill in your questionnaires, the moment you left, I and the other two pharmacists discussed what you did with us. Although we filled in the questionnaires we thought it was silly!

E: At least you filled in the questionnaire, for which I am grateful.

The locum pharmacists' negative comments could have subsequently influenced the other pharmacists interactions with me. Chen (2004) confirmed that pharmacists' knowledge and attitudes towards a diabetes program significantly influenced patient outcomes. This may well mean that negative perceptions could easily translate into passivity, where pharmacists are viewed as 'mechanical dispensers', where they lack active involvement in monitoring patient health outcomes.

Pharmacist (Ph6) made several excuses, in that (s)he had a tendency to continuously and deliberately avoid our scheduled meeting. He/she excused him/herself because of the perceived outpatient load and arranged personal medical appointments that coincided with our pre-arranged meeting time.

Ph6: There are many patients as you can see there is no way I can meet with you.

E: Yes, I see let's appoint for a different time.

We agreed to fix the appointment for Tuesday at 2:00 p.m. I came in for the appointment as scheduled but this time I was given a different excuse.

Ph6: I have got no time. I have an appointment with the doctor, at half past two, serious!

I have got no time! [*Whispering as he/she goes out of the pharmacy*].

Subtle avoidance was evident as this pharmacist (Ph6) seemed to adopt situational constraints to disregard our meeting at the pre-arranged time.

One pharmacist (P3) looked interested at the beginning of the presentation but soon seemed to have lost interest in the discussions. (S)he looked too tired and dozed off intermittently. This left me wondering whether (s)he listened better when (s)he occasionally closed his/her eyes, was too tired in the afternoon or that the discussions were boring.

Despite confirming a pre-arranged time, some pharmacists were not keen to meet with me. Three pharmacists (Ph3; Ph6; Ph8) felt that the educational session did not warrant their undivided attention. Pharmacist (Ph8) felt that I should discuss the educational material while (s)he was dispensing at the outpatient counter.

Ph8: How do you think we can do this? Other than my normal duty of dispensing, I have a lot of other duties to carry out this morning that will prevent me from listening to the presentation. Talk to me while I am dispensing to patients at the same time.

E: It will not work, I explained.

Pharmacist (Ph6) listened to me for some minutes then attended to patient queries.

Ph6: As long as you don't ask me to do anything like answering questions and filling in questionnaires its fine you can talk to me.

I started explaining the various elements of the desk folder. When I was just about to finish the discussion, a patient appeared at the outpatient counter of the dispensary window. (S)he immediately excused himself/herself out of the meeting to attend the patient. When she came back I acknowledged there was a problem.

E: Well, there is a problem. I had more information I wanted to share with you, but it does not seem to work.

We agreed and postponed the meeting.

Another pharmacist (Ph3), who worked in the same pharmacy with (Ph6), seemed to be always busy, either, placing an "emergency" order, balancing the narcotic drugs register or processing leave forms that made it impossible for us to meet at the scheduled time.

E: Good afternoon Mr/Mrs \_\_\_\_\_.

Ph3: Emmanuel as you can see I am very busy now I can't meet with you today?

E: Yes sir/madam, I can see that. I will talk to you over the telephone to arrange when to come again.

I realized that the pharmacist would not make time to meet me on that day.

## 6.9 Interruptions during implementation of the outreach intervention

Interruptions to some extent contributed to negative receptivity. Disruptions ranged from ringing cell phones, landline calls and attending to patients' or nurses' queries. Telephonic interruptions resulted in some pharmacy staff (Ph8; PA11) missing salient points during the discussions.

Some pharmacists had to leave urgently in the middle of our discussions. One pharmacist (Ph1) had to rush out of the meeting because the locum pharmacist had to leave around 3:30 p.m therefore he/she had to immediately resume dispensing at the outpatient counter, which was a priority.

Ph1: I am sorry I have to leave

E: Please take the three practice scenarios to help you apply the information on diabetes that appears in this folder [referring to a photocopy of the folder which I handed to the pharmacist]. I will discuss them with you on my next visit.

Ph1: Okay

As I was about to leave the pharmacy, pharmacist (Ph1) re-assured me that (s)he would assist the pharmacists' assistants and patients by applying the diabetes management principles we had discussed.

Findings from the questionnaire survey also indicated that the majority of pharmacists acknowledged that interruptions were barriers to the intervention (see Part B, figure 6.1).

Poor planning, lack of communication among staff and the inability to coordinate activities at the pharmacies, hindered the implementation of the on-site educational program. It may mean that public sector pharmacists are not accustomed to receiving on-site educational programs within working hours or may not want to view it a necessary part of their professional development. Lack of a dedicated room to conduct educational visits, could hinder implementation of outreach educational programs at public sector health facilities.

### **6.10 Confusion about my role as the outreach educator**

Some pharmacists' initial responses to my role as an outreach educator was perceived with some confusion, although this was usually quickly and easily clarified. The confusion took one of two forms. Some pharmacists seemed to view me either as a representative from either a drug company or from the Department of Health.

Ph4: Which company are you representing?

E: None (smiling)...I am from the University of the Western Cape, School of Pharmacy. I am a postgraduate student.

Ph4: In fact you are more than halfway to becoming a company representative. They are training you very well then to be a company representative!

E: Is that so! (Smiling)

In other instances some pharmacists (Ph1 and Ph7) perceived my role to be that of a public servant working as a representative for the Department of Health's pharmaceutical services.

Ph1; Ph7: Is it the department of health that sent you to do this with us?

E: No (smiling)...I am from the University of the Western Cape, School of Pharmacy. I am a postgraduate student.

In view of the social marketing technique used in this study it was inevitable that staff perceived the outreach educator to be a drug company representative, and that may have resulted in some pharmacists (Ph1; Ph4; Ph 7) feeling uncertain about my role.

One locum pharmacist adopted a defensive attitude about his/her practice upon my entry as an outreach educator.

Locum Pharmacist: Do you think you can teach me anything when I have been practising this long without anybody complaining about my standard of practice?

E: I did not reply

Although many pharmacists agreed with key principles of the diabetes outreach intervention, their commitment to actually apply these in practice may be questionable. It seems that contextual factors in the work environment limit their ability to provide a better dispensing service to diabetics. Until structural barriers, lack of planning, time constraints due to high patient load and understaffing are addressed, adherence towards good pharmacy practice and guideline based care remains a challenge to public sector pharmacists.

### **6.11 Conclusion**

Despite situational constraints, there seemed to be fair acceptance among pharmacists of the intervention. Pharmacists who received the educator openly, held favourable views that the educational program provided practical information on key management principles of diabetes. Further, the folder and the social marketing approach seemed to obtain pharmacists' approval.

Findings from this qualitative study indicate that public sector pharmacists may be willing to participate in educational interventions.

### **6.12 Visit 2**

I discuss pharmacists' responses to my second visit. Visits were assessed qualitatively to explore pharmacists' perceptions and acceptance of the diabetes educational program. Common themes were identified from the field notes and I conclude the discussion with my perceptions as an educator.

I concluded the first visit by handing out practice scenarios at each pharmacy and requested pharmacists to use the folder to answer them. Even though all pharmacists had agreed to apply the information in the folder, comprising the key pharmacotherapeutic principles of diabetes management when solving the practice scenarios and when counselling patients, only a few fulfilled this commitment.

The aim of the second visit was to reinforce the management principles of diabetes using the accordion folder (Appendix D), and assist them in solving three practice scenarios (Appendices F, G and H). The visit was also meant to assess pharmacists' responses and experiences with the application of the information contained in the folder, which formed part of the assessment of the receptivity of the program.

The second visit took place over a six week period from 16<sup>th</sup> May 2005 to 24<sup>th</sup> June 2005.

### **6.13 Scheduling of appointments to meet pharmacy staff**

I followed a similar procedure to that in visit one by scheduling appointments with the pharmacists and introducing the purpose of my visit. Meetings with pharmacists at the community health centre pharmacies were scheduled telephonically. Some pharmacists postponed appointments, as they explained that they “were short-staffed” because one or two staff members were either “off-sick” or “off-duty”.

#### **6.13.1 Telephone conversation to initiate meetings**

I used the same conversation structure as in visit one, but requested 15 minutes of their time rather than 30 minutes.

Most pharmacists except three (Ph4; Ph7; Ph9) responded with an apology during our telephone conversation to arrange for a meeting, as they had not been able to work on the scenarios.

Ph1; Ph2; Ph3; Ph5; Ph6; Ph8: I am sorry I did not have time to do the problems. I do not know if the other pharmacist has solved the problems. Since



you are going to discuss approaches to solve practice scenarios you can come.

E: Should I come in the morning or in the afternoon?

All pharmacists preferred an afternoon visit.

Ph2: As you witnessed during your previous visit, we are ever busy, but you can come any day in the afternoon.

Ph3; Ph4; Ph5; Ph7; Ph8: You can come in the afternoon, anytime from 2:00 p.m.

E: Thank you

#### **6.14 Length of waiting times at pharmacies during visit 2**

As in the first visit, meeting times depended largely on the availability of pharmacists with regard to their dispensing duty. Most visits were conducted from Mondays to Fridays. Meetings usually lasted for up to 15-20 minutes.

At some pharmacies the scheduled meetings were delayed because the pharmacist was busy, resulting in prolonged waiting times ranging from ten minutes to about one hour. Pharmacists who failed to meet at the appointed time, apologized and subsequently arranged for another meeting.

#### **6.15 Implementation of the intervention**

In my second visit met with the same sample of pharmacists as for the first visit and used the IDEALS approach. I reinforced aspects of diabetes care and subsequently guided pharmacists on how to apply key concepts when solving the practice scenarios using the folder (Appendix D). The intention was that the practice scenarios would enable the pharmacists to familiarise themselves with the folder so that it would be relatively easy for them to refer to the folder when dispensing to patients with diabetes.

I concluded the visit by referring to inscription on the pen, "*I am a diabetes educator*" which served as a reminder for pharmacists that they are recognized as diabetes educators.

The key used in visit one which identifies responses to various aspects of the intervention, also applies for visit two.

### **6.16 Pharmacists responses**

Pharmacists responses to the second visit were categorized into two main themes, those that showed interest or attempted to use the information contained in the folder (positive responses), and those who showed no interest to do so (negative responses).

### **6.17 Positive responses**

Themes that describe pharmacists who agreed, were enthusiastic and had completed the practice scenarios are discussed below.

Three pharmacists (Ph4; Ph7; Ph9) showed confidence in solving the practice scenarios questions as they could apply the information gleaned from the folder.

Ph7: I am done with the practice scenarios.

Ph4: I browsed through the folder once or twice and quickly went through the practice scenarios and solved them.

Ph9: Solving the problems was a really good exercise

E: I would like to know your experiences with the use of any of these materials and information?

Ph7: Yes, it was beneficial the first couple of days, some of the details we forget with time, man!

E: Tell patients the information all the time when you counsel them, doing so will assist you to retain the information in your memory for long periods of time.

Ph7: Mmm..h I will try that

E: Thank you

Despite contextual constraints, responses from some pharmacists were positive. One pharmacist (Ph9) responded positively about the folder but patients absence limits optimal care provision.

E: Since the first visit during which we discussed information on diabetes management principles, please tell me about your experiences.

Ph9: I like using the folder because every time I have a question I just quickly refer to it. The locum pharmacist and I use it to quickly check information that we need on diabetes. It is very good indeed.

E: That's good! Do you counsel diabetic patients?

Ph9: Yes, since the educational program, I talk to patients more about diabetes management. The problem is that the diabetic patients do not come themselves to collect their drugs, they just send "collectors". However, the few that come to the pharmacy to collect their medicines, I talk to them about their medicines. I really try to make a difference.

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One of the barriers when dispensing to a collector (a person who collects medication on behalf of a patient) is that salient drug information for patients may not be conveyed to patients (Tietze, 1997).

Another pharmacist explained that (s)he only provides additional information when the patient actually asks for it.

Ph4: I only tell patients more information about diabetes management if they want to know more.

E: The purpose of the diabetes educational session at the pharmacy was to enable you to initiate appropriate counselling for diabetic patients.

Pharmacists should not only respond to patients' questions, but they should also be proactive (Anderson, 2003) in engaging with patients about their therapeutic needs and encourage self management (Roberts, 2004).

One pharmacist expressed difficulty in translating technical pharmaceutical information into lay-persons' terms to enable patients to make informed decisions about their health.

Ph4: Most patients' queries are not in-depth related. They will not talk about metformin drug plasma levels, or the interactions between aspirin and metformin. In varsity we were taught that there is an interaction and you can't use the two.

E: In practice we have to closely monitor the blood glucose levels of the patient and advise the patient or refer as deemed appropriate.

Pharmacists often find that it is difficult to avoid the use of technical terms (Tietze 1997). However, such translation into lay-terms is essential, for adherence to treatment. A further problem arises when friends or family collect medicines on behalf of patients. This hinders patient centred care.

Despite time constraints, the intervention was viewed favourably.

Ph2: We would have liked to fully talk to you and do more work with you, now it's a pity we could not afford that. However, even with the little time we had together, we benefited.

E: Thank you

#### **6.17.1 Perceptions of pharmacists who agreed and were enthusiastic but had not solved the practice scenarios**

This category included pharmacists that had positive intentions but who had not attempted to solve the practice scenarios.

In the accordion folder it is explained that the most useful drugs for the management of diabetic dyslipidaemia are the statins (simvastatin) and the fibrates (bezafibrate). Consequently practice scenarios one and three aimed to sensitise pharmacists to the importance of monitoring triglycerides and cholesterol in the management of diabetes. One pharmacist enquired as follows:

Ph8: Which are the best drugs for the control of cholesterol?

E: For triglycerides, bezafibrate is the best considering what is available in the formulary or drug list. It is one of the broad-spectrum lipid controlling agents in that although its main action is to decrease serum triglycerides, it also tends to reduce low density lipids (LDL-cholesterol) and raise high density lipids (HDL-cholesterol). Whereas simvastatin is good for cholesterol reduction, it acts by competitively inhibiting 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) reductase, the enzyme that catalyzes the rate-limiting step in cholesterol biosynthesis.

Some pharmacists (Ph5;Ph8), although positive about the information we discussed as outlined in the folder, still expressed negative responses when I asked them about their experiences concerning the application of the information in the educational materials when dispensing.

E: What were your experiences with the use of any of the educational materials since our last meeting - especially when you were dispensing.

Ph8: It definitely made a difference, but I didn't change my practice.

Ph5: I did not change my practice.

Even though pharmacists (Ph8; Ph 5) agreed that their knowledge of diabetes care had improved as a result of the intervention, pharmacist Ph8 did not apply key concepts in practice. Efforts to change practice behaviour indicate the need for regular support or reinforcement visits (Grol, 1995). When comparing the two

pharmacist (Ph8 and (Ph5) in terms of translating knowledge into practice, pharmacist Ph5 became more aware of the need to provide better care. (S)he seemed proactive to the extent that (s)he even pantomimed the activity when counselling patients on how to rotate injection sites when administering insulin. This pharmacist may be identified as one who could be at the stage of contemplating practice change (Rollnick, 1999).

Although pharmacist (Ph5) had not answered the practice scenarios, she seemed to have grasped the importance of rotating insulin injection sites.

Ph5: Since the educational program I have realized that some patients are not sure about the practice of rotating sites when injecting insulin. When I advise them about rotating injection sites, I make them follow a pattern. I simply ask them to place their hand over an injection area and use the spaces between the fingers as the next injection sites. This is practical and it helps them rotate injection sites.

E: (Smiling)...I appreciate it that some of you apply the information we shared for the benefit of patients.

Even though the outreach visit may not have resulted in imminent practice change, it seemed to have instilled more awareness and vigilance of good management of diabetes.

Pharmacists' active involvement in advising patients about the importance of rotating injection sites and probing into patients' knowledge and understanding (Tietze, 1997) of diabetes could contribute to better self-control.

One pharmacist (Ph5) expressed concern about the poor monitoring of information when patients are transferred from tertiary to primary care facilities, resulting in lack of continuity of care.

- Ph5: Concerning the glycosylated haemoglobin (HbA1c) values, that information is not readily available in patients' folders. When a patient is referred from tertiary centres, we only receive a referral letter at the community health centres.
- E: Okay, that is one area that needs to be explored with the relevant authorities. I believe the information is important in order that better care can be provided to patients.

During the process of the transfer of care (Grimshaw, 2005) from a tertiary to a primary care facility, sometimes there is a lack of relevant clinical data, and this may result in the provision of sub-optimal care.

Pharmacist (Ph2) commented positively about the intervention, suggesting that (s)he realized the level of engagement expected of pharmacists in diabetes care.

- Ph2: The program is interesting and helpful but the problem is lack of time. The good thing about the program is that it somehow forces you to concentrate on your work. It draws your attention and reminds you to do things that you will not normally do when you dispense to diabetic patients. In fact it encourages you to talk more with the diabetic patients.
- E: (Smiling) that's a good experience.

Other pharmacists (Ph7; Ph8) were positive about the educational program and shared their experiences after using the accordion folder.

- Ph8: At least we have valuable information in the form of a folder that we can refer to.
- Ph7: It's good information.

Since trained post-basic pharmacist's assistants will be allowed to dispense under the supervision of pharmacists (Pharmacy Act of 1997), the pharmacist's skill in critical analysis of prescriptions is crucial. During implementation of the outreach

intervention, a positive interaction with one of the pharmacists (Ph5) was as follows:

E: I understand post-basic pharmacist's assistants (PA's) will soon be dispensing and counselling patients for some of the medicines up to schedule six at the beginning of July 2005. I guess pharmacists could be involved more with patient care. I suppose they will concentrate more on reading the folder, interpreting and analyzing prescriptions and advising more once they identify any anomaly with prescriptions.

Ph5: Pharmacists better check prescriptions, and monitor adherence on other conditions such as hypertension and not just diabetes. They need groundwork on how to go about putting up say a diabetes clinic in place. It is best that pharmacists check prescriptions and identify those patients not well-controlled say on diabetes. In fact what you are doing with the current diabetes educational program is a step in the right direction.

E: I am happy with your observations.

Ph5: You know Emmanuel, we always make recommendations and we do not put workable solutions in place, thus they remain recommendations and will remain idealistic.

By reviewing prescriptions and identifying patients with diabetes who are poorly controlled, pharmacists can refer patients for more appropriate therapy. Further reviewing response to therapy from clinical data will enable better control (Tietze, 1997). Observations from this study suggest that pharmacists dispensing overall, remains mechanical.

One pharmacist (Ph9) expressed his/her appreciation of the colour-coded folder that was used to highlight key information on diabetes management.



- Ph9: I appreciate the manner in which you linked the different colours to emphasise the important information that we have to know. How did you do that?
- E: Information highlighting the same message is colour-linked to specify the same topic. For example, all the messages emphasising hypoglycaemia (low blood sugar levels), appear in a red background and those emphasising hyperglycaemia (high blood sugar levels), appear in a yellow background. Drug interactions appear in a light green background. The side effects of drugs appear in a light blue background.

### **6.18 Pharmacists who were negative in their responses**

Some pharmacists openly admitted they not only forgot to use the folder to solve the practice-based scenarios, but also that they did not have the time to do so.

These pharmacists did not show interest and were cynical in their approach towards the intervention. Even though I may have established a rapport with the pharmacists since my first visit, their non-cooperation towards the practice scenarios, was attributed to the numerous practice barriers.

Time constraint was identified as the main limitation. Some pharmacists were on sick leave, while others had forgotten to familiarise themselves with the folder.

E: What are your experiences with the use of the folder that I discussed with you during my last visit? I'd also like to know if you were able to solve some practice scenarios.

Ph3: I do not know where I left the practice scenarios. Let me check in my drawer. I haven't used the folder, I have been sick for five weekdays and now I have "stuff" (referring to his/her office work) to catch up with.

Ph3; Ph6; Ph8: I did not have time.

One pharmacist (Ph3), was not able to work on the practice scenarios because (s)he was moving house, and was too tired to do any extra work.

Ph3: I have not yet had time to attend to the practice scenarios [I had been told this explanation six times before]. You know I am moving house and I just don't have time! I just can't help you. I am in a bad situation. You know Emmanuel there comes a point in your life when you just can't put an hour together.

E: Yes, I do understand. Working on the scenarios would help you to apply the key principles.

Ph3: Well I do not know, check me Thursday afternoon. Please call me first but I am not promising anything.

Situational constraints, seem to influence the overall preparedness or willingness of pharmacists to engage fully in the educational program.

Other pharmacists claimed that solving practice scenarios was perceived to add to their intense workload.

Ph8: I cannot do your practice scenarios now, I am busy! You better come for guiding and solving the scenarios, Thursday or Friday. Be aware that what you want us to do increases our workload.

E: Yes I can see it.

Ph8: Look at my desk, I have lots of work to do! I never have time to sit in this office and do my work!

Ph6: Do you think we ever have free time here?  
Look [showing me the dispensary area full of patients] this is how busy we are from morning to evening everyday.

Some pharmacists added humour to their negative responses.

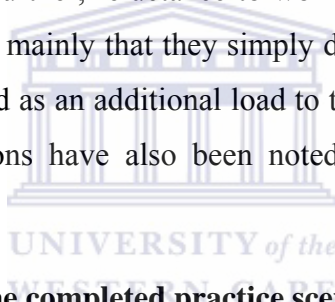
Ph6: Emmanuel see what you are doing to us. You are chasing us around! This pharmacist walked out of the pharmacy for an errand and returned shortly after five minutes.

Another pharmacist highlighted the problem of lack of time as a joke:

Ph1: My supervisor does not give me time to look at the practice scenarios [Indeed joking!]

E: it's you, [\_\_\_\_\_ calling the name of the pharmacist] who is not keen to solve the practice scenarios.

Underlying the relaxed atmosphere and humor expressed as laughter, [ha..ha..ha..ha, e..e..e..e], it was apparent that lack of time was identified as a main barrier for most pharmacists. Further, reluctance to work on the scenarios was not because they were difficult but mainly that they simply did not find it necessary to solve them as they were viewed as an additional load to their already overstretched practice duties. Time limitations have also been noted in other studies (Mays, 1994).



### **6.19 Attempts to retrieve the completed practice scenarios**

On average I made nine visits to each of the four sites to retrieve the completed practice scenarios, but my efforts were not successful. While the care of patients takes priority over other activities at health facilities, pharmacists may have used this as leverage. Consequently, an incentive was offered as a strategy to improve the response rate. The offer of a certificate for recognizing their participation in the educational program and the return of solved scenarios and completed questionnaires, subsequently resulted in 100 % response rate and a change in attitude was also evident.

Pharmacists (Ph1; Ph3; Ph5; Ph6; Ph8) were initially reluctant to cooperate but changed their attitude once they realised that certificates for the acknowledgement of their participation would be offered. Attitude and planning are factors that are likely to influence practice behaviour.

One pharmacist (Ph6) who habitually found some excuse not to fully participate in the educational program, adopted a more positive approach once (s)he realized that certificates would be offered. However, (s)he asked me, whether I would do a similar study again under the same constraints, after realizing how busy they were and how little time they had to accommodate any educational programs.

E: Good afternoon \_\_\_\_\_ (name of pharmacist)

Ph6: Hello Emmanuel

E: I am here to collect the solutions to the practice scenarios as agreed.

Ph6: Are you ever going to do a similar study under the same constraints, where you follow people at practice sites?

E: Yes, we want to see how best we can share knowledge with pharmacists while they are on duty under the constraints and barriers you currently experience. Maybe from this study we may begin to know better, what it is that would encourage you to implement guidelines in practice.

Ph6: But you can see it is not working. The best way is to invite some pharmacists to a common venue and educate them. I believe you will get better concentration from the staff and also better results.

E: I would have preferred to do that but I do not have the authority to give you time off from work. Remember that I do not work for government.

## **6.20 Perceptions of the educator**

My role as an outreach educator who is not resident in South Africa did not significantly influence the practice behaviour of pharmacists. However, knowledge of local languages (Xhosa and Afrikaans) would have enabled me to identify –some perceptions, prejudices and attitudes unfamiliar to a non-South African. One fifth (2; 22%) of the pharmacists spoke Xhosa, while the rest were Afrikaans-speaking.

The social marketing technique commonly used by the pharmaceutical industry (Soumerai, 1990) seemed acceptable. The aim was to influence pharmacists' practice patterns towards patient-centred diabetes care. It enabled pharmacists to share the barriers they encountered and what motivated them as well as what inhibited them from applying key concepts when providing care.

A number of barriers have been identified during the implementation of this intervention. One of these is the high patient load which limits the involvement of pharmacists in devoting time in professional development programs.

### **6.21 Conclusions**

There were some attempts made to engage with the scenarios which indicated that some effort was evident.

Most pharmacists seemed to agree with the implementation of the on-site diabetes pharmacotherapy educational outreach program. Their commitment to actually apply the key concepts in practice was limited.

In this study the qualitative methods using unobtrusive depth interviews and covertly making notes about the meetings, were appropriate. Views, perceptions and attitudes towards the educational intervention, provide indepth insight into the reality of pharmaceutical care provision in public sector health facilities. Overall findings indicate that the outreach intervention was found to be fairly acceptable among the pharmacists despite the contextual constraints.

### **6.22 Part B: Quantitative results: Post-intervention questionnaire survey**

The questionnaire survey was used to assess pharmacists' receptivity of the outreach intervention. The main objective was to assess if the intervention could improve pharmacists' knowledge on diabetes management and if it influenced their practice

pattern. I present the results of the post-intervention questionnaire survey in Tables 6.2 and 6.3.

### 6.23 Overview of the contents of the post-intervention questionnaire

The post-intervention questionnaire (Appendix J) inquired about the pharmacists' background, their views and perceptions concerning diabetes care, their management principles, and their monitoring and lifestyle management skills. Furthermore, other questions assessed pharmaceutical practice, training and the educational program.

Expressions that indicated frequency of ratio e.g. 1 out of every 10 patients, were used to measure change in practice.

### 6.24 Profile of pharmacists who completed the questionnaire

The gender profile of pharmacists who completed the questionnaire is shown below.

**Table 6.2: Gender profile of pharmacists (n = 9)**

	<b>n</b>	<b>(Percentage)</b>	<b>Age range (years)</b>
Gender: Male	5	(56%)	30 - 60
Female	4	(44%)	20 - 50

All pharmacists were registered with the South African Pharmacy Council and most were males (5; 56%). The duration of employment amongst the pharmacists varied between one and forty years.

**Table 6.3: Results of post-intervention questionnaire survey**

	1 Strongly agree, agree, or yes (%)	2 # of subjects (%) who did not respond	3 Strongly disagree, disagree, or no (%)
<b>Pharmacy practice barriers</b>			
1a) Pharmacists who felt that the hatch or dispensing window is too small	6(67)		3(33)
1b) Pharmacists who felt that there is no privacy at the hatch or dispensing window	9(100)		
2) Pharmacists who perceived that the external sources of interference commonly experienced when counselling are...			
noise	7(78)		
constant patient queries	9(100)		
angry patients	8(89)		
telephone calls	7(78)		
3) Pharmacists who felt patients prefer a private counselling area when collecting medication			
yes	3(33)		
no			1(11)
up to half of the patients	5(56)		
<b>Barriers to dispensing and counselling</b>			
4) Pharmacists who noted that barriers to good dispensing are....			
shortage of staff	8(89)		
too much workload	8(89)		
no privacy	7(78)		
patients are impatient	8(89)		
language and communication problems	5(56)		
lack of space	5(56)		

friends and family members collect medicines for patients who are at home/work	9(100)		
other	3(33)		
<b>Pharmacotherapy educational programs for pharmacists</b>			
5) Pharmacists who felt there is a need to improve the quality of dispensing information	9(100)		
6 Pharmacists who felt the program helped them to improve their:			
a) dispensing skills in terms of diabetes management	9(100)		
b) knowledge of side effects of drugs used in diabetes	9(100)		
c) ability to identify drug interactions and contraindications	9(100)		
d) alertness to correct drug dosages	8(89)		
<b>Diabetes care</b>			
7) Pharmacists identified the recommended fasting blood glucose level range to be...			
4 ( $\leq$ ) and less than or equal to 7 mmol/L	9(100)		
16 ( $\leq$ ) and less than or equal to 20 mmol/L		0	
22 ( $\leq$ ) and less than or equal to 25 mmol/L		0	
8) Pharmacists who believed that hypoglycaemia can be due to drug effects	9(100)		
9) Pharmacists who believed hypertension accelerates development of complications such as...			
a) diabetic nephropathy	9(100)		
b) diabetic retinopathy	9(100)		
10 After implementation of the program pharmacists who...			
a i) agreed to advise patients on foot care	6(67)		
ii) claimed they do not have time to advise patients on foot care	3(33)		



b	i) agreed to advise patients on eye care after the program	7(78)		
	ii) claimed they do not have time to advise patients on eye care	2(22)		
c	i) agreed to advise patients on HbA1c levels	5(56)		2(22)
	ii) claimed they do not have time to advise patients on HbA1c levels	2(22)		
d	i) agreed to advise patients on the importance of well-controlled blood glucose levels	6(67)		
	ii) claimed they do not have time to advise patients on the importance of well controlled blood glucose levels	3(33)		
11	a) Pharmacists who would advise the following proportions of patients on foot care			
	1 out of every 2 diabetes patients	0		
	1 out of every 10 diabetes patients	4(45)		
	1 out of every 20 diabetes patients	3(33)		
	all diabetes patients	0		
	none of the diabetes patients	1(11)	1(11)	
	missing			
11	b) Pharmacists who would advise the following proportions of patients on eye care			
	1 out of every 2 diabetes patients	1(11)		
	1 out of every 10 diabetes patients	2(22)		
	1 out of every 20 diabetes patients	4(45)		
	all diabetes patients	0		
	none of the diabetes patients	1(11)	1(11)	
	missing			
12	Pharmacists who spent more time counselling the following types of patients after the program			
	newly diagnosed diabetics only	7(78)		2(22)
	chronic diabetic patients only	3(33)		5(56)
	all newly diagnosed and chronic diabetic patients	5(56)		3(33)
	missing		1(11)	
13)	Pharmacists who after the program changed their work routine to spend more time on caring for diabetes patients	4(44)		5(56)

did not change their work routine at all missing	3(33)	1(11)	5(56)
<b>Monitoring of diabetes</b>			
14) Those pharmacists whose response to a recorded HbA1c level 12 was...			
let it pass	0		
I do not have time to look at it closely	1(11)		
I advise the patient to make enquiries at the doctor	8(89)		
15) Those pharmacists who would check FBG levels to monitor treatment in the following proportions of patient's folders			
In about 1 out of every 10 diabetes folders/charts	3(33)		
In about 1 out of every 30 diabetes folders/charts	0		
In about 1 out of every 50 diabetes folders/charts	2(23)		
all the time	1(11)		
never	3(33)		
16) Those pharmacists who intend referring to FBG, RBG, HbA1c, and TG...			
when analyzing patients' prescriptions	9(100)		
when analyzing patients' prescriptions although it's time consuming	9(100)		
17) Pharmacists who correctly identified the ideal lipid range to be the following...			
total cholesterol less than 5 mmol/L	9(100)		
triglycerides less than 1.5 mmol/L	8(89)		1(11)
18) Pharmacists who were of the opinion that the drug of choice for a patient with hypertriglyceridaemia is bezafibrate	9(100)		
19) Pharmacists who were of the opinion that bezafibrate should be used with extreme caution in patients with impaired kidney function	9(100)		

20) Pharmacists who were of the opinion that some side effects of bezafibrate are muscle wasting and abdominal pain	9(100)		
<b>Lifestyle management</b>			
21) Those pharmacists who found that after the program they tended to advise the following proportions of patients represented as patients' folders on the importance of stopping smoking...			
all the time	3(33)		
In about 1 out of every 10 diabetes folders/charts	4(45)		
In about 1 out of every 30 diabetes folders/charts	1(11)		
In about 1 out of every 50 diabetes folders/charts	1(11)		
never			
22) Those pharmacists who found that after the program they tended to advise the following proportions of patients represented as patients' folders on the importance of exercise and weight control...			
all the time	3(33)		
In about 1 out of every 10 diabetes folders/charts	4(45)		
In about 1 out of every 30 diabetes folders/charts	2(22)		
In about 1 out of every 50 diabetes folders/charts			
never			
<b>Comments about the pharmacotherapy educational program</b>			
23) Pharmacists who found that the pharmacotherapy educational program makes dispensing...			
highly interesting	9(100)		
less interesting			
boring			
It does not make a difference			
<b>Educational program</b>			
24) Pharmacists who perceived that the			

pharmacotherapy educational program...			
increases the work load	4(44)		5(56)
although it increases workload, it's worth doing	8(89)		1(11)
good knowledge for use during practice	9(100)		
information needed if you teach in a university			
25) Pharmacists who were of the opinion that the following materials increased awareness of diabetes when dispensing....			
folder only	4(44)		
pen only			
both pen and folder	5(56)		
none of them			
26 Pharmacists who were of the opinion that the desk folder...			
is easy to understand	9(100)		
is difficult to understand			9(100)
is a good reference source	9(100)		
is too full of 'information' (cluttered)			9(100)
is a good reminder	9(100)		
helped improve knowledge of diabetes management	9(100)		
takes too much space			9(100)
improved my confidence in diabetes management	9(100)		
is accessible because it is mounted on the wall	8(89)		1(11)
27) Pharmacists who are of the opinion that illustrations in desk folder helped improve their understanding and clarity with regard to diabetes	9(100)		
28) Pharmacists who asserted that some of the information in the folder they do not agree with because ...			
it is wrong	1(11)		7(78)
they are not sure if it is wrong or right		1(11)	
they did not use the folder			

29) Pharmacists who found that the pen serves as a useful reminder	6(67)	3(33)
<b>Students</b>		
30) Pharmacists who were of the opinion that an educational program will definitely help them facilitate students learning at the site	9(100)	
<b>Opinion of educator</b>		
31) Pharmacists who were of the opinion that the educator...		
was knowledgeable about the principles of diabetes management	9(100)	
clarified and reinforced their understanding of diabetes management principles	9(100)	
<b>Educator and the educational material</b>		
32) Pharmacists who found that the following components of the program could have contributed to improving their understanding of diabetes...		
educator and material	9(100)	
folder and pen	1(11)	8(89)
only the educator	1(11)	8(89)
none of the above (educator, folder or pen)		9(100)
<b>Overall view of the educational program</b>		
33) Pharmacists who were of the opinion that visits during routine working hours were....		
useful	9(100)	
did not make a difference		
were not useful		
<b>Perceptions/feelings about the presentation style of the educational session</b>		
34) Those pharmacists who perceived the following about the presentation style....		
free to pose questions or ideas	9(100)	

<p>were guided on important concepts</p> <p>were encouraged to counsel patients more</p> <p>were dictated to as to how they should act when dispensing</p>	<p>9(100)</p> <p>9(100)</p> <p>1(11)</p>	<p>8(89)</p>
<p><b>Experiences with the use of information in the desk folder</b></p>		
<p>35) Those pharmacists who experienced the following with the use of the information in the desk folder...</p>		
<p>did not use the folder</p> <p>know most of the contents and will apply the knowledge</p> <p>do not know what is in the folder</p> <p>haven't had time to apply the information in the folder</p> <p>are satisfied with their usual style of dispensing</p> <p>will use the folder from now onwards</p>	<p>2(22)</p> <p>8(89)</p> <p>9(100)</p> <p>2(22)</p> <p>3(33)</p> <p>9(100)</p>	<p>7(78)</p> <p>1(11)</p> <p>7(78)</p> <p>6(67)</p>
<p><b>Attendance preference for educational session</b></p>		
<p>36) Pharmacists who were of the opinion that a combined session for pharmacists and pharmacists' assistants was ...</p>		
<p>fine</p> <p>not fine</p> <p>it did not make a difference</p>	<p>9(100)</p>	
<p><b>Recognition for participation in an educational program</b></p>		
<p>37) Pharmacists who were of the opinion that....</p>		
<p>they need a certificate for participating in the program</p> <p>It did not make a difference</p>	<p>8(89)</p>	<p>1(11)</p>
<p>38) Pharmacists who were of the opinion that the short and educative programs on diabetes must be continued for the management of other chronic conditions</p>		
	<p>9(100)</p>	

### **6.25 Response rate**

The initial response rate was low (3; 33%) but it increased after pharmacists were informed that a certificate would be offered to pharmacists who completed all facets of the program. This resulted in a 100% response rate.

### **6.26 Results**

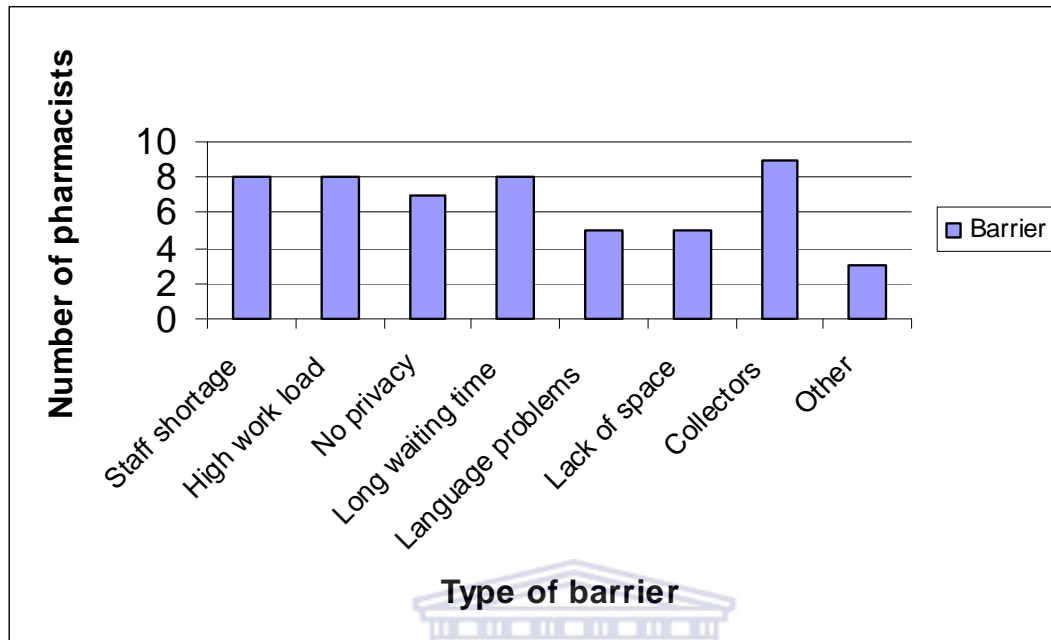
Two thirds of the pharmacists (6; 67%) were of the opinion that the outpatient dispensing window was too small, and all of them (9; 100%) felt that there was no privacy.

In identifying external sources of interference all pharmacists (9; 100%) felt that constant patient queries were most prevalent. The majority of them (8; 89%) found that patients became angry as they waited for a long time for their medications. Over three quarters of the pharmacists (7; 78%) believed that both noise and telephone calls were equally disturbing because patients strain to listen to instructions thereby limiting comprehension (Moody, 1998).

The majority (8; 89%) of the pharmacists felt that most patients prefer a private counselling area when collecting their medications. Pharmacies without designated counselling rooms, leads to dispensing being done in an overburdened environment form noise and overcrowding of patients. This could have a high potential for poor adherence (Grimshaw, 2005).

Pharmacists identified a range of barriers to good dispensing (Figure 6.1). Most of them identified, shortage of staff, high work-load and long periods of waiting (8; 89%), no privacy (7; 78%), language and communication problems (5; 56%), lack of work space (5; 56%), lack of direct patient contact as friends and family members collect medicines when patients are at home/work (9;100%), lack of understanding and no direct phone line to contact patients (3; 33%).

**Figure 6.1 Summary of pharmacists' barriers to good dispensing (n=9)**



All pharmacists (9; 100%) believed that there is a need to improve the quality of dispensing information on diabetes management. The perceived high work-load and impatient patients due to long waiting periods (8; 89%) added to suboptimal service provision. Stress and burn-out affect service delivery. All pharmacists (9; 100%) found that since friends and family members collect medicines on behalf of patients, this impact negatively on information transfer.

### **6.27 Lack of time**

One third (3; 33%) of the pharmacists claimed they do not have time to advise patients on the importance of well-controlled blood glucose levels. This finding was also supported by statements expressed during unobtrusive interviews. A number of studies have shown that lack of time for the promotion of health was a major barrier (Keene, 1994; Mottram, 1995; Moore, 1996; Anderson, 1998).

Although all pharmacists mentioned the problem of lack of time as a factor that hinders them from providing quality counselling, qualified post-basic pharmacists' assistants



(PA's) may be utilized optimally to provide counselling. Currently pharmacist's assistants have undergone post-basic training to improve their skills in not only reading prescriptions, but counselling patients too. This means that pharmacists should invest their time in providing patient-centred care (Armstrong, 1990).

More than half (5; 56%) of the pharmacists perceived language difficulties when counselling patients. As language is central to understanding, some Afrikaans-speaking patients may not fully comprehend counselling that is conducted in English. Multilingualism will be an advantage for pharmacists working in this environment because it enables them to assess the patient's level of understanding when providing information (Moody, 1998).

#### **6.28 Pharmacists' knowledge of diabetes care and monitoring**

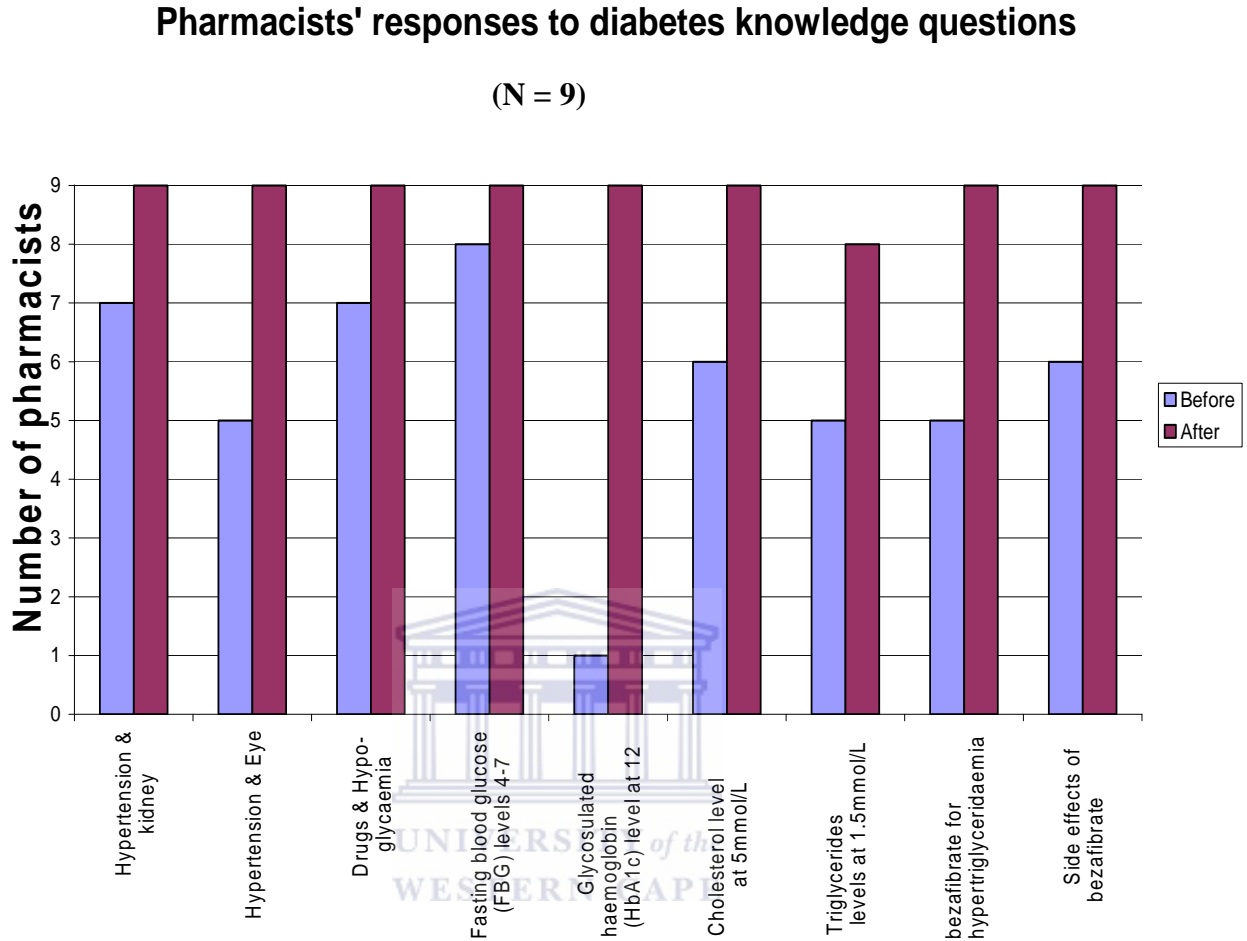
Knowledge questions from the pre-intervention questionnaire were used in the post-intervention. They are based on the national diabetes guidelines and are focussed on care and monitoring. The post-intervention questionnaire survey was conducted one year after the pre-intervention study. I compared the number of pharmacists who gave correct responses to the same questions. An increase in the number of pharmacists responding correctly indicated that there had been some increase in general knowledge (see bar graph Figure 6.2).

**Table 6.4 Results of the pharmacist' responses to the pre-intervention and post-intervention diabetes knowledge survey (n = 9)**

The percentages (%) for the number of pharmacists who responded correctly are placed in brackets.

<b>Description of question</b> <i>(The abbreviated question appears in brackets)</i>	<b>Number of pharmacists who responded correctly (Pre-intervention) (%)</b>	<b>Number of pharmacists who responded correctly (Post-intervention) (%)</b>
Hypertension accelerates diabetic nephropathy <i>(Hypertension &amp; kidney)</i>	7 (79)	9 (100)
Hypertension accelerates diabetic retinopathy <i>(Hypertension &amp; eye)</i>	5 (57)	9 (100)
Hypoglycaemia can be due to drug effects <i>(Drugs &amp; hypoglycaemia)</i>	7 (79)	9 (100)
Fasting blood glucose (FBG) level is between 4 - 7 mmol/L <i>(Fasting blood glucose FBG levels 4-7)</i>	8 (93)	9 (100)
I will refer patient to the doctor instead of filling in the prescription when glycosylated haemoglobin A1c (HbA1c) level is 12 <i>(Glycosylated haemoglobin A1c (HbA1c) at 12)</i>	1 (11)	9 (100)
The ideal lipid profile of a diabetic should be less than 5 mmol/L <i>(Cholesterol levels at 5 mmol/L)</i>	6 (64)	9 (100)
The ideal lipid profile of a diabetic should be a triglycerides level less than 1.5 mmol/L <i>(Triglycerides level at 1.5 mmol/L)</i>	5 (57)	8 (89)
The drug of choice for a patient with hypertriglyceridaemia is bezafibrate <i>(Bezafibrate for hypertriglyceridaemia)</i>	5 (57)	9 (100)
Some side effects of bezafibrate include muscle wasting and abdominal pain <i>(Side effects of bezafibrate)</i>	6 (64)	9 (100)

Figure 6.2 Pre- and post-intervention knowledge surveys



### 6.29 Diabetes monitoring

All pharmacists (9; 100%) correctly identified the recommended fasting blood glucose level range and knew that hypoglycaemia may be associated with drug use. They also believed that hypertension accelerates the development of complications such as diabetic nephropathy and retinopathy and that the ideal lipid profile level range for diabetics should be total cholesterol less than 5 mmol/L. Further they could identify that the drug of choice for a patient with hypertriglyceridaemia is bezafibrate and that some side effects of bezafibrate are muscle wasting and abdominal pain. Most pharmacists (8; 89%) correctly identified that triglycerides levels for diabetics should be less than 1.5 mmol/L.

### **6.30 Pharmacotherapy educational program**

After participating in the educational program, all pharmacists (100%) believed that their dispensing skills and knowledge of the side-effects of drugs had improved and that they were more alert to identifying drug interactions and contraindications in diabetes management. The majority (8; 89%) felt that the program helped them to identify correct drug dosages. Almost all (8; 89%) of the pharmacists mentioned that the educational program was worth doing even though it increased their workload.

During the baseline observation study, pharmacists performed poorly when counselling patients about side-effects, adverse effects, warnings and cautions. Lack of sufficient information by pharmacists and other health care professionals such as doctors, has been noted in some reviews (Herxheimer, 1993). During the visit, specific efforts were made through the use of illustrations to highlight information about these effects.

### **6.31 Experiences with the accordion folder**

All pharmacists (9; 100%) believed that the folder helped improve their knowledge of and confidence in diabetes management, and served as a good reference source and reminder that was easy to understand.

After implementation of the intervention, all pharmacists (9; 100%) believed that they would continue to use the folder. The majority (8; 89%) of them felt that they knew the contents of the folder and would apply the knowledge and that the accordion folder was accessible to them because it was mounted on the wall.

All pharmacists (9; 100%) were of the opinion that illustrations in the desk folder helped improve their understanding and clarity about diabetes. The colourful illustrations aimed to stimulate a more focused behavior change in the pharmacists (Avorn, 1983). Other studies have shown that incorporating visual or pictorial aids such as pictograms in medicine labels and leaflets to complement written text, improved

comprehension of information (Dowse, 2003). However, their successful use depended on their use as an aid to, rather than the sole means of communication (ibid).

Each component of the intervention promoted greater awareness and aimed to reinforce the adoption of optimal diabetes care. Printed educational materials are rarely read or applied in practice but other forms of multifaceted interventions, especially those that catch the attention of the user, have been found to influence positive behaviour (Avorn, 1983).

### **6.32 Pharmacists' views on the pen**

One third (6; 67%) identified the pen as a useful reminder. Reminders have consistently been found to be effective in contributing positively towards improving professional practice (Grimshaw, 2005).

### **6.33 Effect of the educational program on students facilitation**

All pharmacists (9; 100%) believed that the educational program will definitely help them facilitate students who learn at site. Pharmacists who are involved in facilitating students' learning should have easy access to evidence-based information and easy-to-understand guidelines are essential.

Based on the above observations, it appears that pharmacists need support to consistently advise patients on drugs, treatment and complications associated with diabetes.

### **6.34 Monitoring**

Glycosylated haemoglobin (HbA1c) evaluation is an accepted standard of care for assessing diabetes control (Sicard, 2005).

One of the inquiries into assessing change in practice amongst the pharmacists was their ability to evaluate if treatment was appropriate by referring to FBG levels. One third (3; 33%) of the pharmacists stated that they do not refer to them. However an equal number

(3; 33%) claimed that they checked if treatment was appropriate in one out of every ten diabetic folders which they dispensed. A fifth (2; 22%) of the pharmacists mentioned that they checked if treatment was appropriate in one out of every fifty diabetic folders. This suggests that pharmacists seem to infrequently monitor [fasting blood glucose (FBG), random blood glucose (RBG), glycosylated haemoglobin levels (HbA1c), triglycerides (TG) and total cholesterol levels], for diabetes control even though they have every intention to do so. Close monitoring was perceived to be time-consuming, and not easy to implement. In other studies patients have benefited considerably in programs where the pharmacists were involved in medication profile review and proper counselling (Pray, 2003; Britton, 1991).

More than three-quarters (7; 78%) of the pharmacists mentioned that they have used the folder as a reference tool.

### **6.35 Provision of advice on lifestyle management**

Pharmacists provision of advice on the importance of smoking cessation and weight control is crucial in diabetes management. One third (3; 33%) of the pharmacists stated that they advised all patients, while a higher proportion (4; 45%) claimed to advise one out of every ten patients. One pharmacist (1; 11%) mentioned that (s)he advised one out of every thirty patients and another pharmacist (1; 11%) claimed (s)he advised one out of every fifty patients.

An inquiry into whether pharmacists advised patients on the importance of exercise and weight control was explored. Only one fifth (2; 22%) of the pharmacists claimed that they advised one out of every thirty diabetic patients. This may imply that diabetic patients may not be appropriately advised on lifestyle modification. In other words, although the outreach intervention was well accepted, it had little effect in influencing pharmacists' counselling styles. Good educational programs include the use of reminders (Grimshaw, 2005). A systematic review of the effectiveness and efficiency of guideline dissemination and implementation strategies published in 2004, estimated the

effectiveness of some interventions such as educational materials, reminders, audit and feedback. Reminders were consistently observed to be effective (ibid).

Results from the post-intervention questionnaire and unobtrusive interviews showed that, although pharmacists believed that their dispensing had improved as a result of the intervention, this was however, not reflected in actual practice. During my unobtrusive observation, I paid special attention to pharmacists dispensing to diabetes patients and found that they had adhered to their usual counselling and dispensing styles. Past behaviour seemed to directly affect intentions and subsequent behaviour (Szeinbach, 1998). Perceived change towards practice improvements is a slow process that requires continual support. Even if care providers are well informed about what they should be doing, they often do not perform in accordance with their knowledge and skills (Sanazaro, 1983; Kosecoff, 1987).



### **6.36 The accordion folder and standards of practice**

Two-thirds of the pharmacists (6; 67%) mentioned that they were not satisfied with their usual style of dispensing and all of them (9; 100%) felt the need to improve the quality of counselling information which they provided. This may suggest that they were aware that they do not meet the recommended standard operating procedures (SOP's) stipulated by the MDHS pharmaceutical department, and the Guide to Good Pharmacy Practice manual (1997). Even though two-thirds of the pharmacists were aware of their practice deficiencies, they were not necessarily receptive to the desired behaviour change.

Rollnick (1999) explains that the stages of change model is an attempt to describe readiness and how people move towards making decisions and behaviour change in their everyday lives. In this study only a third (3; 33%) of the pharmacists seemed to demonstrate behaviour change in terms of accepting and readily applying the information in the folder in order to improve their counselling of patients. They were willing and showed a positive attitude (Fedder, 1988) during the implementation of the

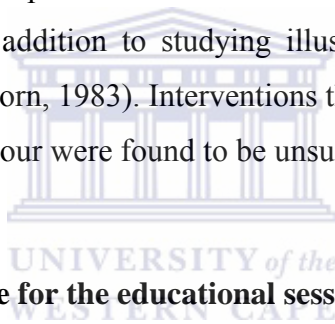
intervention process. However, most pharmacists (6; 67%) were slow to change. This could mean that these pharmacists are pre-contemplators, who required additional support to influence their behaviour resulting in improved practice.

### **6.37 Opinion about the educator**

All pharmacists (9; 100%) believed that the educator was knowledgeable and has helped to clarify and reinforce their understanding of diabetes management.

Further they agreed that the educator and educational materials, folder, pen and practice scenarios contributed towards improving their understanding of diabetes management. In addition they felt that they were free to interact concerning concepts and were encouraged to counsel patients more about the management of the disease.

Some studies have demonstrated positive results in behaviour change in physicians that had face-to-face education in addition to studying illustrated and visually appealing bulletins as an intervention (Avorn, 1983). Interventions that used only printed materials to bring about change in behaviour were found to be unsuccessful (ibid).



### **6.38 Attendance preference for the educational session**

All pharmacists (9; 100%) supported a combined meeting between pharmacists and pharmacist's assistants during implementation of the outreach intervention. All pharmacists (9; 100%) were of the opinion that the short but educative programs on diabetes should be introduced for the management of other chronic disease conditions.

Educational programs should also focus on improving the pharmacotherapy knowledge of pharmacist's assistants in service provision in public sector facilities.

### **6.39 Recognition for participation in an educational program**

The majority of the pharmacists (8; 89%) responded positively to provision of a certificate to endorse their participation in the program. In this study certificates were awarded as an incentive to improve the response rates for the completion of practice scenarios and questionnaires. Some researchers have offered monetary incentives to improve response and participation rates (Wong, 2004; Edwards, 2005).



#### **6.40 Conclusion**

The results of the current study suggest that when pharmacists are supported by an educational program, positive changes in knowledge and attitudes are imminent.

Overall the results of this educational intervention suggest that it was fairly acceptable to the pharmacists. Improvements in knowledge and positive attitude indicate that educational interventions are needed for pharmacists to remain up-dated on guideline recommendations in chronic disease management.



## CHAPTER 7

### DISCUSSION

The aim of this study was to design, implement and assess pharmacists' receptivity of an outreach intervention. In addition the study aimed to determine if their knowledge on diabetes management had improved and if this could be subsequently translated into practice.

Diabetes is a multifactorial disease requiring concerted efforts by all health care professionals who bring in different perspectives, skills and knowledge to optimize care provision. Results from the pre-intervention study showed that the involvement of pharmacists is limited. Other studies also indicate that their role in monitoring drug therapy is limited (Decker, 1988; Younis, 2001).

It is reasonable to suggest that if pharmacists are updated and guided about the key principles of diabetes management, they are likely to better counsel patients on self-management of the disease. Research has shown that short-term continuing education programs can improve pharmacists' knowledge (Leemans, 1998) and attitudes towards the management of diabetes (Chen, 2004). The current study partially supports this. Overall, the results of this study show that the intervention was fairly well accepted and that it had enhanced pharmacists' knowledge and awareness on optimal diabetes management, but this was not translated into practice.

#### **7.1 Acceptability of the intervention**

Results obtained from the qualitative interviews and field notes, indicated that pharmacists were generally in favour of the outreach intervention. For two pharmacists the folder served as a quick reference tool at the out-patient counter.

*“I like using the folder because every time I have a question I just quickly refer to it”.*

One had further suggested that the educational program be extended to other chronic diseases.

*“It would be useful if you had this (folder) [referring to the diabetes folder] for the management of hypertension and other chronic diseases”.*

One pharmacist summed up appreciation of the intervention:

*“It draws your attention and reminds you to do things that you will not normally do when you dispense to diabetic patients. In fact it encourages you to talk more with the diabetic patients”.*

This conclusion is also supported by the results from the quantitative post-intervention questionnaire where all pharmacists (9; 100%) believed the educator and educational materials contributed to a clearer understanding of diabetes. All pharmacists (9, 100 %) believed they will continue to use the folder, and the majority (8; 89%) of them felt that they knew the contents of the folder and had hoped to use the knowledge in routine practice. Furthermore, all nine pharmacists believed after receiving the educational program, their dispensing skills and knowledge about the side-effects of drugs improved and that they were more alert to identifying drug interactions and contraindications in diabetes management. Before the intervention two thirds of the pharmacists responded correctly to the knowledge questions whereas after the intervention all pharmacists responded correctly suggesting that there was increase in knowledge of diabetes management principles. Thus integrating and mixing of research methods, provided insight into pharmacists' acceptance of the intervention (Creswell, 2004).

## **7.2 Factors that contributed towards acceptability of the intervention**

One plausible explanation for acceptance of the intervention was that a personal face-to-face informal discussion, in the pharmacist's own setting enabled them to openly share their individual concerns and experiences. This collegial interaction fitted well into their routine dispensing activity and provided pharmacists with an empathic and interested listener who encouraged them to share their unique experiences openly and without the fear of criticism. They seemed uninhibited to enquire about key concepts during the discussions. This resulted in an authentic account of their views on the use of the intervention in line with other studies (Stålsby, 1999) where there was a positive behaviour change and improvement in

knowledge for the management of urinary tract infections among physicians. A study, which involved testing of four educational methods dealing with transferring information on cough medicines was also well accepted (Leemans, 1998).

### **7.2.1 The educator**

All pharmacists believed that the educator was knowledgeable and had clarified and reinforced their understanding on the key principles of diabetes management. Behavioural science literature indicates that several important principles derived from adult learning and persuasive communication theories support pharmacists' interventions to improve the quality of healthcare delivery (Soumerai 1990). These theories suggest that behaviour change is likely to occur when the agent of change has credibility as an expert consultant (Grol, 1995) who can present both sides of a controversial issue. There are a number of studies that have shown positive results where a pharmacist was involved in providing services with the clinical health care team (Sczupak, 1977; Hendryx, 1998; Sinclair, 1999; Simpson, 2004) or provided outreach services (Fedder, 1987; Coenen, 2004). Therefore, an outreach role in chronic disease management may seem a possible alternative role for South African pharmacists to explore.

### **7.2.2 The educational materials**

The educational materials included the folder and practice scenarios (Sodha, 2002), may have also contributed to improving pharmacists understanding of diabetes management.

The practice scenarios served as a vehicle to quantitatively evaluate how pharmacists could internalize key concepts and then apply them within their scope of practice. Those pharmacists who participated in solving the scenarios felt that they could engage more freely with patients as their understanding of the disease had improved. While this might be viewed as a first step towards knowledge translation, further support visits are needed to embed guideline based care among pharmacists. Gerstein (1999) also obtained positive results using scenarios.

Two thirds of the pharmacists identified the pen as a useful reminder. Reminders in the form of gift incentives have consistently been found to be effective in influencing practice in a number of studies (Grol, 1995; Grimshaw, 2005).

Almost all pharmacists (8; 89%) were of the opinion that a certificate would endorse their participation in the program. In this study certificates were awarded as an incentive to improve response rates for completion of practice scenarios and post-intervention questionnaires. This may indicate that pharmacists are likely to participate in surveys that acknowledge their participation or possibly offer some incentive. Monetary incentives have also been used in other studies to improve survey response rates (Wong, 2004; Edwards 2005).

Availability of clinical guidelines for the management of chronic diseases does not, however, guarantee their use in practice. Most guidelines are written in medical terminology which may not be easily translated into practice for pharmacists. Guidelines that are adapted and tailored to address the pharmacist's need would facilitate quality care provision. In this study although the folder was specifically designed to provide practical, up-to-date, easily accessible information to assist the pharmacist in care provision, more strategies that could enable adoption in practice need to be sought. For example, focus group discussions with pharmacists and pharmaceutical service coordinators could provide a deeper insight into the design of pharmaceutical care reminders or tools that would facilitate quality service provision. Further, infrastructural and operational changes are needed to enable pharmacists to engage directly with patients and interact with nursing and medical staff at the clinics to monitor therapy, and fulfill their primary care role (Lindenmeyer, 2006).

In order to determine the effectiveness of this diabetes educational outreach intervention on patient health outcomes, a cluster randomized controlled trial (Fairall, 2005) is deemed necessary. Alternatively, simulated patients may be used to assess pharmacists' application of key concepts.

### **7.3 Multifacetedness**

In this multifaceted intervention all elements were aimed at influencing the pharmacist's practice pattern. In a multifaceted intervention it is not possible to determine which particular element actually promoted greatest receptivity since each component of the intervention aimed to promote greater awareness. The folder itself is unlikely to have created much impact because studies have shown that printed educational materials only are relatively ineffective (Baker, 1999). Wong (2004) found that academic detailing plus printed materials demonstrated a trend towards increased knowledge retention compared with printed materials only. A multifaceted approach using attention-grabbing diagrams that reinforce practical evidence-based information is likely to enhance knowledge and possibly with time influence the practice pattern of pharmacists.

### **7.4 Impact of the intervention on pharmacists' knowledge**

Findings from the pre-intervention study indicated that knowledge deficiencies among pharmacists in diabetes management may have affected the quality of care provision. However, improvement in pharmacists' knowledge was evident from the post-intervention study and this finding concurs with that in other studies (Leemans, 1998). Sczupak (1977) demonstrated that after the pharmacist's knowledge on diabetes management was enhanced through a diabetes mellitus educational intervention, it resulted in a more extensive patient-orientated pharmaceutical service that benefited the patients. Note that in this study, pharmacists' knowledge increase was translated into improved practice that benefited patients. Schilling (1977) showed that positive results were obtained after the pharmacist implemented locally produced guidelines among diabetic patients.

Chen (2005) established that improved knowledge, positively influenced some of the pharmacists's attitudes, communication and motivation. However, in the current study only a weak link has been established between enhanced knowledge and translation into improved counseling. One pharmacist seemed to be proactive:

*“Since the educational program... I advise patients about rotating injection sites, I make them follow a pattern ... and this is practical since it helps them rotate injection sites”.*

Another pharmacist also claimed the program encouraged him/her to talk more with patients:

*“The program is interesting and helpful. It encourages you to talk more with the diabetic patients”.*

The improvement on pharmacists' knowledge may be attributed to the fact that the pharmacies were established pharmacotherapy learning sites for the final year University of the Western Cape pharmacy students' service-learning programme (2003). Since the pharmacists are perceived as service-learning partners, their active involvement in student mentoring is essential. Access to evidence based information and easy to understand guidelines are needed to promote experiential learning. The educational outreach visit may have prompted pharmacists to improve on their knowledge and skills as evident from the post-intervention questionnaire survey. Further studies are needed to validate this finding at the non-intervention sites.

South African clinical teams conduct random blood glucose and urine tests, and measure blood pressure for each visit as part of routine care (Levitt, 1997). Even when such test results are noted in the patients' folder, the question is, do these figures mean anything to the pharmacist? While this intervention attempted to engage pharmacists more actively in management of diabetes by enhancing their knowledge, it was hoped they would also better monitor ambulatory patients from symptoms and monitoring parameters such as random blood glucose (RBG), fasting blood glucose (FBG) and glycosylated haemoglobin (HbA1c). Medication profile reviews along with interpretation of clinical or laboratory data among pharmacists are essential in pharmacotherapy (Britton, 1991; Pray, 2003). Therefore, training on clinical guideline implementation for pharmacists would equip them with the skills to work alongside nurses and doctors in chronic disease management.

## **7.5 Research methods**

The use of mixed methods has provided valuable insight into the pharmacists' knowledge, attitude and practice on diabetes management in the public sector. The range and prevalence of barriers to good dispensing practice in a developing country against a backdrop of constraints such as high patient load, understaffing and lack of educational support has been explored. Further, combining qualitative and quantitative (Stange, 1996; Hanson, 2005) methods provided an indepth and credible account on acceptability of the intervention under very challenging structural barriers in the public sector. Structured reflection may be an alternate approach to identify possible barriers to care provision (Freitheim, 2004).

Regular qualitative and quantitative evaluations are needed to check sustainability of acquired knowledge and how these actually translate into practice (Wong, 2004). Although findings from this study are not generalizable because of the small sample (n=9), the range of barriers identified to care provision, the dispensing and counseling skills, knowledge and attitudes may be reflective of practice patterns of pharmacists working in Western Cape public sector MDHS pharmacies.

By combining research methods, discrepancies in responses can be identified. For example results from the post-intervention questionnaire and unobtrusive interviews clearly indicated that two-thirds of the pharmacists had believed that their dispensing had improved as a result of the intervention but, this was not reflected from observation in actual practice, as they adhered to their usual counseling and dispensing styles. Past behaviour seemed to directly affect intentions and subsequent behaviour (Szeinbach, 1998). Perceived change towards practice improvements is a slow process that requires continual support. Even if care providers are well informed about what they should be doing, they often do not perform in accordance with their knowledge and skills (Sanazaro, 1983; Kosecoff, 1987; Leemans, 1998). Although the outreach visit may not have resulted in imminent practice change, it brought about more awareness and vigilance on good management of diabetes. Continuous on-site educational programs are required to translate knowledge into routine practice.



A recurring finding from the mixed methods was that pharmacists claimed to not have time to advise patients on the importance of controlling blood glucose levels. Other studies although they did not use mixed methods have identified lack of time as a major barrier to care provision (Armstrong, 1990; Keene, 1994; Mottram, 1995; Moore, 1996; Anderson, 1998; Leemans, 1998). A possible reason is that the skills deficiency across South African public sector health facilities accounts for a 56 % vacancy rate for pharmacists (Pharmaciae, 2006). Consequently, this places a huge burden on currently employed staff. The skills deficit certainly poses a grave concern for both academic institutions and health-care planners (ibid). The South African public sector remains relatively worse off than the private sector in terms of the ability to retain pharmacists. According to Söderlund (1998) and van Rensburg (1999), in South Africa more than 70% of pharmacists work in the private sector. This could be attributed to better working conditions and higher salaries than that offered in the public sector. Lack of dedicated and qualified personnel makes it difficult to establish proper drug monitoring services in most public health facilities.

One of the aims of the outreach intervention was to address pharmaceutical care constraints encountered by pharmacists. The intervention did not attempt to change the organizational and / or structural barriers in the public sector MDHS pharmacies, such as lack of private consulting rooms which require long term infrastructural changes (Grol, 1995). Until such barriers are addressed pharmacists may not be in a position to optimize care provision and would be viewed as ‘mechanical dispensers’. The isolated nature of pharmacy practice in the public sector often precludes pharmacists from engaging directly with patients on pharmaceutical care plans that are integral to the primary health care concept (Emmertson, 2005). The infrastructure to accommodate pharmacists to apply their pharmacotherapeutic skills to enable them to interpret appropriateness of therapy using clinical monitoring parameters in the privacy of a consulting room is deemed necessary for chronic disease management.

## **7.6 Pharmacist's assistants extended role**

The staff in the pharmacies comprises pharmacists and pharmacist's assistants (see section 4.6 and 6.4).

Although all pharmacists mentioned the problem of lack of time as a factor that hindered them from providing pharmaceutical care, qualified post basic pharmacist's assistants (PAs) may be utilized optimally under the supervision of a pharmacist. Post basic pharmacist's assistants are legally allowed to handle up to schedule 6 drugs in terms of their scope of practice according to the Pharmacy Act of 1997. The Act was amended in November 2000 to accommodate PAs training and registration. In the Western Cape, PAs generally only dispense up to schedule 5. The extended PA role could allow pharmacists to re-organise their work schedules to engage fully with patients on providing patient-centred care. For example, they could work closely with pharmacists to check monitoring parameters [fasting blood glucose (FBG), random blood glucose (RBG), glycosylated haemoglobin (HbA1c) levels, triglycerides (TG) and total cholesterol levels] to better manage patients for diabetes control (Armstrong, 1990; Tietze, 1997).

## **7.7 Conclusion and recommendations**

The study clearly underpins several factors that affect pharmacists' active involvement in diabetes management in public sector primary health care facilities. Overall the findings of this study imply that:

- An audit to identify barriers and assess knowledge and practice patterns of public sector pharmacists to optimal diabetes care should be conducted
- Training on monitoring procedures and provision of support programs in chronic disease management is crucial in pharmaceutical care
- Training pharmacists in educational outreach is a viable option for translating guideline recommendations into patient-centred care
- Infrastructural and operational changes (eg. private consulting rooms) should be considered to enable pharmacists to achieve patient-orientated care in chronic disease management.

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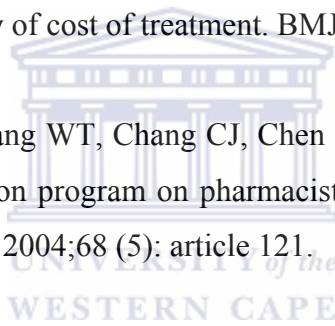
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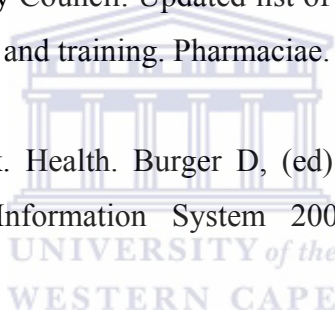
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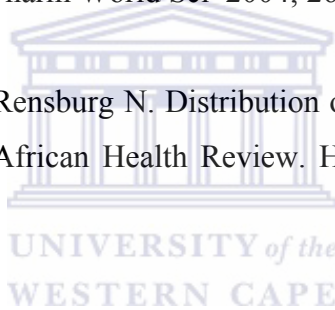
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UNIVERSITY OF THE WESTERN CAPE

School of Pharmacy  
Private Bag X17  
Bellville 7535  
Ph: 021-9592190  
Fax: 021-9593407

OBSERVATION STUDY- PHARMACISTS

**ASSESSMENT OF DRUG USE PATTERNS:**

The School of Pharmacy, discipline of Pharmacology, University of Western Cape (U.W.C) is undertaking a survey to assess the quality of pharmaceutical services at public sector Metropole, District Health Services (MDHS). We are enquiring about barriers, views and perceptions concerning service delivery amongst pharmacists.

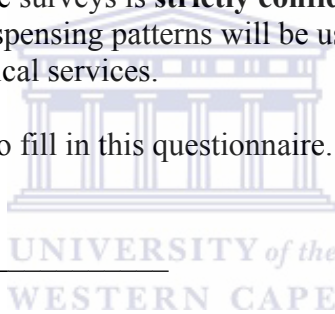
The aim of the observation study is to assess current dispensing and counseling practices of pharmacists.

Information obtained from these surveys is **strictly confidential**.

The baseline data on current dispensing patterns will be used to design an improvement programme for the pharmaceutical services.

Thank you for taking the time to fill in this questionnaire.

Pharmacist signature: \_\_\_\_\_ Date : 2004/\_\_\_\_/\_\_\_\_.



MDHS pharmacy at:

- 1 Delft      2 Bishop Lavis      3 Vanguard      4 Athlone      5 Parow  
6 Heideveld    7 Hanover Park      8 Elsies River      9 Belhar      10 Retreat

**PHARMACIST BACKGROUND**

1.a. Gender

Male    Female

b. Age \_\_\_\_\_ years

2. S A Pharmacy council registration # \_\_\_\_\_

3. How long have you been working as a pharmacist \_\_\_\_\_ Years    \_\_\_\_\_ months

**TABLE 1. FACILITY INDICATORS**

INDICATOR	GOOD	AVERAGE	POOR
<b>Physical surroundings:</b> neat tidy			
<b>Storage areas:</b> inadequate adequate organised disorganized			
<b>Labeling and storage of medicines on shelf</b> organised disorganized			
<b>Hygiene</b> of surfaces used during dispensing			

**TABLE 2 REFERENCE BOOKS**

	Available	Edition/ year	Available but not used	Not available
i) Copy of SOP's ii) Essential drug list or Treatment guideline iii) Formulary-SAMF iii) Martindale iv) Daily drug use				

i) Availability of essential drugs

Yes                      No

--	--

ii) Names of drugs out of stock \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

iii) "I owe you" note

Given to patient	Not given to patient
------------------	----------------------

iv) Availability of tablet counter

Yes                      No

--	--

**TABLE 3**

**PHARMACOTHERAPEUTIC ACTIVITY**

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
<u>. Establishing contact with patient/ care giver.</u> 1. Greeting (establishing language used) 2. Verifying folder number 3. Verifying name of patient 4. Verifying who medicine is for 5. Getting attention of patient										
<u>Information, instruction, warnings given to patient regarding dispensed drugs.</u> Drug details 1. Clinical indication- (treat what ?) 2. Generic name 3. Strengths, 4. Administrative form 5. Instruction (when to take, dosage) Total amount/special instructions (shake...)										
Drugs effects (onset and duration of action) 6. Side effects (describe what to do 7. Duration of therapy 8. Storage/ safety 9. Adverse effects /warnings/ cautions										
<u>Suitability</u> 10. Contra- indications 11. Drug Interaction 12. Convenience										
<u>Follow up</u> 13. Date of next appointment 14. When to return earlier										
<u>Communication style</u> 15. Clear (audibility, pronunciation, and understandable 16. Structure of conversation (logical). 17. Allowing patient to express (him/her) 18. Ensure that patient understands, and asks the patient to repeat drug information.										
<u>Non drug measures</u> 19. Describes rationale 20. Gives instructions and warnings										



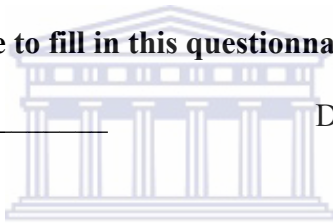
**UNIVERSITY OF THE WESTERN CAPE**  
**School of Pharmacy**  
**Private Bag X17**  
**Bellville 7535**  
**Ph: 021-9592190**  
**Fax: 021-9593407**

Dear PHARMACIST

The School of Pharmacy, discipline of Pharmacology, University of Western Cape (U.W.C) is undertaking a survey to assess the quality of pharmaceutical services at public sector Metropole, District Health Services (MDHS). We are enquiring about barriers, views and perceptions about Pharmacists. Information obtained from these surveys is strictly confidential. The results of this survey would provide insight into designing an improvement program for the pharmaceutical services.

**Thank you for taking the time to fill in this questionnaire**

Pharmacist Signature: \_\_\_\_\_ Date: 2004/ \_\_\_\_ / \_\_\_\_



UNIVERSITY of the  
WESTERN CAPE

MDHS pharmacy at:

- 1 Delft      2 Bishop Lavis      3 Vanguard      4 Athlone      5 Parow  
6 Heideveld      7 Hanover Park      8 Elsie's River      9 Belhar      10 Retreat

**PHARMACIST BACKGROUND**

1.a. Gender

Male       Female

b. Age \_\_\_\_\_ years

2. S A Pharmacy council registration # \_\_\_\_\_

3. How long have you been working as a pharmacist?  
\_\_\_\_\_ Years      \_\_\_\_\_ months

**Question 1**

**PHARMACEUTICAL SERVICES**

- a) What is the estimated daily average of the number of patients receiving medicines from the Pharmacy? Please tick the appropriate box



- < 100
- 100-199
- 200-299
- 300-399
- 400-499

b) In your experience does the pharmacy have **adequate working space** to carry out dispensing functions:

Yes	No

If **No** please explain

.....

.....

c) Do you feel that the out patient window /hatch is a suitable environment for you to dispense and counsel patients?

Yes	No

ii) If **No** explain your difficulties

.....

.....

d) Are there any external sources of interference when you are counseling your patients on medication use: e.g.

i) Noise:    yes        No

--	--

ii) Constant patient queries

Yes    No

--	--

e) Do patients prefer a **private counseling area** when collecting medication from the pharmacy?

Yes	No

**Question 2**

Mention some barriers that prevent you from adhering to good hospital pharmacy dispensing and counseling practices

- a).....
- b).....
- c).....
- d).....
- e).....

**Question 3**

For each of the statements below please choose and tick the box with the correct response:

**a) Inaccurate dispensing leads to the patient receiving.....**

	Yes	No
i) wrong medicines .....	<input type="checkbox"/>	<input type="checkbox"/>
ii) incorrect strength and/or amount of medicines .....	<input type="checkbox"/>	<input type="checkbox"/>
iii) incorrect instructions .....	<input type="checkbox"/>	<input type="checkbox"/>
iv) inadequate instructions on medicine .....	<input type="checkbox"/>	<input type="checkbox"/>
v) ambiguous instructions on medicine use.....	<input type="checkbox"/>	<input type="checkbox"/>
vi) medicines being packaged in an appropriate container (e.g glyceryl trinitrate in a dark/amber glass bottle.....	<input type="checkbox"/>	<input type="checkbox"/>

**b) Incomplete dispensing leads to .....**

	Yes	No
i) patients lacking understanding of instructions on medicine use .....	<input type="checkbox"/>	<input type="checkbox"/>
ii) inadequate adherence to medication use.....	<input type="checkbox"/>	<input type="checkbox"/>
iii) non- adherence to medication use.....	<input type="checkbox"/>	<input type="checkbox"/>

**c) Adequate communication and counseling means that the pharmacist is:**

	Yes	No
i) aware when additional advice should be given	<input type="checkbox"/>	<input type="checkbox"/>
ii) aware of how additional information should be given	<input type="checkbox"/>	<input type="checkbox"/>
iii) knowledgeable about what advice should be given to the patient	<input type="checkbox"/>	<input type="checkbox"/>

**Question 4**

Using the scale 1-10 please rate yourself (satisfactory, good, very good and excellent) from the descriptions outlined in the table: Please tick the appropriate column once.

	<b>Satisfactory 1-2-3</b>	<b>Good 4-5-6</b>	<b>Very Good 7-8-9</b>	<b>Excellent 10</b>
Your ability to put to use the information you know about rational use of drugs...				
Application of skills and knowledge in pharmacology/pharmacotherapy to practice is.....				
Your dispensing is generally.....				

**Question 5**

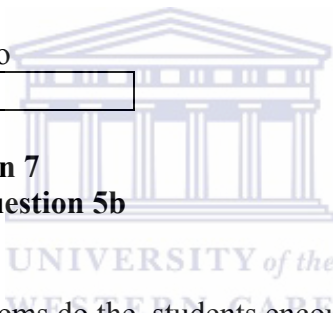
**PHARMACOTHERAPY TRAINING FOR STUDENTS**

5a) Did you train undergraduate pharmacy students in pharmacotherapy at this pharmacy ?

Yes                      No

--	--

If **No** please proceed to **question 7**  
If **yes** please continue with **question 5b**



5b) In your opinion what problems do the students encounter at your facility during training ?Please tick as many as necessary.

**Students seem NOT to mention:**

- i) generic drug names .....
- ii) side effects of drugs.....
- iii) actions or clinical indications of drugs.....
- iv) the frequency of use or administration of the drugs per day.....
- v) the dose of the drug.....
- vi) special precautions where necessary
- vii) directions of use.

**Question 6**

In the spaces below list the group of **drugs and/or name the specific drugs** that students usually have problems with in their effort/endeavour to give accurate and complete information when dispensing:

**Pharmacological/Pharmacotherapeutic group or name of drug**

- a)-----
- b)-----
- c)-----
- d)-----
- e)-----
- f)-----
- g)-----
- h)-----
- I)-----
- j)-----

**Question 7**

**RATIONAL DRUG USE**

a) Are you familiar with the **concept** of rational drug use

Yes	No
-----	----

Have you had any **training** on rational use of drugs?

Yes	No
-----	----

If **yes** please specify if the training approach was:

i) Problem based learning ( PBL)

Yes	No
-----	----

ii) In-service training

Yes	No
-----	----

iii) Workshop

Yes	No
-----	----

iv) Seminar

Yes	No
-----	----

b) Were you **satisfied** with the type of training you received to be

Poor	Satisfactory	Good	excellent
------	--------------	------	-----------

If **yes** how do you **apply** the principles and concepts in your daily practice?

.....  
.....

d) Are there any tangible **results** in your practice that could prove application of rational drug use?

.....

e) What are your **views** about participating in a training program on rational drug use?

.....  
.....  
f) i) Have you heard of **problem based learning (PBL)**

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

ii) If **yes**, please **explain** in simple terms the meaning of PBL ?  
.....  
.....

### Question 8

<b>PHARMACOTHERAPY TRAINING FOR PHARMACISTS</b>
---

1) Based on your experience do you think that **patients need to have more information** about the medicines they are using/taking?

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

2) Do you feel there is need to improve the **quality of dispensing information** that you give to patients about use of their medicines?

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

3) Do you feel that a **pharmacotherapy-training programme** at the pharmacy would enable you to

a) Improve your dispensing skills

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

b) Improve your knowledge about side –affects of drugs

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

c) Alert you to identify drug interactions and contra-indications.

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

d) Alert you to correct drug dosages easily

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

**Question 9**

On a Scale of 1 to 5, please identify which pharmacological group you would like pharmacotherapy training in. Please tick the appropriate box to express your perceived needs.

Pharmacological group or category	Highest Need (5)	High Need (4)	Medium Need	Low Need (2)	Lowest Need (1)
<b>Antiretroviral drugs</b>					
<b>Antiasthmatic drugs</b>					
<b>Antihistamines</b>					
<b>Antimycobacterials/-Antituberculosis drugs</b>					
<b>Antidiabetic drugs</b>					
<b>Cardiovascular drugs</b>					
• Cardiac therapy					
• Antihypertensive drugs					
• Diuretics drugs					
• Beta blocking agents					
• Calcium channel blockers					
<b>Drugs Acting on the Central Nervous System</b>					
• Antiepileptics					
• Antipsychotics/psycholeptics					
• Antidepressants/psychoanalitics					
• Antiparkinsonian agents					
<b>Antimicrobial drugs</b>					
• Antibiotics/Anti-infective drugs					
• antifungals					
<b>Chemotherapeutic drugs</b>					
• Cytotoxic drugs(cancer drugs)					
• AntiParasitic drugs					
<b>Oral Contraceptives</b>					
<b>Alimentary Tract and Metabolism drugs</b>					
• Antiulcer drugs					
• Antispasmodic & Anticholinergic drugs					

Pharmacological group or category	Highest Need (5)	High Need (4)	Medium Need (3)	Low Need (2)	Lowest Need (1)
Ophthalmologic/(eye) drugs					
GenitoUrinary System & Sex hormones					
<ul style="list-style-type: none"> <li>Sex hormones and modulators of the genital system</li> <li>Oral Contraceptives</li> </ul>					
Analgesics <ul style="list-style-type: none"> <li>Opioid</li> <li>Non-opioid</li> </ul>					
Drugs used in Hyperlipidaemic conditions					



**Question 9**

a) Do you feel that the pharmacotherapy training should be part of a continuing education program for pharmacists?

Yes                  No

--	--

Definitely   
 Yes maybe   
 May be   
 Not at all

**Question 10**

Please comment about anything that concerns you about working in a day hospital pharmacy.

.....

.....

.....

.....



**UNIVERSITY OF THE WESTERN CAPE**

**School of Pharmacy  
Private Bag X17  
Bellville 7535  
Ph: 021-9592190  
Fax: 021-9593407**

Dear Pharmacist

The School of Pharmacy, discipline of Pharmacology, University of Western Cape (U.W.C) is undertaking a survey to assess the quality of pharmaceutical services at Metropole District Health Services (MDHS). We are enquiring about current approaches to diabetes management in primary care facilities. **Please note there are no right or wrong answers. Information obtained from these surveys is strictly confidential.** The results of this survey would provide insight into designing an improvement program for the pharmaceutical services.

Thank you for taking time to answer this questionnaire.

Pharmacist signature: \_\_\_\_\_ Date : 2004/\_\_\_\_/\_\_\_\_\_.



UNIVERSITY of the  
WESTERN CAPE

MDHS:

- 1 Delft     2 Bishop Lavis     3 Vanguard     4 Dr Abdurahman     5 Parow
- 6 Heideveld     7 Hanover Park     8 Elsies River     9 Belhar     10 Retreat

**PHARMACIST  
BACKGROUND**

1. a. Gender

Male	Female
------	--------

b. Age \_\_\_\_\_ years

2. S A Pharmacy council registration # \_\_\_\_\_

3. How long have you been working as a pharmacist \_\_\_\_\_ Years  
\_\_\_\_\_ months



## Identifying current practice in diabetes management

### A. Guidelines

#### Question 1

Which guidelines do you prefer using when providing care to patients?

- a) National guidelines on the management of diabetes    yes     no   
b) Standard treatment guidelines.    yes     no

#### Question 2

Are you familiar with the national diabetes guidelines for adults and children ?

- a) Never heard of it before    yes     no   
b) Heard of it before but do not use it to check if prescribed therapy  
is appropriate    yes     no   
c) Heard of it and follow it    yes     no

#### Question 3

- a) In your opinion patients who are more likely to develop diabetes have  
impaired glucose tolerance (IGT)    yes     no   
impaired fasting glycaemia (IFG)    yes     no

### B. Current role in diabetes management

#### Question 4

- a. What are your views regarding your current role in diabetes treatment
- |  |                              |                             |
|--|------------------------------|-----------------------------|
| Counseling patients on proper drug use | yes <input type="checkbox"/> | no <input type="checkbox"/> |
| Checking adherence to therapy          | yes <input type="checkbox"/> | no <input type="checkbox"/> |
| Advising on insulin use/administration | yes <input type="checkbox"/> | no <input type="checkbox"/> |

#### Question 5

In your view, is the recommended **fasting** blood glucose level is ...

- <10 mmol/L    yes     no   
<16 mmol/L    yes     no   
≥20 mmol/L    yes     no   
≥22 mmol/L    yes     no

### C. Symptoms

#### Question 6

- i. Do you think that patients know what to do when they experience symptoms of diabetes?  
yes     no
- ii. In your experience what are the most common symptoms that diabetes patients present ?  
a).....  
b).....

## D. Medication use

### Question 7

a) Do you think that patients take their medicines as prescribed?

yes  no

b i) Do you ever ask patients about problems they have after taking their medications?

yes  no

b ii) If yes mention any 1 or 2 problems they usually readily tell you

.....

.....

b) If a patient is on maximum dose of sulphonylurea, reduce the dose by 50% when introducing bedtime insulin

yes  no

### Question 8

1. Are patients generally adherent to their medication use?

yes  no

## E. Side-effects

### Question 9

a) Have you observed patients experiencing side effects resulting from diabetes medication?

i. oral

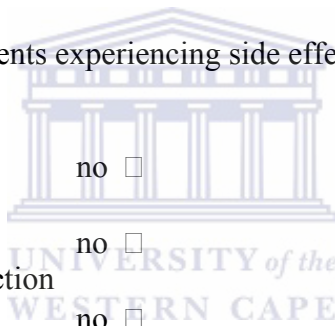
yes  no

ii. injection

yes  no

iii. oral and injection

yes  no



b) Have patients reported any side effects resulting from medication use to you?

yes  no

c) Do you believe that hypoglycaemia may be due to the effects of drug therapy?

yes  no

### Question 10

Do you think that prescribers are aware of any drug interactions related to diabetes medication?

yes  no

### Question 11

Have you identified prescription errors in diabetes patients with respect to:

a) over prescribing yes  no

b) unclear prescribing yes  no

c) under prescribing yes  no

## F. Monitoring

### Question 12

- a) Do you think that patients understand the meaning of different blood glucose levels?  
yes  no
- b) Does the recorded fasting blood sugar levels help you with your prescription assessment  
yes  no
- c i) Does acetylated haemoglobin 1c (HbA1c) have any importance in your understanding of diabetes?  
yes  no
- c ii) If you find that a patient's glycosylated hemoglobin (Hb A1c) levels are beyond recommended levels of  $\geq 7-8\%$  what action do you take?  
a) Let it pass yes  no   
b) I do not have time to look at it closely yes  no   
c) Refer to a doctor yes  no
- d) Do you ever refer to the patient's fasting blood glucose levels to check if treatment is appropriate?  
yes  no
- e) Dipstix test for proteins in urine is important for diabetes management  
yes  no
- f) The aim of regular follow up in diabetes is to monitor and improve sugar control, blood pressure and blood lipids  
yes  no
- g) The ideal lipid profile of a diabetic is ...  
i) total cholesterol  $< 5$  mmol/L yes  no   
ii) triglyceride  $< 1.5$  mmol/L yes  no
- h) The ideal choice of a drug for a patient with predominant hypertriglyceridaemia is bezafibrate  
yes  no
- i) Fibrates should be used with extreme caution in patients with impaired kidney function  
yes  no
- j) Muscle wasting and abdominal pain are some side effects of bezafibrate  
yes  no

### Question 13

In your practice are you able to advise the patient on

- a) foot care yes  no   
b) eye care yes  no

Question 14

If you find that a patient's blood glucose level is very low (< 3.9 mmol/L) or very high ( $\geq 16$ mmol/L) do you .....

- a) Gather more information from the patient on medication use  
yes  no
- b) Refer patient to a doctor  
yes  no
- c) Discuss dietary requirements with the patient  
yes  no

**G. Diabetic management programme**

Question 15

Do you think that providing patients with an information leaflet would reinforce management of diabetes?

yes  no

i. if **yes**, state what information should appear in it

.....  
.....  
.....

Question 16

Tick the appropriate answer

Do you feel that a diabetes management programme should include:

- a) Counselling patients in how to control blood sugar levels  
yes  no
- b) Monitoring blood sugar levels  
yes  no
- c) Monitoring long term blood sugar control levels (HbA1c)  
yes  no
- d) Monitoring side effects of insulin treatment with patients  
yes  no
- e) Monitoring side effects of oral hypoglycaemic agents  
yes  no

**H. Lifestyle Management**

**i) Diet**

Question 17

a) Do you inquire about dietary recommendations in diabetes management?

All the time  occasionally  never

b) Do you think that patients adhere to a recommended dietary programme ?

yes  no

c) Do you advise patients on weight control measures ?

yes  no

**ii) Exercise**

Question 18

Have you been able to advise patients about the importance of exercise in managing their diabetes?

yes       no

Question 19

In your view is your current role as a health care provider in diabetes care...

Satisfactory	yes <input type="checkbox"/>	no <input type="checkbox"/>
Underutilised	yes <input type="checkbox"/>	no <input type="checkbox"/>
Need to be improved	yes <input type="checkbox"/>	no <input type="checkbox"/>
Not sure	yes <input type="checkbox"/>	no <input type="checkbox"/>



# DIABETES



Diabetes is a group of different diseases (heterogeneous syndrome) primarily showing as hyperglycaemia but also including other body function abnormalities (e.g. dyslipidaemia) resulting from impaired insulin secretion and/or action. Diabetes is associated with other serious body function complications (comas, sepsis) as well as long term small blood vessels microvascular- diseases (involving eyes, kidneys, nerves) and large blood vessel macrovascular- (coronary, cerebral and peripheral arteries) complications. These results in premature diseases and deaths.

## Aetiology

Diabetes is a result of both genetic and environmental causes

- 1) Diabetes is a disorder of carbohydrate metabolism and/or beta-cell destruction leading to absolute insulin deficiency which results in poor control of blood glucose (sugar) levels. It is a chronic, progressive incurable disease which, if not controlled, may lead to long term complications which can include cardiovascular disease, retinopathy, nephropathy and neuropathy.

## Causes:

1. Failure or insufficient insulin production from pancreas to produce enough insulin to control blood glucose levels
2. Insulin resistance poor utilisation of endogenous insulin in liver, muscle and adipose tissue
3. Failure to adequately metabolize carbohydrates incomplete metabolism of fats and production of ketones resulting in e.g. ketonuria
4. Blood glucose levels rise in common illnesses (eg common cold, bronchitis, urinary tract infections, boils etc), surgery, pregnancy, hyperthyroidism and drug therapy (eg thiazides and steroids).
5. Acute insulin resistance can occur during stress (e.g. surgery, trauma, emotional upset, and infections).

## Diagnosis:

Early detection of diabetes is essential because complications can begin early in the course of the disease, even before symptoms develop. Detection should be made early considering patients with **high risk factors** such as obesity, tests that are beginning to be out of normal ranges, excessive thirst, etc. Lipid disturbances, obesity and hypertension are common in type 2 diabetes, and probably contribute to the high prevalence of vascular disease.

**Note:** Type 2 diabetes mellitus is a "silent disease" that can go on for about 10 years without being noticed and will often present with neuropathy and/or vascular complications. The first signs of diabetes may present as **thirst, polyuria, nocturia, genital itchiness, tiredness and visual blurring.**

## Diagnostic criteria:

Determined from:

- 1) Fasting blood glucose levels (FBG): **>7 mmol/L** normal: (4.0 - 7.0 mmol/L)
- 1) Random blood glucose (RBG) plasma levels: normal **11.1 mmol/L**.
- 2-hour post glucose (oral glucose tolerance test) not used for diagnosis in childhood: (OGTT) **11.1 mmol/L**

It is suggested that drug treatment should be initiated at random blood glucose level **> 15 mmol/L** or FBG **16 mmol/L**.

There is need for caution when interpreting blood glucose concentration because normal whole blood glucose values are approximately 15% lower than plasma glucose values.

Should the diagnosis and/or treatment be delayed, ketones will accumulate and the patient may develop dehydration, Kussmaul's respiration, vomiting, central nervous system depression, somnolence and coma.

**Impaired glucose regulation** includes both **impaired glucose tolerance (IGT)** and **impaired fasting glycaemia (IFG)**, this refers to a body function state intermediate between normal glucose body balance and diabetes. Both of these constitute risk categories for future type 2 diabetes and/or cardiovascular disease. IGT is a much stronger predictor.

## Diagnostic stages of diabetes:

**Table 1: Diagnosis of diabetes: fasting plasma glucose (FPG) and oral glucose tolerance test (OGTT)**

Physiologic state	Fasting plasma glucose (FPG)	Oral glucose tolerance test (OGTT)
Diabetes	7.0 mmol/L	11.1 mmol/L
Impaired fasting glycaemia (IFG) Pre-diabetes	6.1 - 7.0 mmol/L	7.8 mmol/L
Impaired glucose tolerance (IGT)	7.0 mmol/L	> 11.1 mmol/L

Figure 1

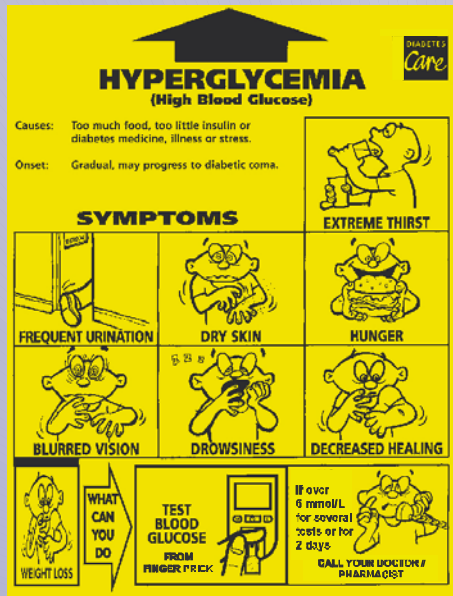


Figure 2

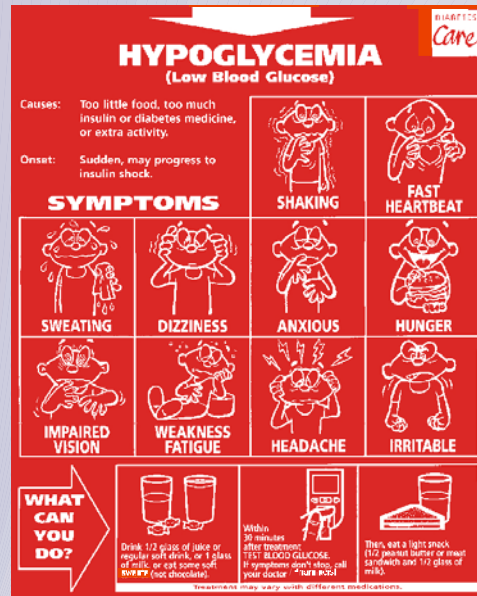


Fig. 1.1. Diabetes: How to Recognize the Signs

Figure 3

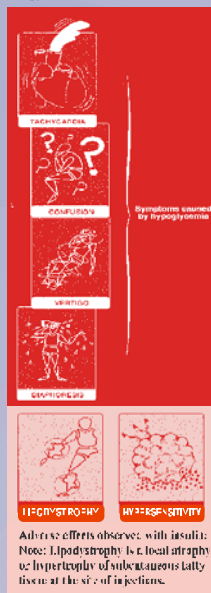


Figure 5

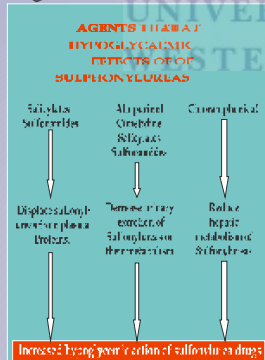


Figure 6  
How Diabetes Tablets Work

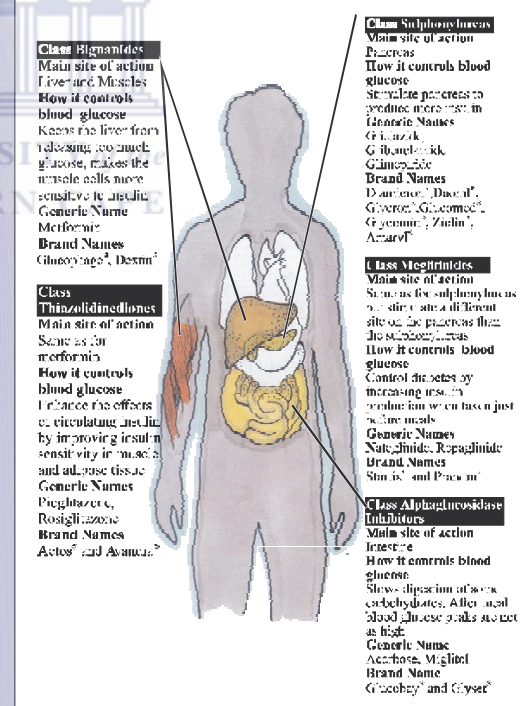


Figure 4

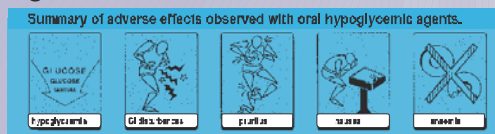


Fig. 1.2. Summary of adverse effects observed with oral hypoglycemic agents

Diabetes: How to Recognize the Signs

**Note:** **Diabetes insipidus** is a rare disease due to hyposecretion of antidiuretic hormone (ADH) or vasopressin in which the patient is constantly thirsty and produces large quantities of dilute urine (free of sugar). **This is a different disease**

**Types:**

**Type 1**-previously known as insulin dependent diabetes mellitus (IDDM), juvenile-onset, is the most common endocrine deficiency disorder of childhood. It is usually due to pancreatic  $\beta$  cell destruction primarily caused by an autoimmune process. Insulin deficiency causes most cells to metabolise fats and proteins. This could lead to ketosis and acidosis (**Ketoacidosis**)\*. (see pages 2 & 4)

**Type 2**-previously known as non-insulin dependent diabetes mellitus (NIDDM), maturity or adult onset common in people over (>30 years and obese) where there is decreased delayed insulin secretion. The ability of the pancreas to produce and secrete insulin is decreased or delayed but it is not absent. It is typified by hyperglycaemia and is characterised by insulin resistance syndrome which is usually made worse by excess body fat.

**Other types**- include gestational and pancreatic diabetes. Pancreatic is due to chronic alcohol damage. Approximately 30% of women with gestational diabetes will develop permanent type 2 diabetes in later life.

**Insulin Resistance** is a syndrome which describes a group of body function changes that limits the body's ability to control levels of glucose and lipids. These include excessive secretion of insulin as a result of its inadequate peripheral action (hyperinsulinaemia), out of control blood fat levels (dyslipidaemia), hypertension and high fat distribution around the waist area (abdominal obesity). There is also elevated plasminogen activator inhibitor 1 which contributes to reduced fibrinolysis and high risk for thrombosis. People with insulin resistance are at a greater risk of dying from heart related diseases (cardiovascular) disease and other causes. Insulin resistance is **diagnosed** when a person has 3 or more of the following conditions: abdominal obesity, high triglyceride levels, low high density lipoprotein (HDL) cholesterol levels, high blood pressure, and high fasting glucose levels.

**Table 2: Some risk factors for insulin resistance**

Risk factor	Defining level
Overweight with Abdominal obesity	Body mass index (BMI) men > 25 Kg/m <sup>2</sup> women > 24 Kg/m <sup>2</sup> Waist circumference men > 102 cm women > 88 cm
Elevated triglyceride levels	> 1.5 mmol/L
Reduced high density lipids (HDL)	< 1.1 mmol/L
High blood pressure	< 130/80 mmHg require lifestyle modification 140/90 mmHg require lifestyle modification + drug therapy a) Hypertension in diabetes is confirmed if BP is 180/110 at any one visit b) If BP 130/85 on 3 occasions over a period of 2-3 weeks Patients with diabetes + hypertension (HT) require drug therapy at 130/85 mmHg c) Any increase in BP and if target organ damage is present

NB: Children have different blood pressure (BP) reading values  
Other risk factors include family history of diabetes.

**Control of blood glucose levels**

**Glycosylated Haemoglobin (HbA1c test)** determines the average blood glucose over the last 2-3 months. The **higher** the level of glucose in the blood, the more it sticks to the red blood cells (haemoglobin) leading to poor control.

**Interpreting the results:**

**Table 3: Glycosylated haemoglobin (Hb A1c test)**

HbA1c %	Good control Normal ≤7 %	Borderline control <2% points above normal	Action is suggested for poor control >2% points above normal
---------	-----------------------------	---	---

**The micral test**

The test is done for microalbuminuria (very small bits of protein) to make sure kidneys are healthy. Incipient nephropathy is when there is persistent microalbuminuria (MA) ( 2 of 3 test positive in 3 months). Blood pressure can be normal or slightly elevated.



**Table 4:**  
**2) Acute and late signs and symptoms of hyperglycaemia and hypoglycaemia**

	<b>Hyperglycaemia (see figure 1) ↑ Blood glucose</b>	<b>Hypoglycaemia (see figure 2) ↓ Blood glucose</b>
<b>Face/Skin</b>	Flushed face, visual disturbances, dry, warm	Pale colouring of face, Cool, clammy, cold sweats (Diaporesis)
<b>Other physiological systems</b>	Polyuria: water is taken from other cells to dilute the urine Polydipsia: because there is loss of fluid, this results in excessive thirst. Polyphagia: (excessive eating) because glucose is lost before being converted to energy	Diarrhoea
<b>Gastrointestinal</b>	Nausea and vomiting, abdominal cramping, Paradoxical weight loss.	Nausea
<b>Pulse</b>	Fast, pounding pulse	Rapid, irregular pulse or palpitations
<b>Breath</b>	Air hunger, rapid deep breaths, fruity acetone odour (mainly in type 1 diabetes)	
<b>Sensation</b>	Decreased sensation	Numbness of hands and tongue,
<b>Behaviour changes</b>	<i>Sudden changes in behaviour variable</i>	<i>Sudden changes in behaviour euphoric, irritable, anxious, Memory loss and confusion</i>
<b>Central nervous system (CNS)</b>	Blurred vision, fatigued, confusion and very rarely unconsciousness  <div style="border: 1px solid black; padding: 2px; width: fit-content;">These symptoms could lead to ketoacidosis** (see emergency care)</div>	Weakness, sleepiness, <b>SEIZURES, COMA</b> Drowsiness, light headedness, headache, unusual hunger, Dizziness, nausea, nervousness, blurred vision, weakness, tremors  <div style="border: 1px solid black; padding: 2px; width: fit-content;">These symptoms could lead to hypoglycaemia** (see emergency care)</div>
<b>Onset</b>	Slow (may be days)	Quick (minutes)
<b>Causes</b>	Insufficient insulin available, (omission), lack of access, failure to increase dose in case of need), Excessive food intake, Lack of exercise	Overdose of insulin Too little food intake/food consumed delayed, omitted, vomited, Excessive exercise
<b>Laboratory findings Fasting blood glucose</b>	usually > 10.0 mmol/L Glycosuria, ketonuria	< 3.5 mmol/L

Continued hyperglycaemia results in the classic 'three P's' of IDDM (polyuria, polydipsia, polyphagia), genital itch and weight loss.

### Diabetes and dyslipidaemia

#### Co-morbidity: diabetic dyslipidaemia

Symptoms of coronary heart disease (CHD) only become evident when the coronary lumen is about 60 to 70% occluded.

#### Risk factors include:

Low density lipids (LDL or 'bad lipids') and diet rich in kilojoules, saturated fats and cholesterol are the greatest contributors to the development of atherosclerosis. In typical dyslipidaemia you find decreased high density lipids (HDL 'good lipids'), increased triglycerides (TG), increased low density lipids (LDL or 'bad lipids') which are atherogenic. Non drug treatment for the management of diabetic dyslipidaemia include low saturated fats diet.

The most useful drugs for the management of diabetic dyslipidaemia are the **statins** (simvastatin) **and the fibrates** (bezafibrate).

The ideal choice of a drug for a patient with predominant hypertriglyceridaemia is bezafibrate. Fibrates should be used with extreme caution in patients with impaired renal function. Low dose statins can be used as an alternative.

If routine diabetes management plan including diet, weight loss, and improved sugar control do not successfully achieve normalisation of blood lipids goal within 3 - 6 months, lipid lowering drug therapy should be started. If macrovascular disease is present, start lipid lowering agents immediately.

**Side effects:** Muscle stiffness or weakness and abdominal pain.

### Diabetes and hypertension

**Hypertension is a major determinant** of both micro- and macro-vascular complications of diabetes. It accelerates the development of (microalbuminuria) and progression (persistent proteinuria) of diabetic nephropathy (DN) and retinopathy. Blood pressure (BP) control may delay onset and slow the progression of diabetic nephropathy.

5 classes are considered effective as mono/initial therapy i.e. thiazide diuretics; angiotensin converting enzyme inhibitor (ACE-I), calcium channel blocker (CCB),  $\beta$ -blockers and  $\alpha$ -1 receptor blockers. Special drug choices are made when treating antihypertensive patients with diabetes nephropathy. Antihypertensive drug treatment should be individualised and continued lifelong.

**Table 5: Cholesterol levels in adults without evidence of coronary heart disease (CHD)**

Risk factor	Normal defining level
Total cholesterol <b>Desirable</b>	< 5 mmol/l.
Low density lipid (LDL) cholesterol <b>Desirable</b> <b>High risk</b>	< 3 mmol/L (< 2.6 mmol/L if additional cardiovascular risk factors are present) 4 mmol/L (hypertriglyceridaemia)
High density lipids (HDL) cholesterol	> 1.2 mmol/l.
Triglyceride (TG)	< 1.5 mmol/L

**Aspirin and heart disease**

Aspirin is used as a secondary prevention therapy in individuals who have evidence of large vessel disease e.g. angina or myocardial infarction (MI). It is also used in individuals with diabetes type 1 and 2 with cardiovascular risk factors. Low dose aspirin has antiplatelet effects which helps to reduce the risk of adverse events such as coronary artery disease (CAD). Adverse effects: gastric irritation which may cause abdominal pain, nausea, vomiting, and hidden mucosal bleeding

**The damage produced by hyperglycaemia**

Persistent high blood glucose levels could result in glycosylation of proteins resulting in irreversible tissue damage in the eye, nerves, ocular lens, kidneys and the cellular membranes. It also accelerates the atherosclerosis process caused by high blood lipids and hypertension.

**Poor blood glucose control:**

When blood glucose is not well controlled over a long period of time, the tiny blood vessels and nerve endings in the areas farthest from the heart are damaged.

**3) Poor control of blood glucose leads to:**

**Damage of organs/tissues**

- Kidneys**-damage to capillary and glomerular membrane → kidney failure  
Diabetes can also cause anaemia which could also be a warning sign of developing serious kidney disease
- Heart**- hardened and narrowed blood vessels (arteries) // Atherosclerosis
- Foot**- narrowing of the tiny blood vessels in the foot → poor blood supply and nerve damage  
This damage leads to poor circulation and less sensation in the feet. The damaged nerve supply causes the feet to lose their ability to sweat and they become dry and cracked. This delays wound healing in the feet → peripheral vascular disease and occurrence of leg cramps
- Eye** - damage to the sensitive blood vessels → damage to retinal vessels (retinal haemorrhage), hardening of lens (cataracts) → blindness
- Nerves**- early symptoms are "pins and needles", numbness, pain (peripheral neuropathy), nerve damage can also affect sexual activity

**Poor wound healing**

- Infections are common as high blood glucose inhibits the action of white blood cells which aid healing

**Genital itchiness**

- Because sugary (glucose) urine irritates skin and encourages the growth of fungal infection

**Macrovascular disorders**

Macrovascular (large vessel) complications include hypertension, atherosclerosis and thrombosis. About 75% of macrovascular diabetic mortality is the consequence of coronary heart disease (CHD). The remaining 25% results from a combination of accelerated cerebral vascular disease (strokes), peripheral vascular disease leading to gangrene, or both.

**4) Medications that interfere with diabetes control**

Agents that ↓ blood sugar level:

High dose ( > 25mg /day) hydrochlorothiazide, lithium, salbutamol, chlorpromazine, phenytoin, prednisone.

Agents that ↑ blood sugar level:

Insulin, oral hypoglycaemic drugs, rifampicin, propranolol, cimetidine, quinine, antifungals, theophylline, salicylates and alcohol. Alcohol blocks the release of glucose by the liver.

## 5) Therapeutic objectives

- To maintain blood glucose within normal limits without causing dangerous hypoglycaemia
- To keep urine free or as nearly free of glucose as possible
- To prevent or delay the long term complications associated with diabetes (cardiovascular, renal, retinal, neurological, muscular)

## 6) Treatment

Drug treatment includes hypoglycaemic agents and may include antihypertensives, lipid lowering drugs, anti-clotting, sexual dysfunction drugs, antidepressants and analgesics.

Treatment is individualised according to blood glucose levels, age, nutritional status, activity level and/or other disease conditions.

Drug therapy, diet and exercise help control blood sugar levels.

If routine diabetes management plan including diet, weight loss, and improved glycaemic control do not successfully achieve these goals within 3 - 6 months, lipid lowering drug therapy should be considered. Start immediately if the patient has established cardiovascular (CV) disease.

Diabetic dyslipidaemia and hypertension must be diagnosed and appropriately treated in all patients

- A) Drug therapy      i) Insulin  
                               ii) Oral hypoglycaemics

### A i) Insulin

Insulin is a polypeptide hormone that controls the storage and metabolism of carbohydrates, proteins and fats.

It reduces blood glucose levels and in excess can cause life-threatening hypoglycaemia.

**Table 6: Insulin**

Pharmacokinetic profile	Uses	Adverse effects (see figure 4)	Contraindications	Drug interactions
<p><b>Rapid acting (Ultra fast) analogue (clear)</b>                      Insulin aspart (Lantus)<sup>®</sup>                      Insulin aspart (NovoRapid)<sup>®</sup>                      Onset: (0-15min)                      Duration: (3-5hours)                      Inject at start of eating</p> <p><b>Short acting (Fast) Coded- Yellow (clear)</b>                      Regular insulin (Humulin R) Zinc biosynthetic human insulin                      Neutral protamine (Actrapid HM) (cc)                      Onset: (20-30min)                      Duration: (5-8hours)                      Inject 30-45 min before meals</p> <p><b>Intermediate acting Coded- Green (cloudy)</b>                      "NPH" isophane biosynthetic human insulin (Humulin N)                      Isophane (Protaphane) (HM)                      Onset: (1-2 hours)                      Duration: (18-20hours)</p> <p><b>Long acting Coded- Blue (clear) (cloudy)</b>                      Humulin T / Zinc biosynthetic human insulin + 20% regular insulin                      Moxidart<sup>®</sup>                      Onset: (4-8hours)                      Duration: (22-24 hours)</p> <p><b>Insulin biphasic</b>                      Isophane + soluble (regular) insulin. Coded- Brown                      (Aspartard 30/70, LY, cc) 30% soluble + 70% isophane (Humulin R 30/70) 30% regular insulin + 70% isophane</p> <p>Trapiace = fast acting insulin analogues                      NovoMix<sup>®</sup> 30 (soluble insulin aspart + 70% protamine crystallized insulin)                      Tardag<sup>®</sup> Mix25<sup>®</sup> (25% insulin lispro solution + 75% insulin lispro protamine suspension for injection)</p> <p>Onset: (0-30min)                      Duration: (14-16 hours)</p> <p><b>Ultra Long acting</b> { no mixing with other insulins }                      Insulin degludec (Toujeo) (clear)</p> <p>Duration: (24 hours)</p> <p><b>Route of administration</b>                      (Generally subcutaneous (SC)) - to be given only with specially graduated syringes of sizes (0.3 / 0.5 / 1ml) which has no dead space or will not mix sea.                      Intravenous intravenously (IV) only fast ultra fast, regular insulin given this route</p> <p><b>Site of metabolism:</b> liver kidney and muscle</p> <p><i>NPH</i> = neutral protamine hagedra</p>	<p>Type 1 DM                      diabetic ketoacidosis</p> <p>Hyperglycaemia in pregnancy, surgery, infections</p>	<p><b>Hypoglycaemia</b> due to acute insulin toxicity</p> <p><b>Lipohypertrophy</b> - fat deposit from repeated injection in the same site (appears as a swelling)</p> <p><b>Lipodystrophy</b> - Lipodystrophy - death of skin from repeated injection in the same site (appears as a pitted appearance)</p> <p><b>Weight gain</b>                      Periferal oedema (insulin causes salt and water retention in the short term when started)</p> <p><b>Dermat:</b> urticaria                      Rash, itching at injection site 3-6 hours after administration</p>	<p><b>Starvation</b>                      Hypoglycaemia</p>	<p><b>Drugs which may:</b>                      activity of insulin:                      sulphonylureas, pyridoxine, sulphamides, salicylates                      ACEI's, -blockers,                      atesolol, enoximone,                      quinine, lithium,                      ketocumazole, theophylline</p> <p><b>Drugs which may:</b>                      Mask some of the symptoms of developing hypoglycaemia:                      -blockers</p> <p><b>Drugs which may:</b>                      activity of insulin:                      thiazide diuretics,                      furosemide, calcium channel blockers, -blockers,                      oral contraceptives,                      thyroid hormones,                      fentanyl, phenothiazines,                      prednisolone, clonidine,                      tobacco smoking, nicotine,                      marijuana, phenytoin</p>

NB: The commonly used insulins are differentiated with different colour codes (yellow, green and brown see table). These are interchangeable (unit per unit) regardless of the company that manufactures the insulin

**Patient advise on insulin use**

- Invert cloudy insulin 20 times to mix up to be a homogeneous suspension
  - Rotate insulin injection sites to avoid lipohypertrophy and the rare lipoatrophy
- Unopened bottles or pens of insulin must be stored in a refrigerator but not frozen. If using insulin from a refrigerator warm the bottle by holding it in your hands for a few minutes. It is best not to inject cold insulin. Do not expose to direct sunlight or extreme heat. An opened insulin bottle/pen may be stored at room temperature for 1 month after which any unused insulin should be thrown out/discarded. If using insulin twice a day it is advisable to eat three regular meals and three between meal snacks to avoid hypoglycaemia. It is important that patients know the colour codes of the insulin they use.

**Insulin pen use**

It is easy to use and easy to carry. The three main steps are:

- Step 1: Prepare pen** a) Remove cap b) Screw needle on
- Step 2: Air shot** a) Remove needle cap b) Dial 2 units
- Step 3: Dial dose and inject** a) Dial dose b) Mix cloudy suspension by } c) Get rid of air bubble
- c) Inject
- } inverting several times }

**Exercise and insulin requirements**

If exercising, inject the insulin into the stomach area or arm rather than the leg muscles because the leg muscles may absorb the medicine too quickly. Vigorous exercise may increase requirements for carbohydrates or decrease insulin requirements. Review this with your doctor.

**Aii) Oral hypoglycaemic agents (see figure 6)**

**B i) Sulphonylureas**

Acts by stimulating the release of endogenous insulin from  $\beta$  cells of the pancreas. However they are not insulin sensitizers and therefore do not address the problem of insulin resistance.

**Table 7: Sulphonylureas (SU)**

Example	Uses	Dose	Pharmacokinetics	Adverse effects (see figure 6)	Contra indications	Drug interactions (see figure 6)
Glibenclamide	Type 2 Diabetes mellitus	2.5 mg increased gradually to maximum 15mg/day	Long acting up to 24hours <i>Metabolism:</i> liver and bile Protein binding 90% <i>Excretion:</i> urine	Headache Hypoglycaemia <i>Gastrointestinal:</i> Nausea, vomiting, diarrhoea Liver disease Blood dyscrasias eg. leucopenia, neutropenia, leucocytosis Photosensitivity	Obesity, pregnancy Adjust dose in the elderly, breastfeeding, liver, kidney disease.	Drugs which may: activity of sulphonylureas: NSAIDs, rifampicin, elmeritine, warfarin, sulphonylureas, methylfolate and alcohol effect of sulphonylureas: oral contraceptives, steroids, diuretics, thyroxine, phenobarbitone, phenytoin and rifampicin
Gliclazide	Type 2 Diabetes mellitus	Initially 40-80 mg daily adjusted to reach maximum 320 mg/day in 2 divided doses. <i>Take with food</i> suitable for the elderly	Short acting (6-12 hours) <i>Metabolism:</i> liver <i>Excretion:</i> urine highly protein bound	Same as for glibenclamide	Liver, kidney disease	Same as for glibenclamide
Glimepiride	Type 2 Diabetes mellitus	Initially 1-2 mg daily adjusted to reach a maximum 8 mg/day take before breakfast	Long acting up to 24hours <i>Metabolism:</i> liver <i>Excretion:</i> urine highly protein bound	Same as for glibenclamide	Liver, kidney disease	Same as for glibenclamide

Other sulphonylureas used in other provinces in the country are glipizide, gliclazide.

- While taking the above medicines it is best to
- avoid alcohol
  - avoid staying in too much sun

Sulphonylureas occasionally causes weight gain.

**Bii) Biguanides (see figure 6)**

Metformin is indicated in patients with type 2 diabetes that cannot be controlled by diet management, exercise or weight reduction, or when insulin therapy is not required. It decreases hepatic glucose production. It decreases glucose absorption from the gastrointestinal tract. Produce beneficial changes in the lipid profile by decreasing triglycerides, low density lipids (LDL) cholesterol and total cholesterol but it has no significant effect on high density lipids (HDL) cholesterol. It often causes some welcome weight loss.

Table 7 continued: Biguanides

Example	Uses	Dose	Pharmacokinetics	Adverse effects (see fig. 9)	Contra indications	Drug interactions (see page 3)
Metformin	Type 2 Diabetes mellitus especially obese patients	Initially 500mg twice daily or 850mg once daily. Daily maximum is 3g.  <b>Take with food</b>  Caution is required if prescribed in older persons > 60 years or with kidney disease	Partially absorbed (50%) <i>Excretion:</i> kidneys	<b>Headache</b> <i>Gastrointestinal:</i> nausea, vomiting, diarrhoea, abdominal pain, anorexia, bloating, flatulence  Metallic taste  Lactic acidosis*** (rare)	Kidney or liver disease Heart failure Severe infection or trauma or metabolic acidosis Severe dehydration Alcoholism Pregnancy and breast-feeding	activity of metformin: aspirin, alcohol, propranolol, rifampicin, sulphonamides, sulphonylureas risk of lactic acidosis: alcohol risk of hypoglycaemia: chlorzoxiprone, nifedipine, thiazemide  activity of metformin: prothrombin, oral contraceptives, hydrochlorothiazide, verapamil, thiothiazides, fozantid, phenytoin, thyroid hormones  Vit B12 absorption

It is best to avoid alcohol when taking metformin.

**Lactic acidosis\*\*\*: is rare but often fatal**, this condition results from diminished tissue oxygenation. It can be due to elevated levels of acids in the blood.

Metformin may cause lactic acidosis therefore it must be used with caution in the elderly patients with compromised renal function and it is contraindicated in patients with absolute renal and hepatic diseases.

**Symptoms:** Nausea or vomiting, unusual tiredness, stomach pain, muscle cramps, air hunger and slow deep breathing (overbreathing) leading to near unconsciousness

*Seek medical help!*

#### Patient advice on use of oral hypoglycaemics:

Formal diabetes education has been shown to greatly improve quality of life and metabolic control and significantly reduce the rate of acute complications.

**Take tablets with or after food / as directed**

- Eat small regular meals
- Avoid excessive alcohol

Monitor your blood sugar levels regularly using home glucose monitoring test strips as well as urine ketones test strips for type 1.

Wear a medical bracelet inscribed "DIABETES- GIVE SUGAR IF CONFUSED" at all times to help treatment provision during emergencies.

#### Pharmacists check list

##### System of care and/or check list for pharmacists to use to monitor therapeutic adherence

Encourage patients' self monitoring of blood glucose levels (random + fasting) daily testing and recording (diary) of random and fasting blood glucose levels

- Encourage annual to quarterly testing and recording of glycosylated (glycated) haemoglobin A1c (HbA1c)
- Regular urinalysis for microalbuminuria, proteins and ketones

Encourage regular cholesterol screening  
Maintain ideal body weight

Encourage regular blood pressure monitoring (should be < 130/80 or 140/90 mmHg)

Encourage foot examinations, heart status and/or risk (electrocardiogram), dermatological, dental assessment and eye examinations

Check appropriateness of antidiabetic regimen and aspirin use

Adhere to nutrition and exercise plan

Educate patients about the management of the disease, awareness to psychological and neurological disorders

- Educate patients about adherence to therapy and about alternative or complementary medicines such as vitamins and omega 3
- Talk to patients about the value of belonging to diabetes groups or societies where "cultural" issues can be discussed and may possibly lead to improvement in adherence

#### 7) Emergency care

Uncontrolled diabetes can lead to medical emergencies.

- i) Hypoglycaemia causes drowsiness which is (dangerous when operating machinery, driving or sleeping) and lead to coma, brain damage and convulsions.
- ii) Hyperglycaemia and ketoacidosis can lead to hypovolaemic shock.

**i) Managing hypoglycaemia** (See figure 2 and table 1 on pages 2 & 4 for symptoms leading to hypoglycaemic coma )  
Hypoglycaemia\* ( blood glucose levels below 3.5 mmol L) and also hypoglycaemia with neuroglycopenia (blood glucose levels below 2.8 mmol L plus coma, seizures, or altered behaviour) is a medical emergency

For ambulatory patients (still able to swallow)

Give sugar orally (non diet cold drinks, fruit juices, honey, milk with sugar)

In an unconscious hypoglycaemic patient:

20-25ml of 20-50% dextrose solution IV

(Glucagon (see table 8 below) if patient is unable to swallow. Teach a family member how to prepare and administer glucagon

**TABLE 8: Glucagon use in emergencies**

Glucagon	Uses	Route of administration	Pharmacokinetics	Adverse effects	Contra indications
Natural hormone secreted by the pancreas. It raises blood glucose levels by stimulating the liver to metabolise glycogen into glucose. Glucagon <sup>®</sup> kit (syringe, needle, powder, diluent)	<b>hypoglycaemia</b>	IM, IV, SC Children 0.5mg dose not to exceed 1mg/dose. Adult 0.5-1mg repeated in 20 min as needed.  This must be followed by oral glucose	Peak effect on blood glucose levels: 5-20 min Duration of action: 60-90 min <b>Metabolism:</b> Liver, kidney and muscle <b>Excretion:</b> Some excretion occurs to the kidneys	<b>Cardiovascular:</b> Hypotension, Skin itchy rash <b>Gastrointestinal:</b> Nausea, vomiting <b>Respiratory:</b> Respiratory distress	Cancer of pancreas and kidney

If patient fails to respond to glucagon, IV dextrose must be given.

#### ii) Hyperosmolar nonketotic state

Impaired mental status and elevated plasma osmolality in a patient with hyperglycaemia. This includes severe hyperglycaemia (e.g. 23 mmol/L) and elevated serum osmolality (e.g. 320 mosmol/L) usually with severe dehydration. Marked acidosis and ketonuria are absent.

#### Ketoacidosis\*\* (see figure 1 and table 4 on pages 2 & 4 for symptoms)

Ketacidosis\*\* in hyperglycaemia is a severe condition in which acidosis is caused by ketosis. It is caused by lack of insulin or an increase in stress hormones. It is marked by high blood glucose (usually > 20 mmol/L) and urinary ketones > 2+ in the urine as well as dehydration, vomiting, abdominal pain and shock, usually in type 1 and occasionally also in type 2 diabetes.

#### Treatment:

Hydrate with sodium chloride 0.9% IV infusion.  
Monitor acid-base levels and continue to give fluids  
Monitor potassium levels  
Refer urgently to emergency centre

### Prevention of common complications in diabetes:

#### Foot and skin care

Keep your feet clean, wash daily and dry them carefully. To prevent ulcer formation avoid walking bare foot, even on hot sandy beaches; wear well-fitting shoes; avoid using corn medication and avoid wearing sandals or shoes that expose the toes. Moreover, since there is loss of sensation, avoid use of hot water bottles.  
Inspect tissue around the nail or between the toes, the middle foot and the sole. Inspect these areas carefully each day for breaks in the skin, swelling, redness or other signs of infection.

#### Eye care

Annual eye examinations (including fundoscopy) are advised

#### Dental care

Biannual teeth examinations are advised

#### Diet and exercise help control blood sugar levels

**Weight control** (5-10% reduction in body weight) is essential in overweight and obese patients. Small frequent meals advised. A balanced and nutritional meal helps maintain a body weight within normal limits. A diet containing adequate amounts of carbohydrates, reduced saturated fats and enough proteins must be followed.  
Limit salt and animal fat intake to prevent cardiovascular complications  
Increase fibre intake

#### Exercise regularly

follow a programme eg moderate exercise such as 30 minutes brisk walk daily for 5 days. Moderate exercise produces an insulin-like effect and this would reduce insulin requirements and can improve blood sugar control, blood pressure, lipids and cardiovascular risks.

Exercise significantly strengthens the heart, control blood pressure, and there is decreased risk of cardiac disease. There is reduction in body fat, improved glucose utilisation, improved insulin sensitivity. Moreover, there is stress reduction and it improves overall emotional status of the diabetic person.

Exercise intensity can be prescribed and monitored using heart rate especially in the elderly and in people with established cardiovascular disease.

Secondary causative factors such as alcohol abuse must be effectively managed. Alcohol should be avoided or decreased. Alcohol is contraindicated and must be avoided if a patient has hypertriglyceridaemia.

**Stop smoking** or avoid starting at all. Smoking hardens the blood vessels which are already under strain.

Join a smoking cessation programme

**Remind patients that drug therapy is an adjunct to, and not a substitute for lifestyle modifications.**

### Additional anti-diabetic agents

**Insulin**; (see table 6)

**Basal/booster or multiple injection regimen.**

It is a combination which involves use of ultra short acting insulin (insulin boluses) (e.g. Humalog<sup>®</sup> - insulin lispro or NovoRapid<sup>®</sup> - insulin aspart) to cover during meals and "basal insulin" (prolonged acting insulin) (NPH, isophane (e.g. Novolin<sup>®</sup> N and Lantus<sup>®</sup> N) to cover throughout the day and an intermediate acting NPH (isophane (e.g. Novolin<sup>®</sup> N and Humulin<sup>®</sup> N) taken at bed time to cover the night

**Oral hypoglycaemic agents** (see figure 6)

**1. Alpha glucosidase inhibitors** (e.g. acarbose (Glucobay<sup>®</sup>); miglitol (Glyser<sup>®</sup>))

Enzyme enzymes (amylase and sucrase) in the intestines and therefore delays the breakdown of complex carbohydrates to simple and absorbable sugars and therefore delays entry of glucose into the liver and muscle tissue. Contraindications side effects, cramps, flatulence and diarrhoea are the most common reactions to the  $\alpha$ -glucosidase inhibitors. Caution some patients on concurrent therapy with these drugs. It should be used with low doses and a trial up

**2. Thiazolidinediones (TZD's) "Glitazones"** (e.g. pioglitazone (Actos<sup>®</sup>); rosiglitazone (Avandia<sup>®</sup>))

They reduce insulin resistance - however they do not stimulate the secretion of insulin but rather enhance the effects of circulating insulin by improving insulin sensitivity in muscle and adipose tissue.

They work when insulin is present but cells do not respond to it. Works by stimulating receptors (peroxisome proliferator-activated receptor gamma or PPAR- $\gamma$ ) in the nucleus of the cells. The genes produce a certain protein, called GLUT-4. This particular protein carries a packet of glucose across the membrane and into the cells interior. There have been case reports of liver damage in patients receiving these agents (particularly with rosiglitazone now withdrawn). Therefore the safe use of these agents require careful monitoring of liver function. Patients with hepatic impairment should not be treated with TZD's. These agents can cause fluid retention, which may lead to or exacerbate heart failure.

Thus patients must be observed for signs and symptoms of congestive heart failure.

**3. Meglitinides** (e.g. repaglinide (Navenon<sup>®</sup>); nateglinide (Starlix<sup>®</sup>)). (These are not sulphonylureas)

They are a new group of drugs designed to control diabetes by increasing insulin production. When taken just before meals, the drug temporarily stimulates a different site on the pancreas than the sulphonylureas to release more insulin when it is needed. Because these agents have a very short onset of action and short half-life, they must be taken immediately before every meal - therefore treatment adherence may be a problem for some patients. They have a side effect profile similar to the sulphonylureas.

### Terminology

**Fasting glucose concentration:** are used to assess pancreatic function and the response to insulin replacement therapy.

**Fasting blood glucose:** the blood sample is obtained after 8 to 4 hours of fasting - the fasting blood glucose is usually obtained before breakfast or on an overnight fast.

**Random blood glucose:** the random blood glucose sample can be obtained at any time without fasting.

**Postprandial:** the period of time that is less than 2 - 3 hours after a meal.

### Glycosylated hemoglobin

**Glycosylated hemoglobin:** is formed when haemoglobin is irreversibly glycosylated after exposure to high glucose levels. It is used to assess long-term control of hypoglycaemic therapy. Good control is a HbA<sub>1c</sub> level < 7%. Values above these figures indicate that for the past 2 - 3 months glucose levels were high and not well controlled. This could motivate the doctor to possibly change treatment regimen.

### Pharmacist drug information check list

*Have you provided the following information to your patients?*

- Name of the medicine
- Drug effects (effects of the medicine on the body)
- Instructions on how to use the medicines
- Adverse effects/warnings/cautions
- Ensured the patient understand instructions
- Complications of the disease



Even though you work as a team do not assume other team members have done appropriate counselling on your behalf.

*Play your part, discuss drug use and preventive care eg smoking, alcohol use and exercise.*

*Have you talked to your patient about the importance of stopping smoking and the fact that there is increased chance of amputation if you are a smoker?*

*Advise on stop smoking*

A diabetes educator emphasizes the importance of:

- Blood glucose control
- Blood pressure control
- Cholesterol levels
- Healthy diet
- Lifestyle and exercise
- Advise on aspirin use
- Diuretics and support groups eg. Diabetes SA - see website <http://www.diaheresa.co.za>
- telephone: 021 425 4110 (Western Cape)

Make it your habit to talk about all of the above with your patients

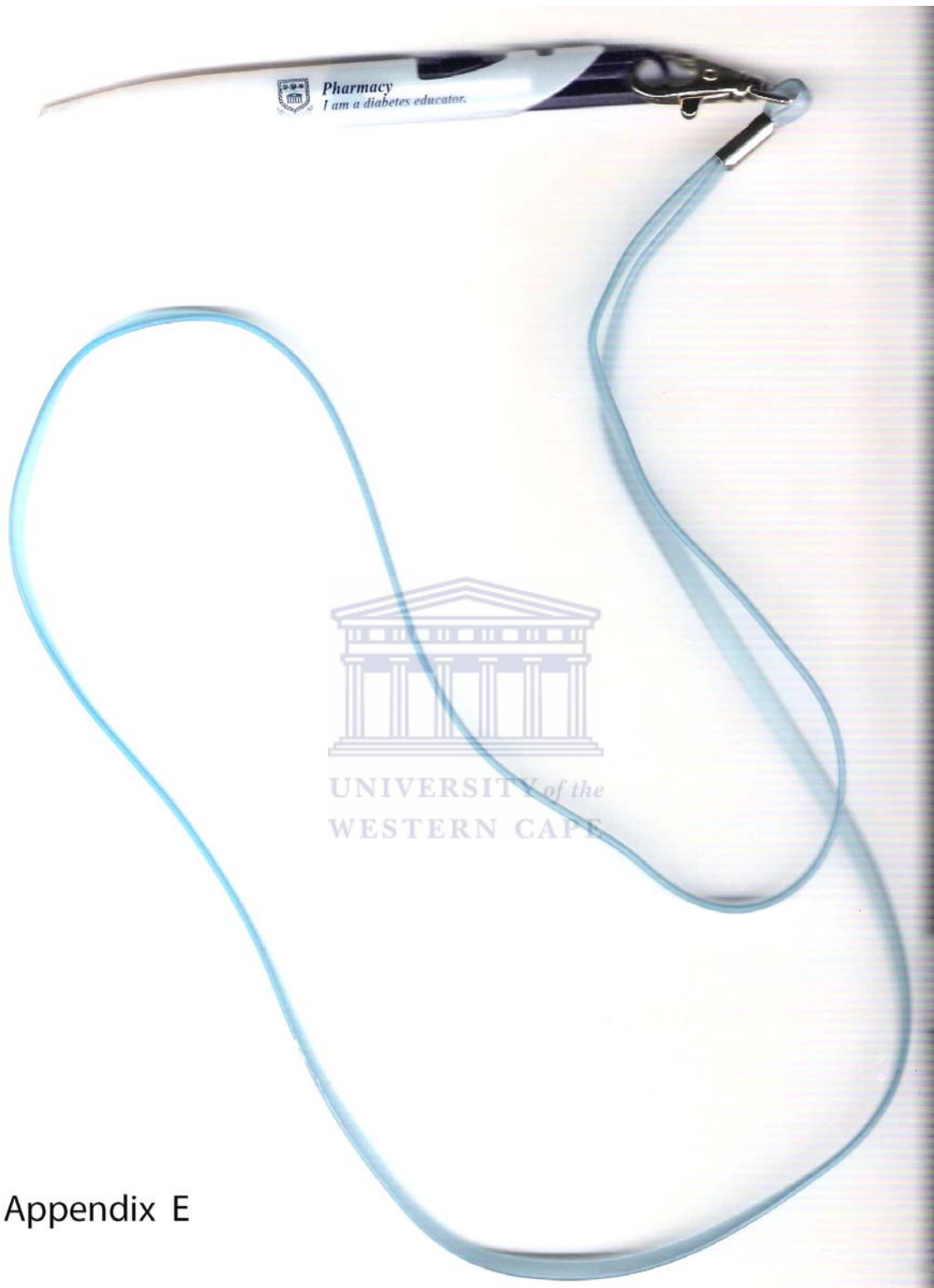
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## I AM A DIABETES EDUCATOR



School of Pharmacy  
E Molosiwa, Tel: 021 959 2977



Appendix E



## Practice scenario 1

Mrs. C. Happy: age 75yrs; weight 60kg; height 166cm; diabetic for 7 years

Triglycerides 1.77 mmol/L (Recommended must be less than < 1.5 mmol/L)

Total cholesterol 5.5mmol/L (recommended must be less than < 5mmol /L)

Fasting blood glucose 3mmol/L (recommended must be between 4 - 7mmol/L)

She complains of sweating, headache, confusion, impaired vision and is irritable.

### Current treatment:

Glibenclamide 10mg t.d.s x  $\frac{1}{12}$

Pharmacists were asked the following questions based on the above scenario:

1. What surprises you about this prescription? (Say anything that comes to your mind.
2. Since the patient is irritable and has been waiting for a long time, she shouts back to you that, "I am the next patient, I can see that my card is ready. I want to go and rest, give me my medicines you know I have been taking this medicines for a long time. I will not wait for your pharmacist to come back from tea." What could be the cause for irritability?

## Practice scenario 2

Mr .M. Joy: is on hypertension treatment BP 150/95 and is well controlled, he came for review but complains of blurred vision and tiredness because he has to get up 3-4 times at night to urinate. He has a fasting blood glucose done and reads 10.8mmol/L (normal 4 – 7 mmol/L). He does not believe he is diabetic, and has come to the hospital to see the doctor for a second opinion. Doctor has advised that a different test be done oral glucose tolerance test (OGTT) 2 hours post glucose load and is 21.8mmol/L (recommended must be less than  $\leq$  11.1mmol/L).

1. Doctor asks you for an opinion “is the patient diabetic? If he is diabetic what treatment would you recommend?”

For the following two questions I asked pharmacists to give possible explanations behind all the decisions they made.

2. If you give the patient oral antidiabetic drugs (such as metformin) for the first time what advise will you give?
3. If the patient receives insulin for the first time what advise will you give?

### Practice scenario 3

Mr .M. Sad: age 68yrs; weight 76kg; height 166cm; diabetic for 7 years

Triglycerides 2.77 mmol/L (recommended must be less than  $< 1.5$  mmol/L)

Total cholesterol 6.5mmol/L (recommended must be less than  $< 5$ mmol /L)

Random glucose 20mmol/L (recommended must be between (11.1 - 15mmol/L)

HbA1c 12% points (normal must be less than or equal  $\leq 7$ mmol /L)

Patient has come for monthly supply and will see the doctor after 3 months.

He complains of thirst and being tired, itchiness and redness on his penis and has lost 3 kg in the last 2 weeks.

#### Current treatment:

Metformin 850mg t.d.s x  $\frac{1}{12}$

Glibenclamide 5mg b.d x  $\frac{1}{12}$



Pharmacists were asked the following questions based on the above scenario:

1. What advise would you give? (discuss anything, pharmacological and non-pharmacological that comes to your mind, we are thinking through this problem together as a team. I am also learning).
2. After 6 months when the patient is on medication, the patient is also given acetylsalicylic acid tablets (aspirin): What could happen to the antidiabetic treatment when the drugs are given together?



UNIVERSITY  
*of the*  
WESTERN CAPE



**DIABETES EDUCATIONAL PROGRAMME**

This is to certify that

**Name of Pharmacist**

participated in an educational programme,  
which emphasized "DIABETES MANAGEMENT"

at

.....  
**Community Health Centre  
Pharmacy**

.....  
E. Molosiwa  
Facilitator

.....  
Dr. A. Bheekie  
Supervisor

June 2005



**UNIVERSITY OF THE WESTERN CAPE**  
**School of Pharmacy**  
**Private Bag X17**  
**Bellville 7535**  
**Ph: 021-9592190**  
**Fax: 021-9593407**

Dear Pharmacist

The School of Pharmacy, discipline of Pharmacology, University of Western Cape (U.W.C) is undertaking a diabetes educational program at Metropole District Health Services (MDHS). We are enquiring about the diabetes educational program, that was implemented at the pharmacy a few weeks ago. **Please note there are no right or wrong answers. Information obtained from these surveys is strictly confidential.** The results of this survey would provide insight into designing an improvement program for the pharmaceutical services.

Thank you for taking time to answer this questionnaire.

Date : 2005/ \_\_\_ / \_\_\_

MDHS:

1  Delft      2  Bishop Lavis      3  Vanguard      4  Athlone      5  Parow

**PHARMACIST BACKGROUND**

**Tick the appropriate box**

1.a. Gender

Male     Female

b. Indicate your **Age** range in years

20 – 29     30 – 39     40 – 49     50 – 59     60 – 69     70 – 79     80 – or more

2. How long have you been working as a pharmacist?    \_\_\_ Years    \_\_\_ months

3. South African Pharmacy council registration # \_\_\_\_\_

4. In which country did you train to be a pharmacist? \_\_\_\_\_  
\_\_\_\_\_

**Pharmaceutical Services**

**Tick the correct response**

1. Tick **all** the options that you consider relevant about the hatch or dispensing window

a) Too small                      yes                       no

b) No privacy                      yes                       no

2. Tick the options you encounter as external sources of interference when you are counseling your patients on medication use

Noise     Constant patient queries     Angry patients     Telephone calls

**Tick the correct response**

3. Do patients prefer a **private counseling area** when collecting medication from the pharmacy?

Yes     No     Up to half of the patients     More than half of the patients

**Barriers**

4. Tick **all** the problems and/or barriers that you consider to prevent you from adhering to good hospital pharmacy dispensing and counseling practices. **Add more if you feel some have been left out from the list.**

a)  Shortage of staff                      b)  Too much work load                      c)  No privacy

d)  Patients are impatient                      e)  Language and communication problems

f)  lack of space                      g)  lack of proper equipment

h)  Friends and family members collect medicines for patients who are at home/work

Other:.....  
.....

**Pharmacotherapy educational program for pharmacists**

**Please tick the appropriate option**

5. There is need to improve the quality of dispensing information that I give to patients about use of their medicines?

Strongly agree     Agree     Disagree     Strongly disagree

**Please tick the correct response for questions 6 and 7**

6. Do you feel that the diabetes pharmacotherapy educational program at the pharmacy helped you in the following areas listed below? **Please answer each of the questions a,b,c and d**

a) The program helped me improve my **dispensing skills** for diabetes management?

Strongly agree     Agree     Disagree     Strongly disagree

b) The program helped improve my knowledge about **side-effects** of drugs used in diabetes management

Strongly agree     Agree     Disagree     Strongly disagree

c) The program helped alert me to identify **drug interactions** and **contra-indications** in diabetes management

Strongly agree     Agree     Disagree     Strongly disagree

d) The program helped alert me to correct **drug dosages** for diabetes treatment easily

Strongly agree     Agree     Disagree     Strongly disagree

### Diabetes care

**Please choose the correct answer**

7. In your view, what is the **recommended fasting** blood glucose level **range**?

a) 4 ( $\leq$ ) and less than or equal to 7 mmol/L

b) 16 ( $\leq$ ) and less than or equal to 20 mmol/L

c) 22 ( $\leq$ ) and less than or equal to 25 mmol/L

**Please choose the most suitable option for questions 8, 9 and 10**

8. I believe that hypoglycaemia may be due to the effects of drug therapy such as insulin or the sulphonylurea e.g glibenclamide?

Strongly agree     Agree     Disagree     Strongly disagree

9. In my opinion hypertension accelerates the development of the complications of diabetes such as...

a) Diabetic nephropathy

Strongly agree     Agree     Disagree     Strongly disagree

b) Diabetic retinopathy

Strongly agree     Agree     Disagree     Strongly disagree

10. After receiving the diabetes educational program **are you going to advise patients** on the following:

a) **foot care?**

Yes     No     I do not have time to do that

b) **eye care?**

Yes

No

I do not have time to do that

c) **glycosylated hemoglobin (HbA1c) levels?**

Yes

No

I do not have time to do that

d) **importance of well controlled blood glucose levels?**

Yes

No

I do not have time to do that

**Please choose the appropriate option for statements 11 and 12**

11. In your practice how many patients **are you able to advise on ...**

a) **foot care?**

1 out of every 2 diabetes patients

1 out of every 10 diabetes patients

1 out of every 20 diabetes patients

All diabetes patients

None of the diabetes patients

b) **eye care?**

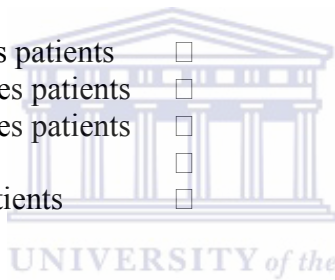
1 out of every 2 diabetes patients

1 out of every 10 diabetes patients

1 out of every 20 diabetes patients

All diabetes patients

None of the diabetes patients



**Please tick the option that is most applicable to you**

12. After receiving the diabetes educational program **I spent more time counseling/advising** \_\_\_\_\_.

a) Newly diagnosed diabetic patients only Yes  No

b) Chronic diabetic patients only Yes  No

c) All (newly diagnosed and chronic) diabetic patients  
Yes  No

**Please tick the option that is most applicable to you**

13. After receiving the diabetes educational program \_\_\_\_\_.

a) I changed my work routine to spend more time on caring for diabetes patients, through more counseling  
Yes  No

b) I did not change my work routine at all Yes  No

### Monitoring

14. **Please choose one option (a, b, or c) that you consider most appropriate for questions 14 and 15**

If you find that a patient's glycosylated hemoglobin (HbA1c) levels is **12% which is above the recommended levels**, or less than or equal to ( $\leq$ ) 7-8% what action do you take?

a)  Let it pass



b)

c)

15. I refer to the patient's **fasting blood glucose levels** written on the patient's folder to check if treatment is appropriate?

- a) In about 1 out of every 10 diabetic folders/charts
- b) In about 1 out of every 30 diabetic folders/charts
- c) In about 1 out of every 50 diabetic folders/charts
- d) All the time
- e) Never

**Please tick statements that applies to you**

16. It is important to have monitoring parameters such as fasting blood glucose levels (FBG), random blood glucose levels (RBG), glycosylated haemoglobin levels (HbA1c), triglycerides (TG) and total cholesterol levels, written on patients folders. Concerning their application, which of the following statements best describes your intentions in relation to monitoring patients' blood glucose and diabetes control?

- a) I intend to refer to all or some of these levels **Agree** **Disagree**
- b) Although these are time consuming and not easy to implement, I intend to refer to these levels **Agree** **Disagree**

**Please use the folder to answer questions 17,18 and 19**

17. The ideal lipid profile of a diabetic is ...

i) total cholesterol less than (<) 5 mmol/L

ii) triglycerides less than (<) 1.5 mmol/L

18. The ideal choice of a drug for a patient with predominant hypertriglyceridaemia is bezafibrate

19. Fibrates **e.g bezafibrate** should be used with extreme caution in patients with impaired kidney function.

20. Muscle wasting and abdominal pain are some side effects of bezafibrate

**Lifestyle Management**

**Please tick the option which is MOST applicable to statements 21 and 22**

21. How many times do you feel you will be able to **advise patients** on the importance of **stopping smoking** in managing diabetes?

- a) All the time
- b) About 1 out of every 10 diabetic patients
- c) About 1 out of every 30 diabetic patients
- d) About 1 out of every 50 diabetic patients
- e) Never

22. How many times do you feel you will be able to advise patients about the importance of exercise and weight control in managing diabetes?

- e) All the time
- f) About 1 out of every 10 diabetic patients
- g) About 1 out of every 30 diabetic patients
- h) About 1 out of every 50 diabetic patients
- e) Never

### Comments

23. Please tick the most applicable option

The diabetes pharmacotherapy educational program that we are implementing with you makes dispensing \_\_\_\_\_.

highly interesting     less interesting     boring     It does not make a difference

### Educational program

24. Please tick all statements that applies, concerning the educational program

a) It increases the work load    Agree     Disagree

b) Although it increases the work load, it is worth doing  
Agree     Disagree

c) It is good practical knowledge that we need to use during our practice  
Agree     Disagree

d) It is information that you need to have only if you teach in a university  
Agree     Disagree

### Use of educational material

25. Please tick the appropriate option

Which material did you find beneficial at increasing your awareness about diabetes when dispensing prescriptions.

Folder only     Pen only     Both pen and folder     None of them

26. Please tick the option that is most applicable concerning the desk folder for statements a → i

a) The desk folder is easy to understand    Agree     Disagree

b) The desk folder is difficult to understand    Agree     Disagree

c) The desk folder is a good reference source    Agree     Disagree

d) The desk folder is too much full of information (cluttered)  
Agree     Disagree

e) The desk folder is a good reminder    Agree     Disagree

f) The desk folder helped to improve my knowledge on diabetes management

- g) The desk folder takes too much space      Agree       Disagree
- h) The desk folder helped to improve my confidence on diabetes management      Agree       Disagree
- i) The desk folder is easily accessible because it is mounted on the wall      Agree       Disagree

**Please tick the appropriate choice concerning the desk folder**

27. The illustrations on the desk folder were very useful and considerably improved my understanding and clarity about diabetes
- Strongly agree       Agree       Disagree       Strongly disagree

**Please tick the appropriate option**

28. I found some information in the folder that I do not agree with because it is wrong.
- Yes       No       I am not sure       I did not use the folder

**Please tick the appropriate option concerning the pen**

29. The pen serves as a useful reminder. It reminds me there is special information (contents of the desk folder) concerning the management of diabetes that I must discuss with patients when counseling them
- Strongly agree       Agree       Disagree       Strongly disagree

**Students**

**Please choose the statements you agree with,** concerning the diabetes educational program in relation to facilitation of students learning at the pharmacy

30. The educational program will definitely help me when I facilitate student learning at this site
- Strongly agree       Agree       Disagree       Strongly disagree

**Opinion on educator**

**Please tick all statements that apply**

31. a) The educator who visited the pharmacy and discussed diabetes management principles with me was knowledgeable
- Strongly agree       Agree       Disagree       Strongly disagree
- b) The educator who visited the pharmacy and discussed diabetes management principles with me has clarified and reinforced my understanding
- Strongly agree       Agree       Disagree       Strongly disagree

**Educator and the educational material**

**For each statements a → e, please tick the appropriate option**

32. The components and/or of the diabetes educational program, that could have contributed to improving my understanding of diabetes include \_\_\_\_\_.
- a) Both the educator and educational materials (folder and pen)      Agree       Disagree
- a) Only the educational materials(folder and pen)

- Agree**       **Disagree**
- c) Only the educator      **Agree**       **Disagree**
- e) None of the above      **Agree**       **Disagree**

**Overall view of the educational program**

**Please tick the appropriate option**

33. Did you find the educational visit(s) during your routine working hours...
- useful       did not make a difference       not useful

**Perceptions/ feelings about the presentation style of the educational session**

**For each statement please tick the option that is most applicable to you**

34. a) During the discussions I felt free to pose any of my questions or ideas  
**Agree**       **Disagree**
- b) During the discussions I was guided on important concepts and/or aspects on the management of diabetes  
**Agree**       **Disagree**
- c) During the discussions I was encouraged to counsel patients more about diabetes  
**Agree**       **Disagree**
- d) During the discussions I had the feeling I was being dictated how I should act when dispensing and counseling patients on diabetes  
**Agree**       **Disagree**

**Experiences with the use of the messages/materials in the desk folder**

**For each statement (a→f) please tick the option that is most applicable to you**

35. **What are your experiences with the use of the messages/materials in the folder**

- a) I did not use the folder      **Agree**       **Disagree**
- b) I know most of the contents about diabetes in the folder and I will apply the information when I dispense and counsel patients  
**Agree**       **Disagree**
- c) I do not know what is in the folder  
**Agree**       **Disagree**
- d) I have no time to apply the information on the folder when dispensing to diabetics  
**Agree**       **Disagree**
- e) I am satisfied with the way I dispense today especially when it comes to patient counseling on diabetes treatment  
**Agree**       **Disagree**
- f) I will use the folder from now onwards

Agree  Disagree

**Attendance preference for educational session**

**Please tick the appropriate option**

36. A combined session for the pharmacists and pharmacist's assistants for the educational program was

fine

not fine

It did not make a difference

**Recognition of participation in an educational program**

**Please tick the appropriate option**

37. I need a certificate for having participated in this educational program

Yes

No

It does not make a difference

38. **Please tick the appropriate option**

These short but educative programs on diabetes must be continued with the treatment of other chronic disease conditions

Strongly agree

Agree

Disagree

Strongly disagree



476728

Navrae  
Enquiries Dr. F. Frantz  
Imibuzo  
Telefoon  
Telephone (021) 460-9116  
Howuni  
Verwysing  
Reference  
Isalathiso  
Datum  
Date 29 April 2004  
Umhla

Ms A. Bheekie  
School of Pharmacy  
University of The Western Cape

Dear Ms. Bheekie

Re. Permission to conduct undergraduate Pharmacy practices at  
Metropole District Health Services

I perused your application to conduct pharmacy practice at primary care facilities managed by the CHSO.

Your proposal complies with all the criteria and requirements for approval to conduct such pharmacy practice

Approval is hereby given with the proviso that:

- You interact with the Facility manager and ascertain that there are no objections from his/her side. The facility manager might need to discuss the issue with the District Management Team.
- The pharmacy practice activity does not impact on service delivery and compromise patient care.
- That ethical issues, eg. confidentiality, be adhered to.
- The Provincial Government of the Western Cape: Department of Health be indemnified from any person, member of the research team, whilst conducting research in any unit of the Community Health Services Organization [Indemnity forms are available from the Facility Manager]

Sincerely yours

  
DR. F. FRANTZ  
SENIOR MEDICAL SUPERINTENDENT



Departement van Gesonheid  
Department of Health  
ISebe lezeMpilo

METROPOLE DISTRICT HEALTH SERVICES  
METROPOOL DISTRIK GESONDHEIDS-DIENSTE  
PRIVATE BAG 77 WOODSTOCK 7115  
TELEPHONE (021) 4609100 FACSIMILE (021) 4471959



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