THE ROLE OF THE COMMUNITY PHARMACIST IN CARDIOVASCULAR DISEASE MANAGEMENT

IJE Venter
THE ROLE OF THE COMMUNITY PHARMACIST IN CARDIOVASCULAR DISEASE MANAGEMENT

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Supervisors: Ms J. McCartney
Ms S. Burton
To my mom and dad
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In accordance with Rule G4.6.3, I hereby declare that the above-mentioned dissertation is my own work and that it has not previously been submitted for assessment to another University for another qualification.

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<tr>
<td>ATP III</td>
<td>Adult Treatment Plan III</td>
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<tr>
<td>BMI</td>
<td>Body Mass Index</td>
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<tr>
<td>BP</td>
<td>Blood Pressure</td>
</tr>
<tr>
<td>CDL</td>
<td>Chronic Diseases of Lifestyle</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuing Professional Development</td>
</tr>
<tr>
<td>CVD</td>
<td>Cardiovascular disease</td>
</tr>
<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
</tr>
<tr>
<td>HbA1c</td>
<td>Glycosylated Haemoglobin</td>
</tr>
<tr>
<td>HDL</td>
<td>High Density Lipoprotein</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome</td>
</tr>
<tr>
<td>LDL</td>
<td>Low Density Lipoproteins</td>
</tr>
<tr>
<td>MRC</td>
<td>Medical Research Council</td>
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<tr>
<td>NHLBI</td>
<td>National Heart, Lung and Blood Institute</td>
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<tr>
<td>NIH</td>
<td>National Institute of Health</td>
</tr>
<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
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<td>WHO</td>
<td>World Health Organization</td>
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SUMMARY

THE ROLE OF THE COMMUNITY PHARMACIST IN CARDIOVASCULAR DISEASE MANAGEMENT

Cardiovascular disease contributes to mortality and morbidity statistics worldwide and in South Africa. The current focus in health care revolves around activities aimed at preventing the development of cardiovascular disease, rather than the treatment of disease.

The identification of risk factors that can predispose a patient to the development of cardiovascular disease is an essential component of any cardiovascular disease management programme. It is necessary that in the management of these risk factors, they are not considered to be isolated, but inter-related.

Through the provision of point-of-care cardiovascular risk screening and monitoring services as well as disease-related counselling, the community pharmacist, as a readily accessible source of healthcare, can play an essential role in the cardiovascular disease management process.

The aim of this study was to describe the nature of the services provided by community pharmacists with respect to cardiovascular risk and disease management in the Nelson Mandela Metropole.

The research design was a non-experimental, descriptive study using a cross-sectional survey method. Data was obtained through the utilisation of a questionnaire. The questionnaire consisted of three sections and was administered to community pharmacies in the Nelson Mandela Metropole, that provided cardiovascular point-of-care screening services.

The community pharmacists correctly identified cardiovascular risk factors such as obesity (76.6%; 36, n=47) and smoking (27.7%; 13, n=47). Other
cardiovascular risk factors such as abdominal obesity (4.2%; 2, n=47), gender (2.1%; 1, n=47) and family history (4.2%; 2, n=47) were largely ignored by the pharmacists.

Point-of-care testing services were readily available in the pharmacies, with all of the pharmacies providing blood glucose and blood pressure measurements. Blood cholesterol measurements were only provided in 87.8% (36, n=41) of the pharmacies. The services were generally provided in a clinic facility, with 90.2% (37, n=41) of the pharmacies having a clinic facility available. Pharmacists were involved in the provision of point-of-care services, with 85.4% (35, n=41) of the pharmacies indicating that the pharmacists participated.

Pharmacists readily provided counselling prior (70.7%; 29, n=41) to and after (80.5%; 33, n=41) the conduction of the screening services on areas such as lifestyle modification and treatment options.

Only 15% (7, n=47) of the pharmacists indicated that they were aware of Cardiovascular Risk Calculator Tools and none of the pharmacists indicated that they had utilised such a tool.

Pharmacists recommended frequent monitoring (60.5%; 26, n=43) and lifestyle modification (67.4%; 29, n=43) to patients, if the result of their screening service was within normal limits. However, the majority of the pharmacists indicated that they would refer patients, if the results obtained were out of the normal range.

Conclusions based on the findings indicated that the pharmacists are readily providing cardiovascular risk screening services. The pharmacists were also able to identify the presence of any risk factors that can lead to the development of cardiovascular disease in the patients. However, active pharmaceutical involvement in further cardiovascular disease monitoring seemed to be lacking. Recommendations were made on areas such as reimbursement for pharmaceutical care services, increased utilisation of
support staff and Continuing Professional Development events that could assist in improving the role of the community pharmacist in cardiovascular disease management.
KEYWORDS

- Cardiovascular disease management
- Chronic disease management
- Community Pharmacist
- Monitoring
- Pharmaceutical care
- Pharmaceutical services
- Point-of-care testing
- Screening
CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Cardiovascular-related disorders contribute to mortality and morbidity both worldwide (American Heart Association & American Stroke Association 2007) and in South Africa (Statistics South Africa 2005). According to the American Heart Association, approximately 71,3 million Americans have one or more forms of cardiovascular disease. Cardiovascular-related causes were responsible for 37,3% of all deaths in the United States during 2003 (American Heart Association & American Stroke Association 2007). In South Africa, diseases of the circulatory system accounted for 16,1% of all deaths in 2001 (Statistics South Africa 2005). Mbewu (2005) commented that up to 80% of cardiovascular deaths are avoidable, suggesting that in South Africa up to 60 000 lives could be saved per year.

The current central focus in health care highlights the promotion of a healthy lifestyle and the prevention of disease, rather than the expensive treatment of disease once it has arisen (Ahrens 2004). An important component of any health promotion campaign is the identification of risk factors that contribute to the development of cardiovascular disease. Once risk factors have been identified, changes in the patient’s lifestyle can be initiated, together with the possible initiation of pharmacotherapy which may contribute towards preventing the occurrence of cardiovascular events.

Patients are regarded as high risk for cardiovascular disease if they have a cardiac disease or condition or predisposing risk factors, which can lead to the development of cardiovascular disease. Modifiable risk factors are those factors that can be altered by the patient and include
obesity, diet, smoking, blood cholesterol, blood pressure and blood sugar levels. The non-modifiable risk factors are factors that the patient cannot alter and include patients’ age, gender and family history (Adult Treatment Panel III 2001). The World Health Organisation (WHO) suggests that these risk factors should not be considered in isolation, but a comprehensive cardiovascular risk management approach, which involves managing all the risk factors together, should be employed to prevent cardiovascular complications (World Health Organisation 2002).

Since the community pharmacist is not only highly accessible to both patients and physicians but is also qualified and capable of providing education and training in disease management for the patient, community pharmacists are in an ideal position to play an important role in this area (Blumi, McKenney, & Cziraky 2000).

The Royal Pharmaceutical Society of Great Britain (2003) has highlighted the potential role of the pharmacist in the management of cardiovascular risk through the provision of health advice and education with respect to the various risk factors. In addition, the pharmacist can be involved in the provision of screening services for risk factor identification, patient monitoring services as well as cardiovascular disease management. (Royal Pharmaceutical Society of Great Britain 2003)

Ahrens (2004) also suggested that screening and management services provided by community pharmacists can contribute to a reduction in the healthcare costs associated with cardiovascular diseases by potentially reducing the number of hospital visits or doctor appointments.

There is little or no published evidence of pharmacists’ involvement in cardiovascular disease monitoring and management in South Africa. However, the provision of screening services by pharmacists is common practice. Point-of-care testing services for blood glucose, blood cholesterol and blood pressure were found to be available in the majority of community pharmacies in the Port Elizabeth area (91%; 43 out of 47
community pharmacies). In 34 of these pharmacies (79%), the services were conducted by a pharmacist either alone or in combination with other staff (Venter 2005).

Recommendations, such as that from the South African Pharmacy Council Good Pharmacy Practice Guidelines (Osman 2005), provide information on the provision of point-of-care screening services and the role which can be played by the community pharmacist. In addition, treatment guidelines are available for the management of most chronic diseases (Ncayiyana 2006; Society for Endocrinology Metabolism and Diabetes of South Africa 2002).

Section 18.6 (a-b) of the Practice regulations in the Pharmacy Act No 53 of 1974 states that the scope of practice of a pharmacist should include:

1. The provision of information and education regarding the promotion of human health.
2. The provision of blood pressure, blood glucose and blood cholesterol-screening facilities, amongst others, to the public. (Osman 2005)

Although the recommendations exist and the regulations provide the pharmacist with guidelines on how to conduct screening tests, the focus lies primarily on the individual risk factors and not overall cardiovascular risk management. According to the World Health Organization (2002) it is essential that these risk factors be considered together in order to minimise cardiovascular complications in the patient.

1.2 PROBLEM DEFINITION

Cardiovascular disease is a major contributor to morbidity and mortality statistics in South Africa, yet up to 80% of cardiovascular-related deaths are avoidable (Mbewu 2005). The identification of risk factors that predispose a patient to cardiovascular complications is integral in the
management of such a patient. As a community pharmacist, there is ample opportunity to contribute to the management of the patient through the provision of point-of-care testing services and monitoring of the disease condition. Comprehensive risk factor management, where the focus revolves around managing all risk factors instead of focusing on individual risk factors, can contribute to improving the patient’s condition (Genest & Cohn 1995). International studies, such as Project ImPACT (Blumi et al 2000) and Project SCRIP (Tsuyuki, Johnson, Teo, Simpson, Ackman, Biggs, Cave, Chang, Dzawik, Farris, Galvin, Semchuk, & Taylor 2002) have provided evidence for the important role the community pharmacist can play in cardiovascular disease management. Treatment guidelines and recommendations exist in South Africa for cardiovascular disease management and for the provision of cardiovascular-related services (Ncayiyana 2006; Osman 2005; Society for Endocrinology Metabolism and Diabetes of South Africa 2002), However these focus primarily on the risk factors in isolation, with little information on managing the risk factors in combination. Thus the need for research into the role of the community pharmacist in the South African context was identified, specifically in the area of cardiovascular disease management.

1.3 AIM

To assess and describe the nature of the services provided by community pharmacists in the Nelson Mandela Metropole with respect to cardiovascular disease management.

1.4 RESEARCH OBJECTIVES

- To describe the nature of cardiovascular risk screening, monitoring and management services provided by community pharmacists in the Nelson Mandela Metropole.
• To determine the extent to which the community pharmacist assesses the cardiovascular risk profiles of patients.
• To determine what community pharmacists perceive their role to be in the management of the patient with cardiovascular disease.
CHAPTER TWO
CARDIOVASCULAR DISEASE

2.1 INTRODUCTION

A review of the literature was conducted and will be discussed in Chapters Two and Three. Chapter Two will focus primarily on cardiovascular disease, as a chronic disease and its management. Chapter Three will focus on the role that the community pharmacists can play in cardiovascular disease management.

2.2 CHRONIC DISEASE

2.2.1 A definition of chronic disease

A chronic disease is a disease and/or illness that can be prevented and controlled with appropriate therapy but at present not cured (United Kingdom Department of Health 2004b; World Health Organisation 2005).

“The life of a person with a chronic disease is forever altered – there is no return to ‘normal’” (United Kingdom Department of Health 2004a). Due to this permanent deviation from normality, chronic diseases are sometimes also referred to as long-term or long-standing diseases.

Since there is a close link between chronic disease and the patient’s lifestyle, several conditions, including diabetes, hypertension, and hypercholesterolaemia are collectively known as “chronic diseases of lifestyle”. These chronic conditions may be the result of exposure, over many decades, to a variety of risk factors such as unhealthy diets, smoking, lack of physical exercise and possibly stress. (Steyn, Fourie, & Temple 2006)

Traditionally chronic diseases have been considered to be non-communicable or non-infectious diseases and are not normally
transmitted from one person to another (South African Department of Health 2005). However, a patient with AIDS, which is primarily classified as a communicable disease, can through lifestyle modifications and effective treatment strategies, lead a prolonged life without getting cured (Matic, Lazarus, and Donoghoe 2005). This opens the door for further interpretations of the definition of a chronic disease.

Examples of disease or conditions that can be classified as being chronic include hypercholesterolaemia, hypertension, ischaemic heart disease, congestive heart failure, diabetes mellitus, asthma, arthritis, epilepsy, cancer, stroke and mental illnesses.

2.2.2 The incidence and impact of chronic disease
Currently about 60% of the global disease burden can be attributed to chronic diseases (World Health Organisation 2005). Mortality figures are also affected as chronic diseases were estimated to have caused the death of at least 30 million people worldwide, during 2005 (World Health Organisation 2005). Furthermore, it is predicted that in the next ten years, a 17% increase in the number of deaths due to chronic diseases can be expected, compared to a 3% increase in deaths following infectious diseases or nutritional deficiencies (World Health Organisation 2005). In the United Kingdom, about 17.5 million adults are living with a chronic condition. In South Africa, the statistics are similar, however it has been suggested that in South Africa, chronic diseases are part of a “quadruple burden of disease structure” with the other three components of this structure being poverty-related diseases, crime-related injuries and the HIV/AIDS epidemic (Steyn et al 2006).

In the elderly population of the United Kingdom, the incidence of chronic disease is estimated to be about three quarters of the population over the age of 75 years (United Kingdom Department of Health 2001). With the improvements in medical technology and increased control of infectious diseases in the younger population
(South African Department of Health 2005), an increased number of people have now reached their seventies, eighties and beyond. This increased lifespan has resulted in an increased burden of chronic diseases (United Kingdom Department of Health 2004b).

Unfortunately this disease burden is further complicated by the effects of the diseases on individuals and their families. Chronic diseases often result in physical and psychological difficulties, socio-economic problems, reduced quality of life and sometimes even social exclusion. Further complications include the development of additional diseases or co-morbidities, meaning that a patient may and often does, present with more than one chronic disease at a time. This leads to difficulties in developing treatment protocols and requires a more intensive approach to treatment. (United Kingdom Department of Health 2004b)

Chronic diseases can also have an impact on health care expenditure, with a large component of this expenditure being attributed to institutional costs, such as hospital admissions (Stuart & Weinrich 2004). Indirect costs are also involved, since many chronic disease patients are not able to continue employment as a result of illness.

The occurrence of chronic disease is often also linked to poor socioeconomic conditions. In developing countries specifically, the premature death or even disability of a family member due to chronic disease can have a negative impact on the economic well-being of the family. This impacts on the community and eventually results in impaired economic growth of the country. (World Health Organisation 2005)

In South Africa, by the year 2030, a 40% increase in mortality figures due to chronic diseases of lifestyle is expected to occur in the 35-64 year-old age group, generally regarded as the working age group (Steyn et al 2006). This can result in severe economic problems, especially if the effect of HIV/AIDS is also considered.
2.2.3 Factors contributing to chronic disease development

Factors, whether individual, inherent and environmental that can increase a patient’s risk of contracting a chronic disease or a disability are referred to as risk factors (Disease Control Priorities Project 2006). The National Heart, Lung and Blood Institute (NHLBI) of the National Institute of Health (NIH), in their third report on the detection, evaluation and treatment of high blood cholesterol in adults, in the United States, indicated that factors affecting the development of chronic disease can be classified as either modifiable or non-modifiable risk factors (Adult Treatment Panel III 2001).

Modifiable risk factors may be defined as all those factors that can be altered to aid in the prevention of chronic disease development and may be regarded as suitable areas for interventions aimed at reducing the risk profile of the patient. These modifiable risk factors include individual or lifestyle behaviours such as smoking, unhealthy dietary habits, obesity, physical inactivity and alcohol usage. (Adult Treatment Panel III 2001)

Many of these modifiable risk factors arise as a result of social, economic and cultural change brought on by factors like urbanisation, globalisation and population ageing (World Health Organisation 2005). Non-modifiable risk factors include those factors that cannot be altered, such as age, gender and family history of chronic disease and their presence requires more intensive reduction in the modifiable risk factor profile of the patient (Adult Treatment Panel III 2001).

Preventing the occurrence of the risk factors remains the best method of treating chronic diseases. In addition, it is essential that health policies and treatment guidelines are developed, instituted and implemented to assist in improving the lifestyle of the patients suffering from chronic diseases.

2.2.4 Approaches to chronic disease management

Once a patient contracts a chronic disease, as a result of disease duration, the multifactorial nature of chronic disease and the
irreversible pathological changes that occur in the patient, a dynamic and complex health care problem arises (Soubbi 2007). Chronic disease management may be defined as “a system of coordinated healthcare interventions and communications for populations with long-term conditions in which patient self care is significant,” (Royal College of Physicians of London & Royal College of General Practitioners 2004).

Chronic disease management includes any medical or pharmaceutical interventions designed to improve patient outcomes and reduce the cost burden (Royal College of Physicians of London & Royal College of General Practitioners 2004).

Good chronic disease management strategies may assist in improving the quality of life of patients and prevent unnecessary acute episodes which often result in hospitalisation and increased costs (Bellingham 2004).

The management of chronic diseases should aim to primarily provide patients with a greater degree of control over their condition. This can be done by encouraging changes in the individual behaviour of patients coupled with healthy living choices and may involve both non-pharmacological and pharmacological means of intervention.

It is this principle that forms the foundation of many chronic disease management models such as the Kaiser Permanente Pyramid, demonstrated by figure 2.1 (United Kingdom Department of Health 2004a)

2.2.4.1 The Kaiser Permanente Pyramid Model as an example of a chronic disease management model.

The essence of this model is to utilise a wider mix of strategies targeting the whole care continuum by focusing on integrated services (Singh & Ham 2006). The pyramid, as shown in Figure 2.1 is broken down into three levels that can be classified as:
• Level 1: Supported self care
• Level 2: Specialised disease management
• Level 3: Case management

Health promotion is the underlying foundation of all three levels.

Considering each of these levels in the Pyramid Model:

• **Level 1: Supported self care**

Self care can be regarded as supporting patients in taking an active role in managing their own care. It involves assisting patients in managing their own conditions and adopting approaches that prevent disease progression and reduce the risk of the patients getting further complications. This concept of self-care forms the broad base of the
Pyramid (Level 1), accounting for 70-80% of the chronic disease population (United Kingdom Department of Health 2004a). Empowering the patient is one of the principal strategies of the Kaiser Permanente Model and involves educating the patient on their condition and involving them in treatment decisions. Information on aspects of their illness and the role that adherence to their prescribed therapy will play needs to be focused on by health professionals. Additional support from other patients with the same long-term conditions either individually or through disease related support groups can also be helpful in empowering the patient. (United Kingdom Department of Health 2004a)

The important role that the patient can play in their own chronic disease management has been the driving force behind the development of the “Expert Patient” principle in the United Kingdom. The “Expert Patient” may be defined as a patient who has the necessary confidence, skills, input and knowledge to play a central role in the management of their chronic disease and at the same time practises activities to minimise its impact on their day-to-day living (United Kingdom Department of Health 2001). These patients undergo formalised, patient education self-management programmes, aimed at providing them with the information and skills necessary to manage their condition within the parameters of the medical regimen (United Kingdom Department of Health 2001). They are developed to motivate the patient to take charge of their own disease management process, which in turn may result in several beneficial outcomes such as a reduction in disease symptom severity, decrease in pain experienced, improved life control and activity and an improvement in resourcefulness and life satisfaction (United Kingdom Department of Health 2001). Several examples of activities that can promote self care are provided in Table 2.1.
### Table 2.1 The different types of self care support

<table>
<thead>
<tr>
<th>EXAMPLES OF SUPPORT CARE</th>
<th>PRACTICAL APPLICATIONS OF SUPPORT CARE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preventional and promotional strategies</strong></td>
<td>Interactive courses on lifestyle modifications¹</td>
</tr>
<tr>
<td></td>
<td>Personal trainers to assist in exercise programme²</td>
</tr>
<tr>
<td></td>
<td>Performing point-of-care testing³,⁴</td>
</tr>
<tr>
<td><strong>Decision on action to take</strong></td>
<td>Telephonic help lines (on disease management)²</td>
</tr>
<tr>
<td></td>
<td>Patient peer support groups²</td>
</tr>
<tr>
<td></td>
<td>Internet discussion groups¹</td>
</tr>
<tr>
<td><strong>Treatment/medication</strong></td>
<td>Self-care courses²</td>
</tr>
<tr>
<td></td>
<td>Drug information⁴</td>
</tr>
<tr>
<td></td>
<td>Information systems such as sending patient reminders¹</td>
</tr>
<tr>
<td><strong>Maintenance and rehabilitation</strong></td>
<td>Self-management in post-hospital care²</td>
</tr>
<tr>
<td></td>
<td>Self-care community groups²</td>
</tr>
<tr>
<td><strong>Monitoring and evaluation</strong></td>
<td>Disease monitoring diaries²</td>
</tr>
<tr>
<td></td>
<td>Individual screening equipment³</td>
</tr>
<tr>
<td></td>
<td>Utilising point-of-care services³,⁴</td>
</tr>
</tbody>
</table>

1. Singh & Ham 2006
2. United Kingdom Department of Health 2004a
3. Moffatt 2001
4. Blumi et al 2000
5. Tsuyuki et al 2002

- **Level 2: Specialist disease management**

Patients with more severe or unstable chronic disease are included in the second level of the Pyramid (Figure 2.1). These patients are more likely to have increased frequency of hospitalisations and long-term complications as a result of insufficient or inadequate early treatment and management of their disease state (United Kingdom Department of Health 2001). They can therefore be categorised as “high risk” patients. At this level a multidisciplinary team is required to provide specialised quality care. The care provided involves employment of specific guidelines and protocols in managing the chronic disease. (United Kingdom Department of Health 2004b)
Such teams will normally be comprised of a physician and other auxiliary health professionals such as nurses, pharmacists, dieticians, physiotherapists amongst others. Each member of the team will be able to apply their respective expertise to a certain aspect of the patient’s disease management process to eventually improve on the disease outcome (Ho & Rumsfeld 2006). The team members should also be in constant communication with one another regarding the treatment of the patient (Wagner 2000).

- **Level 3: Case Management**

As the chronic disease progresses, several other chronic disease conditions may arise. These additional conditions are referred to as co-morbidities. If co-morbidities are present, patient caring practices become more complex and difficult and require a shift from being disease-orientated to patient (case) orientated. This involves a key health care worker, being actively involved in managing the care of the patient (United Kingdom Department of Health 2004a; United Kingdom Department of Health 2004b) This population of chronic disease patients are represented by Level 3 of the Pyramid (Figure 2.1) and being the most complex cases, are difficult to manage.

Even though the approach to disease management differs at the three levels, there are common themes present at each level. These include:

- **Point-of-care testing services** assist in screening and monitoring processes by assisting in the identification of patients at risk of chronic diseases as well as in the eventual diagnostic procedures. Point-of-care also plays a role in the patient disease management process. Point-of-care testing is diagnostic testing performed at or near the site of patient care (Rodis & Thomas 2006). These facilities are available for both the screening of patients as well as assisting in the continuous monitoring of patients. Point-of-care testing services are beneficial in that they can be performed at multiple settings and by a diverse group of
personnel including medical practitioners, nurses and pharmacists and even the patient themselves (Rodis & Thomas 2006).

- **Patient education** and improving patient involvement in their own care (United Kingdom Department of Health 2004a)
- The utilisation of *health-care teams* to assist in disease management (United Kingdom Department of Health 2004a)

### 2.4.2.2. Approach to identification and management of a chronic disease

Any comprehensive chronic disease management programme will include three components:

- **Identification of the patients at risk of contracting a chronic disease**
  
  Patients who are at risk of developing chronic diseases need to be identified. This normally happens through general population based or targeted health awareness programmes and includes providing relevant information on the signs and symptoms of chronic disease states, assessing the risk factors of individuals and performing point of care testing in high risk individuals. Early detection of risk factors can result in early identification and intervention with appropriate management procedures which may aid in preventing the onset of disease (Ahrens 2004).

- **Screening for a chronic disease**

  Screening can be defined as “the presumptive identification of an unrecognised disease or defect by the application of tests, examinations or other procedures which can be applied rapidly.” (Flobbe, Ijsselmuinen, Rheeder, Gerber, & Lubbe 1999)

  Screening can assist in distinguishing the patient who has the disease and is asymptomatic or the patient who is at risk of the disease (Ahrens 2004), from the patient that neither has the disease nor is at risk of it (Flobbe et al 1999). Screening does
not involve a diagnosis but indicates the need for further investigation by a medical practitioner. It can also be helpful in illustrating to the patient the relationship that exists between the patient’s lifestyle and potential disease states (Moffat 2001). Screening and early identification of disease may result in initiation of treatment at an early stage, which could eventually result in a reduction in morbidity and mortality as well as a reduction in institutionalising costs, resulting in decreased health expenditure (Ahrens 2004).

• **Monitoring of the chronic disease patient**

Since an important part of the therapeutic plan involves the measurement, interpretation and monitoring of laboratory values (Rodis & Thomas 2006), point of care testing services are not only helpful in assessing the presence of risk factors, and screening but can also be continuously used during the chronic disease management process.

The chronic disease management process requires that the patient makes frequent visits to determine if the disease is progressing or regressing, that the desired outcomes of therapy are being achieved, as well as to determine if any complications have arisen. This periodic measurement that guides the management of a chronic or recurrent condition is known as monitoring. (Glasziou, Irwig, & Mant 2005)

Monitoring of the chronic disease patient can impact on management practices by:

• Improving adherence to prescribed treatments
• Allowing for a better selection of treatment based on the individual’s response.
• Improving the titration practices of the treatment.
• Educating the patient on non-treatment factors that can improve disease management. (Glasziou et al 2005)
As Davis suggested “Chronic disease management is beginning to develop its own identity as an important component of health care” (Davis 2000).

Good chronic disease management practices can assist in improving patient care, service quality and cost reduction (United Kingdom Department of Health 2004b). It is important that multidisciplinary teams including medical practitioners, dieticians, pharmacists, nurses and other health care professionals assist each other in the process of chronic disease management and that the health care team also recognises the patient by placing a part of the responsibility of chronic disease management process into the hands of the patients themselves (Nixon 2004).

2.2.5 The role of the pharmacist in chronic disease management

As a readily accessible source of health care, the community pharmacist is in an excellent position to implement chronic disease management programmes (Ali, Cloutier, Tremblay, Lariviere, & Laurin 2003). Furthermore, if the pharmacist is a member of the health care team, pharmacists are able to perform a variety of functions in the chronic disease management process that will complement the services provided by the other team members and serve to gain greater benefit for the patient.

Being accessible allows for the pharmacist to be actively involved in the education and counselling of patients. The community pharmacist can also play an active role in the facilitation of self-care and the development of the “Expert Patient” by promoting several self-management programmes such as:

- Offering community-based health awareness talks on areas of chronic disease management (Blenkinsopp & Stuttle 2003).
- Providing details of organisations, peer support groups and other health professionals who can assist the patient in their disease management (Blenkinsopp & Stuttle 2003).
• Serve as advocate and provide a channel of communication between the patient and the physician (Blumi et al. 2000; Tsuyuki et al. 2002)
• Be involved in point-of-care testing services to assist in both the screening and monitoring of patients (Taylor & Lopez 2004; Tsuyuki et al. 2002).

Several of these activities performed by pharmacists can be categorised into the three distinct treatment levels of the Kaiser Permanente Pyramid Model of chronic disease management.

For instance, at level 1 of the pyramid, which consists of self-care for chronic disease patients, the pharmacist can be involved in health promotion activities and counselling on aspects of disease prevention strategies as well as provide additional counselling on chronic, over-the-counter and natural medications (National Health System 2004).

In specialist disease management, level 2 of the Kaiser Permanent Model, disease management guidelines and protocols are developed and implemented. Pharmacists can play a role in developing these guidelines (Bellingham 2004). Additional roles for pharmacists in specialist disease management include noticing signs suggestive of poor disease control, detecting the presence of additional disease risk factors and referring patients to their medical practitioners if necessary (National Health System 2004).

In case management, level 3 of the Kaiser Permanent Model, the pharmacist can play an important role in the management of the pharmacotherapy of the patient. The pharmacist needs to be in a close working relationship with the case manager and if pharmacotherapy is the central treatment modality, the pharmacist may even serve as the patient case manager (Bellingham 2004). Effective management of the medicine component of the disease management plan may have a
beneficial effect in limiting the extent of unnecessary complications and prolonged hospital stay (National Health System 2004).

The treatment of almost all chronic diseases requires drug therapy, therefore pharmacists, as the “custodians of medicines” (Osman 2005), can play an integral role (Bellingham 2004).

2.3 CARDIOVASCULAR DISEASE

2.3.1 Cardiovascular disease as a chronic condition

The cardiovascular system, sometimes also referred to as the circulatory system, consists of the heart and the two different networks of blood vessels present in the body, the systemic and pulmonary circulation. Any disorder, abnormality or failure of these systems to function can be referred to as cardiovascular disease (Oxford University Press 2002).

As per the definition of a chronic disease in Section 2.2.1, cardiovascular disease can be prevented or avoided by implementing certain preventative measures (Steyn et al 2006) and the disease can be controlled by the implementation of various treatment guidelines available (Adult Treatment Panel III 2001; Ncayiyana 2006). The link between the development of cardiovascular disease and lifestyle factors such as physical inactivity, smoking, unhealthy diet and obesity is well-established (Steyn et al 2006). The modification of these lifestyle aspects is recognised as an essential component of treatment interventions (New Zealand Guidelines Group 2003). Cardiovascular diseases include conditions such as hypertension, hypercholesterolaemia, ischaemic heart disease and congestive cardiac failure, whereas the presence of diabetes mellitus and the metabolic syndrome can contribute to the development of cardiovascular diseases.
2.3.2 The incidence and impact of cardiovascular disease

2.3.2.1 Worldwide incidence of cardiovascular disease

The burden of cardiovascular disease on health worldwide is extensive. Cardiovascular disease is the leading cause of death in many countries around the world, including developed countries such as the United States of America (USA), Great Britain and Australia. (American Heart Association & American Stroke Association 2007)

In the USA during 2004, cardiovascular disease was responsible for more than 871 000 deaths a year (American Heart Association & American Stroke Association 2007), which means that almost 2300 American citizens die each day due to cardiovascular disease.

In Great Britain, diseases of the heart and circulatory system also resulted in the highest number of deaths, 216 000 during 2004, accounting for 37% of all deaths during that year in Great Britain (Petersen, Peto, Rayner, Leal, Luengo-Fernandez, & Gray 2005).

2.3.2.2 The incidence of cardiovascular disease in South Africa

In South Africa, cardiovascular disease is also one of the leading causes of death. Until 2001, it was the leading cause of death, however subsequently it has been overtaken by tuberculosis and immune-deficiency related illnesses (Statistics South Africa 2005). Diseases of the circulatory system, which include ischaemic heart disease, hypertension and other heart-related disorders accounted for 18.5% of deaths in 1997. This percentage decreased to 17.3% in 1999 and 16.1% in 2001. It is important to note, however, that even though the percentage of cardiovascular-related deaths has decreased, the actual number of deaths due to cardiovascular disease has increased. In fact the number of cardiovascular-related deaths increased by almost 5% from 1997 to 2001, which is equal to almost 6000 more deaths than in 1997, highlighting the need for effective cardiovascular disease management (Statistics South Africa 2005).
2.3.2.3 Economic burden of cardiovascular disease in South Africa

The economic impact of cardiovascular disease on the South African economy is also of great concern. A study by Pestana and co-researchers (1996), found that in 1991, the estimated total cost of cardiovascular disease was between R4.1 and R5 billion. Of this, about R463.1 million was spent by government hospitals on cardiovascular related conditions.

The researchers further assessed both the direct and indirect cost of cardiovascular disease and identified numerous factors that contributed to the direct costs, including

- Transport costs
- Consultation fees including physician fees and clinic or laboratory fees.
- Expenditure by both public and private hospitals.
- Percentage cost incurred by the hospital patient.
- Post-hospitalisation expenditures such as consultation fees of specialists, drugs and further outpatient care.

Indirect costs describe the productivity loss when a patient either dies from cardiovascular disease or become disabled. The direct cost of cardiovascular disease accounted for approximately 40.7% to 43.1% of total cost, while indirect cost accounted for about 59.3% to 56.9% of total cost. (Pestana, Steyn, Leiman, & Hartzenberg 1996)

Although there have been few other studies of this nature completed in South Africa since 1991 (Bradshaw, Norman, Pieterse, & Levitt 2007), Professor AD Mbewu of the Medicine Research Council (MRC) has since predicted that this figure has probably risen close to R10 billion (Mbewu 2005). This places cardiovascular disease at the same level as the economic burden of the HIV/AIDS epidemic. In addition, Mbewu suggested that up to 80% of cardiovascular deaths are avoidable, which highlights the importance of prevention practices. Considering the effect of cardiovascular disease on mortality figures in this country, as well as the burden it places on the health care economy, effective
measures need to be taken to ensure that cardiovascular disease management becomes a greater priority in the South African health care arena.

2.3.3 The different types of cardiovascular diseases

2.3.3.1 Hypertension

Worldwide, hypertension has resulted in an estimated 7.1 million deaths in the year 2000, of which, approximately 47 000 occurred in South Africa (Norman, Gaziano, Laubscher, Steyn, & Bradshaw 2007). According to the 2006 South African Hypertension Society guidelines, hypertension can be defined as a systolic blood pressure greater than 140 mmHg and a diastolic blood pressure greater than 90 mmHg (Ncayiyana 2006). However if the patient has diabetes mellitus, renal disease or congestive heart failure, the blood pressure needs to be under 130/80 mmHg (Ncayiyana 2006).

Initial management of uncomplicated hypertension involves lifestyle modification and the identification of other cardiovascular risk factors that may be present in the patient (Ncayiyana 2006). These factors must be investigated and defined in the patient, since hypertension commonly occurs in combination with various other factors, such as obesity, diabetes mellitus type 2 and elevated lipid values (Williams 2005). All of these risk factors contribute to the patient’s complete cardiovascular risk profile (Ho & Rumsfeld 2006). Frequent monitoring of blood pressure levels is necessary to determine the need for initiation of pharmacotherapy.

2.3.3.2 Hypercholesterolaemia

Non-optimal cholesterol levels have resulted in an estimated 4.4 million deaths worldwide during the year 2000, of which an estimated 25 000 deaths occurred in South Africa (Norman, Bradshaw, & Gaziano 2007). Any general abnormalities in blood lipid concentrations are referred to as dyslipidaemias (Blom & Marais 2002). If the blood cholesterol levels are elevated, it is referred to as hypercholesterolaemia.
Dyslipidaemic conditions can be classified under three distinct headings:

- **Primary dyslipidaemias** (This is due to an abnormality in a single gene)
- **Secondary dyslipidaemias** (This occurs when dyslipidaemia is diagnosed secondary to conditions such as diabetes mellitus, hypothyroidism, jaundice or drugs)
- **Multiple gene deformity as well as environmental influences combined to cause lipid abnormalities**. (Blom & Marais 2002)

Atherosclerosis, one of the major complications of dyslipidaemia, can be defined as a disease process of the large and medium sized arteries, that is characterised by endothelial dysfunction, inflammation and plaque accumulation in the internal vascular endothelium (Fowler, Kelly, Ruh, & Johnsons-Wells 2006).

In time, plaque rupture can occur, due to a variety of factors, such as inflammation, suppression of collagen synthesis or collagen breakdown. The plaques that are regarded as high risk, consist of a thin, fibrous cap with a large underlying lipid pool (Smith 1998).

Certain cardiovascular conditions such as ischaemic heart disease, myocardial infarction and stroke are predominantly related to plaque formation (Fowler et al. 2006).

Depending on the lipid levels, initial management approaches are centred on lifestyle modifications, especially dietary changes, smoking cessation and increased physical activity. Frequent assessments of cholesterol levels should be performed in order to evaluate the effect of the lifestyle changes on the cholesterol levels. The majority of point-of-care cholesterol screening equipment only tests for total cholesterol levels. Total cholesterol reflects the sum of the patients low density lipoprotein (LDL) level and high density lipoprotein (HDL) level. In order to obtain a more accurate picture, especially if treatment is considered, a complete lipogram procedure needs to be performed. A lipogram will provide the individual LDL, HDL and triglyceride blood levels. The next step in the management would be to introduce pharmacotherapy.
2.3.3.3 Diabetes Mellitus Type 2

In 2000, an estimated 171 million people worldwide lived with diabetes mellitus. By 2030, this estimate is expected to rise to as much as 366 million. In South Africa, by the year 2000, approximately 1-1.5 million people were considered to be diabetics (Bradshaw et al 2007). Diabetes mellitus type 2 is a progressive condition, characterised by increased levels of insulin resistance and impaired beta cell functioning. Insulin resistance in the liver, muscle and adipose tissue leads to a decrease in the amount of glucose uptake in the peripheral tissues as well as an increase in hepatic glucose production and lipolysis (Hawkins, Bradberry, Cziraky, Talbert, Bartels, & Cerveny 2002). As the disease progresses insulin resistance remains constant but beta-cell functioning tends to deteriorate (Hawkins et al 2002).

Diabetes Mellitus type 2 is an important risk factor for the development of cardiovascular disease and needs to be viewed along with the other major risk factors for cardiovascular disease such as hypertension, hypercholesterolaemia and smoking. A sub-study of the United Kingdom Prospective Diabetes Study (UKPDS), UKPDS-23 investigated the risk factors for coronary artery disease in diabetes mellitus type 2 patients. The major risk factors identified were elevated LDL and triglyceride levels, decreased HDL levels, smoking, hypertension and hyperglycaemia. (Turner, Millns, Neil, Stratton, Manley, Matthews, & Holman 1998)

A patient with both hypertension and diabetes mellitus has an increased risk of stroke, transient ischaemic attack, peripheral vascular disease, end-stage renal disease and blindness (Russel, Dunbar, Salisbury, Sketris, & Kephart 2005).

The link between hypertension and type 2 diabetes mellitus has been the subject of several studies, including the Framingham study (Sheridan, Pignone, & Mulrow 2004) and the UKPDS-23 (Turner et al 1998). The UKPDS-23 specifically, has emphasised the importance of tight blood pressure control in the diabetic patient in order to avoid an acceleration in the atherosclerosis progression as well as associated complications such as renal damage (Hawkins et al 2002). The study
(UKPDS-23) found that better control of hypertension in diabetic patients resulted in decreased incidence of multiple diabetic endpoints, including a:

- 32% decrease in death due to diabetes.
- 44% decrease in the risk of stroke
- 34% decrease in risk of macrovascular complications.

The risk of cardiovascular disease in a diabetic patient who smokes is doubled when compared to the non-diabetic patient, thus extensive counselling and intervention in these patients is particularly important (Hawkins et al. 2002).

The lipid profile of the diabetic patient is also a contributing factor to the development of cardiovascular disease. Increased risk is characterized by moderately elevated triglyceride levels, low HDL levels as well as small, dense LDL particles (Solano & Goldberg 2006).

### 2.3.3.4 Metabolic Syndrome

The metabolic syndrome can be defined as a “constellation of interrelated risk factors”, such as disturbed glucose and insulin metabolism, obesity, hypercholesterolaemia and hypertension, that are associated with the development of type 2 diabetes mellitus and cardiovascular risk (Rosensen 2005).

The presence of any three of these risk factors, which include abdominal obesity, insulin resistance, elevated plasma triglyceride levels, low HDL levels and high blood pressure, results in diagnosis of metabolic syndrome (Genest, Frohlich, Fodor, & McPherson 2003).

Even though the cardiovascular conditions were discussed separately in the above section, it is essential to realise that these conditions can occur concomitantly. For example, a patient with type 2 diabetes mellitus is at greater risk of developing hypertension, which further
increases their risk of developing hyperlipidaemia (Adult Treatment Panel III 2001).

2.3.4 Risk factors for cardiovascular disease

There are a variety of risk factors that contribute to the development of cardiovascular disease in patients. In the past, the tendency was to treat these risk factors in isolation. However, cardiovascular risk factors rarely occur in isolation and many people present with a combination of risk factors that contribute to their total cardiovascular disease risk profile (Hobbs, Gensini, Mancini, Manolis, Bauer, Bohler, Genest, Feldman, Harvey, Jenssen, Metcalfe, & Da Silva 2005). The cardiovascular disease risk profile of a patient consists of the combination of all the risk factors and conditions (promoting to the development of cardiovascular disease) that were identified, considered and evaluated prior to the establishment of an individual treatment programme (Adult Treatment Panel III 2001).

It is therefore important to develop a multi-factorial management plan, which focuses on improving the overall quality of care by incorporating management protocols to target all of the cardiovascular disease risk factors present in the patient (Smith 1998).

The risk factors for cardiovascular disease can be broadly classified into two categories, modifiable and non-modifiable risk factors. Modifiable risk factors can be regarded as all those factors that can be altered to aid in the prevention of cardiovascular disease development and can be regarded as suitable areas for interventions aimed at reducing cardiovascular risk (Adult Treatment Panel III 2001). Non-modifiable risk factors include those factors that cannot be altered and their presence requires more intensive reduction in the modifiable risk factor profile of patients (Adult Treatment Panel III 2001). The individual risk factors are discussed in the following section.
2.3.4.1 Modifiable risk factors

- **Physical inactivity**
  
  Physical inactivity is regarded as an important risk factor for the development of cardiovascular disease. Physical inactivity doubles the risk of a heart attack, and increases the risk of death from a heart attack, threefold (Haskell, Lee, Pate, Powell, Blair, Franklin, Macera, Heath, Thompson, & Bauman 2007).

  Several cardiovascular management guidelines recommend regular exercise by the cardiovascular disease patient. Both the New Zealand guidelines group and the ATP III identify that numerous benefits can be derived from vigorous physical activity (Adult Treatment Panel III 2001; New Zealand Guidelines Group 2003). These beneficial effects range from a decrease in the low density lipoprotein (LDL) levels in the body, a reduction in both the systolic and diastolic blood pressure and decreased risk of the development of type 2 diabetes mellitus due to improved tissue sensitivity to insulin (New Zealand Guidelines Group 2003).

  An increase in physical activity is also an important step in the management of other cardiovascular disease risk factors such as obesity and unhealthy diet, since it will result in increased energy expenditure (Adult Treatment Panel III 2001).

  A minimum exercise target of at least 30 minutes, three times a week is currently advocated. The exercise should elevate the heart rate to about 75% of the age-related maximum, which can be calculated by subtracting the patients age in years from 220 beats/minute (Blom & Marais 2002).

- **Obesity**

  In South Africa, about 29% of males and 56% of females are estimated to be overweight or obese (Steyn et al 2006). This is a major contributing factor to the development of cardiovascular disease in the South African population.
The Body Mass Index (BMI) is used to determine and define obesity (Adult Treatment Panel III 2001). The BMI takes into consideration the weight and height of the patient which are incorporated into the following formula:

\[
\text{Body Mass Index} = \frac{\text{Weight of Patient (in kg)}}{[\text{Height of patient (in m)}]^2}
\]

Obesity is defined as a BMI value equal to or more than 30 kg/m\(^2\) whereas overweight can be defined as having a BMI value between 25 and 29.9 kg/m\(^2\).

The classification criteria used to assess the patients BMI value are outlined in Table 2.2.

<table>
<thead>
<tr>
<th>BMI Value</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 18</td>
<td>Underweight</td>
</tr>
<tr>
<td>18.5 – 24.9</td>
<td>Normal</td>
</tr>
<tr>
<td>&gt;= 25</td>
<td>Overweight</td>
</tr>
<tr>
<td>25 – 29.9</td>
<td>Pre-obese</td>
</tr>
<tr>
<td>30 – 34.9</td>
<td>Obese class I</td>
</tr>
<tr>
<td>35 – 39.9</td>
<td>Obese class II</td>
</tr>
<tr>
<td>&gt;= 40</td>
<td>Obese class III</td>
</tr>
</tbody>
</table>

Obesity can result in raised triglyceride levels as well as a reduction in HDL levels in the body. In addition it can result in insulin resistance, which could predispose a patient to type 2 diabetes mellitus. (New Zealand Guidelines Group 2003)

Abdominal obesity is mostly responsible for diseases such as type 2 diabetes mellitus and coronary heart disease (Raja,
Hansen, Baber, & Allen 2004). Therefore measuring abdominal obesity provides the health professional with a better predictor for cardiovascular disease than the BMI method (New Zealand Guidelines Group 2003). In South Africa, abdominal obesity is defined as a waist circumference measurement of 102 cm or more, for men, and 88cm or more, for women (Ncayiyana 2006).

For optimal weight control in the obese patient, further weight gain must be prevented and a moderate loss of weight be encouraged and sustained (New Zealand Guidelines Group 2003). A BMI value of between 18 and 24.9 kg/m² should be the aim and abdominal obesity should be avoided (Ncayiyana 2006).

- **Dietary factors**

  The effects of diet on cardiovascular disease are varied and can be linked to all other cardiovascular risk factors. Dietary modifications are often the first step in the treatment of the cardiovascular disease patient. For example, in most cases a newly diagnosed dyslipidaemic patient’s treatment will be initiated with four to twelve weeks of dietary therapy prior to the introduction of pharmacotherapy (Wolmarans 2005).

  Characteristics of a healthy diet include or should provide:

  - Sufficient energy to achieve and maintain normal body mass
  - A variety of foods to provide adequate nutrient needs
  - Should be low in fats, especially saturated fatty acids (animal fats, hydrogenated vegetable fats, coconut oil and various full-cream dairy blends) and trans fatty acids (hydrogenated vegetables and marine oils)
  - Polyunsaturated fatty acids (sunflower oil, fatty fish and walnuts) and monounsaturated fatty acids (olive oil, almond, pecan and hazelnuts as well as avocados and olives)
• Should be low in dietary cholesterol sources, including those obtained from animal origin. Organ meats such as liver, kidney and tripe contain high levels of cholesterol
• Soluble fibers such as oat bran, dried beans and various fruits and vegetables
• Complex carbohydrates such as wheat bran and wholewheat products
• Moderate alcohol consumption
• Low sodium intake. (Wolmarans 2005)

Dietary approaches play an important role in the lifestyle management of the cardiovascular disease patient. It is important to note that there are various diet plans available to aid a patient in weight loss. These diets have not all proven to be cardiovascular disease safe and therefore referral to dieticians should be advised for dietary interventions (Parikh, McDaniel, Ashen, Miller, Sorrentino, Chan, Blumenthal, & Sperling 2005).

• **Smoking**

In South Africa, with the assistance of strict government legislation, smoking prevalence statistics have reduced from 30.2% in 1995 to 24.1% in 2004. Cigarette consumption has reduced by 33.3% from 1.8 billion packs in 1993 to 1.2 billion packs in 2003. (Steyn et al 2006)

Smoking can increase the risk of a heart attack by 2-3 times (New Zealand Guidelines Group 2003). The three constituents that are thought to be the major contributors in the production of the various smoking-related morbidities include nicotine, carbon monoxide and the oxidant gases (Benowitz 2003). These constituents can contribute to the development of cardiovascular disease by the following means:

• Narrowing of the blood vessels, meaning that cholesterol is more likely to be trapped in the blood vessel lining
• An increase in blood pressure
• An increase in risk of blood clot formation
• An increase in carbon monoxide levels, which in turn can result in decreased oxygen levels. (Benowitz 2003)

Research by Oncken et al in the USA, discovered that 93% of smoking adults (n=537) knew of the cardiovascular-related effects of smoking and also the contribution of smoking to premature death (Oncken, McKee, Krishnan-Sarin, O'Malley, & Mazure 2004).

Smoking cessation has been shown to have several beneficial effects, including a reduction in the risk of heart attack or stroke within 24 hours of smoking cessation. It is even said that one year after cessation of smoking, the risk of heart disease will be halved in the patient and after ten years the risk for cardiovascular disease development will match that of a non-smoking individual. (New Zealand Guidelines Group 2003)

However, smoking cessation is not easy and cigarette smokers should be referred to a smoking-cessation program for psychological support and motivation (Wiggers, Smets, De Haes, Peters, & Legemate 2003).

Various pharmacological treatments exist including nicotine replacement therapy in the form of gum or patches (Wiggers et al 2003).

• Homocysteine levels

Homocysteine is a sulphur-containing amino acid that is derived from the metabolism of methionine (Genest & Audelin 2001). Elevated plasma homocysteine levels can contribute to an enhanced risk of cardiovascular disease (Bautista, Arenas, Penuela, & Martinez 2002). Hyperhomocysteinaemia can be due to certain genetic factors or can be the result of inadequate levels of the vitamin cofactors that are responsible for the metabolism of homocysteine in the body (Genest & Audelin
Normal plasma homocysteine levels are between 5 and 15 micromole/litre whereas values higher than 15 micromole/litre are widely regarded as hyperhomocysteinaemia (Genest & Audelin 2001). The folate status of a patient may also be an indicator of their homocysteine status. Increased homocysteine levels are frequently accompanied by low folate levels in the plasma and red blood cells (Moat, Lang, McDowell, Clarke, Madhavan, Lewis, & Goodfellow 2003). Therefore one of the treatment protocols of hyper-homocysteinaemia is folate supplementation (Moat et al 2003). Elevated homocysteine levels are specifically prevalent in patients with renal impairment and cardiovascular disease (Genest & Audelin 2001).

**Blood glucose levels**

A linear relationship exists between cardiovascular risk and rising blood glucose levels; this means that uncontrolled or abnormal blood glucose levels can lead to an increase in the patient’s risk of cardiovascular disease (Goldberg, Mellies, Sacks, Move’, Howard, Howard, Davis, Cole, Pfeffer, & Braunworld 1998).

The optimal blood glucose values would be a fasting capillary blood glucose value of between 4 and 6 micromole/litre, whereas values between 6 and 8 micromole/litre would be regarded as acceptable. Once the values exceeds 8 mmol/l and the patient presents with signs and symptoms of diabetes mellitus such as lethargy, polyuria, polydipsia and impaired wound healing, further investigation is required (Society for Endocrinology Metabolism and Diabetes of South Africa 2002).

Glycaemic control is one of the major difficulties facing type 2 diabetic patients. The glycosylated haemoglobin percentage (HbA1c) is a method of assessing glycaemic control over a long period of time and therefore provides a better indication of the level of glycaemic control in the diabetic patient. Current South African guidelines suggest that HbA1c should be less than 7%.
and should be assessed on a yearly basis (Society for Endocrinology Metabolism and Diabetes of South Africa 2002). In addition, diabetes mellitus and hypertension are often diagnosed at the same time in patients. It is therefore important to not only ensure adequate blood glucose treatment but also adequate blood pressure control, especially since the cardiovascular risk of a diabetic patient with hypertension is double that of a patient without diabetes (Rosensen 2005). The reason for strict hypertension control in the diabetic patient is due to the increase in risk of microvascular and macrovascular complications in the diabetic patient (Ncayiyana 2006).

If interventions are applied to reduce the blood glucose levels, the resultant outcome is favourable. Every 1% decrease in the sustained blood glucose levels of a patient can be equated with a 7% decrease in their cardiovascular risk (New Zealand Guidelines Group 2003). Interventions include non-pharmacological methods such as increase in physical activity, reduction in weight and smoking cessation as well as pharmacological methods aimed at stabilising blood glucose levels and reducing blood pressure.

• **Blood cholesterol levels**

Modification of the patient’s lifestyle and dietary habits play an essential role in the treatment of the hyperlipidaemic patient. If adequate interventions are implemented, then a 1% reduction in blood cholesterol levels can result in a 2% decrease in the patient’s risk of myocardial infarction (New Zealand Guidelines Group 2003).

Current guidelines recommend that desirable blood cholesterol values are less than 5 mmol/l for total cholesterol and less than 3 mmol/l for LDL cholesterol (Blom & Firth 2006).
• **Blood pressure levels**

Raised blood pressure values can contribute to greater cardiovascular morbidity and mortality (Adult Treatment Panel III 2001). When hypertension is present with other cardiovascular risk factors such as hyperlipidaemia and diabetes mellitus, the need for greater blood pressure control is essential (Ncayiyana 2006). In fact, with every 20mmHg increase in the systolic blood pressure and every 10mmHg increase in diastolic, the risk of mortality from ischaemic heart disease and stroke doubles (Ncayiyana 2006). Target blood pressure is set at a systolic value under 140 mmHg and a diastolic value of below 90 mmHg. Blood pressure values can vary from normal ranges (120-129/80-84 mmHg) to severe hypertension (>180/>110) (Ncayiyana 2006). It is also important to notice that a single elevated blood pressure reading does not constitute hypertension, but that the diagnosis consists of three blood pressure measurements done on three separate occasions. The reason for this is that several factors can contribute to temporary elevations such as smoking, caffeine or rigorous exercise shortly before a measurement and other factors such as white-coat hypertension (Ncayiyana 2006).

If a patient is diagnosed with hypertension or is already on antihypertensive medication, the patients’ cardiovascular risk profile will need to be adapted similarly (Ncayiyana 2006).

These abovementioned modifiable cardiovascular risk factors are appropriate targets for interventions, such as lifestyle modification and pharmacotherapy. These interventions are aimed primarily at reducing the patient’s cardiovascular risk profile. (Adult Treatment Panel III 2001)
2.3.4.2 Non-modifiable risk factors

- **Family history**
  During the assessment of the patient’s cardiovascular risk profile, attention should be given to the patient’s family history of cardiovascular conditions. There is a particularly high incidence of familial hypercholesterolaemias in South Africa. This is particularly prevalent in the Afrikaner population, Lithuanian Jews, Indians and Christian Lebanese and these population groups require particular attention (Blom & Firth 2006).
  Cardiovascular incidents such as myocardial infarction in first degree relatives (such as mother and father) under the age of 50 years (in case of father) and under 55 years (in case of mother) places the patient at high risk of contracting cardiovascular disease (Blom & Firth 2006).

- **Age**
  Advanced age is the major driving factor behind morbidity and mortality figures in the elderly (Tuomiletho 2004). As evident from Table 2.3, cardiovascular diseases are one of the main causes of age-related deaths. The incidence of cardiovascular related deaths also increases with age as is evident from the significant increase in the number of deaths occurring in the 65+ age group compared to that of the 15-49 year age group (Statistics South Africa 2005).
  In the 15-49 year age group the majority of deaths were due to cerebrovascular diseases as well as heart conditions such as myocardial infarction. In the 50-64 year category the incidence of diabetes mellitus, ischaemic heart disease and hypertensive diseases increase prominently. In patients over the age of 65 years cardiovascular related deaths are the most common cause of death (Statistics South Africa 2005).
Table 2.3 The number of deaths caused by cardiovascular-related conditions according to age in 2001 (Adapted from Statistics South Africa 2005)

<table>
<thead>
<tr>
<th>Condition</th>
<th>15-49 years</th>
<th>50-64 years</th>
<th>65+ years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of deaths (%)¹</td>
<td>Rank²</td>
<td>Number of deaths (%)¹</td>
</tr>
<tr>
<td>Other forms of heart disease</td>
<td>5684 (2.8%)</td>
<td>6</td>
<td>4876 (6.3%)</td>
</tr>
<tr>
<td>Cerebrovascular conditions</td>
<td>3833 (1.9%)</td>
<td>7</td>
<td>5716 (7.4%)</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>No data</td>
<td>4</td>
<td>4744 (6.1%)</td>
</tr>
<tr>
<td>Ischaemic Heart Disease</td>
<td>No data</td>
<td>7</td>
<td>3330 (4.3%)</td>
</tr>
<tr>
<td>Hypertensive disease</td>
<td>No data</td>
<td>9</td>
<td>2862 (3.7%)</td>
</tr>
</tbody>
</table>

¹. The number of actual deaths occurring due to the specified condition.
². The percentage of deaths caused by the specific condition compared to all deaths.

- **Gender**

  The rise in the absolute cardiovascular risk is greater with age in males than in females. The risk becomes most significant in males in their mid-forties and in post-menopausal females. The reasons for this 10-15 year difference in risk occurrence between males and females are currently unknown. (Adult Treatment Panel III 2001)

  However, the mortality rates in females are much higher than in their male counterparts, as evident from Table 2.4.

  One reason that may have contributed to the higher mortality rates in females of the 60+ population age group is the increasing ratio of females to males surviving. Currently about 61% of the population over the age of 60 years is female. This figure is expected to rise to 63% by 2020, which means that more females may be at risk for the development of cardiovascular diseases (Steyn et al 2006).
Table 2.4 The number of cardiovascular-related deaths in males and females in 2001 (Adapted from Statistics South Africa 2005)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of</td>
<td>Rank</td>
<td>Number of</td>
<td>Rank</td>
</tr>
<tr>
<td></td>
<td>deaths (%)(^1)</td>
<td></td>
<td>deaths (%)(^1)</td>
<td></td>
</tr>
<tr>
<td>Other forms of heart disease</td>
<td>10351 (4.4%)</td>
<td>3</td>
<td>12195 (5.7%)</td>
<td>4</td>
</tr>
<tr>
<td>Cerebrovascular conditions</td>
<td>9452 (4.0%)</td>
<td>4</td>
<td>13077 (6.1%)</td>
<td>3</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>4334 (2.4%)</td>
<td>8</td>
<td>8840 (4.1%)</td>
<td>6</td>
</tr>
<tr>
<td>Ischaemic Heart Disease</td>
<td>6643 (3.2%)</td>
<td>6</td>
<td>4930 (2.3%)</td>
<td>10</td>
</tr>
<tr>
<td>Hypertensive disease</td>
<td>No data</td>
<td></td>
<td>6630 (3.1%)</td>
<td>7</td>
</tr>
</tbody>
</table>

1. The number of actual deaths occurring due to the specific condition.
2. The percentage of death caused by the specific condition compared to all deaths

The abovementioned risk factors for cardiovascular disease are all non-modifiable. Although no lifestyle modifications exist for the management of these risk factors, acknowledgement of their role in the development of cardiovascular disease is essential when determining the overall risk profile of the patient. (Adult Treatment Panel III 2001)

2.4 USING A COMPREHENSIVE CARDIOVASCULAR DISEASE MANAGEMENT APPROACH

Cardiovascular disease management has changed over the years. The approach in the past was to isolate the cardiovascular conditions from each other and treat each condition separately. This resulted in a failure of cardiovascular disease management policies to recognise the importance of universal cardiovascular risk in an individual patient (Williams 2005).
The WHO recommended that a shift in focus, from treating risk factors in isolation to a comprehensive cardiovascular risk management process, is necessary (World Health Organisation 2002). Cardiovascular risk management can be defined as the appropriate assessment and management of the cardiovascular risk factors present in the patient with the aim of improving the health outcomes in the individual (World Health Organisation 2002). This approach is now regarded by many as being essential in cardiovascular disease management (Williams 2005).

All the relevant risk factors that affect the patient need to be addressed (Nixon 2004). This multifactorial approach involves all aspects of lifestyle modification such as increased exercise, cardioprotective diet, weight loss and smoking cessation (Lenz 2005). These lifestyle changes then complement the prescribed pharmacotherapy.

2.4.1 A comprehensive cardiovascular disease management approach

A step-wise approach to the management of the cardiovascular disease patient has been recommended and is illustrated in Figure 2.2 (New Zealand Guidelines Group 2003).

2.4.1.1 Step 1: Identification of “at risk” population and conduction of screening tests.

Cardiovascular disease often occurs without the patient being aware of their risk, typically, since the patient, in many cases, may not experience any ill effects from an elevated LDL level or a raised blood pressure (Joffe & Spinner 2007). Considering that several modifiable risk factors such as obesity, unhealthy diet, physical inactivity and cigarette smoking are either visible or can be easily determined by the health care professionals, cardiovascular risk can be easily assessed (Blumi et al 2000). Apart from identifying cardiovascular risk factors, recommendations do exist that provide an indication of when it is advisable to perform risk assessment on individuals. In terms of age and gender, current guidelines suggest that cardiovascular risk
assessments be performed in males over the age of 45 years and females over the age of 55 years, even though the patient presents with no symptoms.

However, the New Zealand Cardiovascular Guidelines Group (2003) further recommend that if the patient is at higher risk of developing cardiovascular disease, due to the presence of a family history of cardiovascular disease, cigarette smoking and sedentary lifestyle, the screening should instead be performed at 35 years in males and 45 years in females (New Zealand Guidelines Group 2003). If a patient is
newly diagnosed with diabetes mellitus, the cardiovascular risk screening should be performed immediately (New Zealand Guidelines Group 2003).

Due to technological advances and the development of various point-of-care testing services that provide adequate, rapid and reliable results in a short time, patients at risk of cardiovascular disease can be identified and screened appropriately and effectively (Blumi et al 2000). Additional measurements such as Body Mass Index and waist measurement can also be performed to determine the extent of cardiovascular risk.

The types of screening services that can be provided during an initial cardiovascular risk screening programme are indicated in Table 2.5.

<table>
<thead>
<tr>
<th>Table 2.5 Recommended cardiovascular risk screening services during initial assessment¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A fasting lipid profile:</td>
</tr>
<tr>
<td>• total cholesterol</td>
</tr>
<tr>
<td>• HDL and</td>
</tr>
<tr>
<td>• LDL values</td>
</tr>
<tr>
<td>2. A fasting plasma glucose</td>
</tr>
<tr>
<td>3. The average of two blood pressure measurements</td>
</tr>
<tr>
<td>4. Body mass index assessment</td>
</tr>
<tr>
<td>5. Waist circumference measurement</td>
</tr>
</tbody>
</table>

¹ New Zealand Cardiovascular Guidelines Group 2003

These screening services can be performed during a personal consultation with the patient. During this consultation, questions on the family history and medical history of the patient can be posed along with the provision of counselling on cardiovascular disease and its treatment.
2.4.1.2 Step 2: Assessing cardiovascular risk status

Once a patient has been classified as “at risk” of cardiovascular disease, the degree of their risk needs to be determined and assessed. The results obtained from the screening services provided in Table 2.5 can be utilised to perform a comprehensive cardiovascular risk assessment (New Zealand Guidelines Group 2003).

The purpose of performing these assessments is to determine the likelihood of the patient experiencing a cardiovascular event over a given time period (New Zealand Guidelines Group 2003) and may assist in guiding the choice of pharmacological and lifestyle interventions required for the individual.

A popular method of determining the risk is through the utilisation of cardiovascular risk calculators. A risk calculator is a multivariate risk prediction equation that can be utilised to provide an estimate of the risk of a patient contracting a chronic disease. The tool is usually developed from information obtained from large, prospective cohort studies or randomized controlled trials and generally provides a risk estimate for a chronic disease event over a period of ten years. (Sheridan et al 2004)

The most popular of these calculators for cardiovascular risk assessment is the Framingham Cardiovascular Risk Assessment Tool (Adult Treatment Panel III 2001). A variety of additional risk calculators that may be useful in assessing a patient’s cardiovascular risk profile are also available and a summary of these is provided in Table 2.6.

The Framingham Tool was developed by the National Heart, Lung and Blood Institute (NHLBI) of the United States of America, with the purpose of determining which risk factors can contribute to the development of cardiovascular disease (National Heart Lung and Blood Institute 2006).
<table>
<thead>
<tr>
<th>Name</th>
<th>Availability</th>
<th>Nature of Tool</th>
<th>Input data required (Additional data not included in the core data*)</th>
<th>Output Data obtained</th>
<th>Risk description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified Sheffield Tables</td>
<td>BMJ 2000;320:671-6; <a href="http://www.bmj.com">www.bmj.com</a></td>
<td>C</td>
<td>Diastolic blood pressure, HDL and diabetes status.</td>
<td>Myocardial infarction (MI), sudden death and angina</td>
<td>10-year absolute risk in 3 categories: (&lt;15%, &gt;15%, &gt;30%)</td>
</tr>
<tr>
<td>Joint British Society Coronary Risk Prediction charts</td>
<td>BMJ 2000;320:705-8; Heart 1998;80:S1 29;www.hyp.ac.uk/bhs/riskview/resources_prediction_chart.htm</td>
<td>C</td>
<td>HDL and diabetic status.</td>
<td>MI, sudden death</td>
<td>10-year absolute risk in 4 categories (&lt;15%, 15% to 20%, 20% to 30% and &gt;30%)</td>
</tr>
<tr>
<td>Joint European Societies Coronary Risk Chart</td>
<td>Atherosclerosis 1998; 140: 199-270</td>
<td>C</td>
<td>None</td>
<td>MI, sudden death</td>
<td>10-year absolute risk in 5 categories: (&lt;5%, 5% to 10%, 10% to 20%, 20% to 40%, &gt;40%)</td>
</tr>
<tr>
<td>Stat Cardiac Risk for Palm</td>
<td><a href="http://www.statcoder.com">www.statcoder.com</a></td>
<td>H</td>
<td>Diastolic blood pressure, HDL and angina.</td>
<td>MI, sudden death and angina.</td>
<td>10-year absolute risk.</td>
</tr>
</tbody>
</table>

*Core data: Age, gender, systolic blood pressure, total cholesterol and smoking.  
Abbreviations:  
C → Static risk chart  
S → Spreadsheet calculator  
W → Web-based calculator  
H → Handheld computer programme

Patient information necessary to utilise the Framingham Tool includes, age, gender, total cholesterol value, HDL cholesterol level, smoking history and the systolic blood pressure value (Adult Treatment Panel III 2001). The risk value is expressed as a percentage risk over the next
ten years and the higher the value, the greater the perceived risk of cardiovascular disease. If risk is calculated to be greater or equal to 20%, the patient is regarded as being at high risk. The tool is not indicated for patients with established cardiovascular diseases, diabetes mellitus, familial hypercholesterolemia and diabetes-related nephropathy, since these patients are already regarded as having a cardiovascular disease risk greater than 20% (Adult Treatment Panel III 2001).

If the risk is less than 20%, lifestyle modifications should be implemented and a reassessment should take place within a period of five years. If the risk is greater or equal to 20%, intensive lifestyle modifications should be implemented and effects reassessed within six weeks. If the risk remains greater or equal to 20%, pharmacological interventions should be implemented. (Adult Treatment Panel III 2001)

2.4.1.3 Step 3: Develop a treatment plan

After conducting a cardiovascular risk assessment calculation and determining the degree of risk of an individual, a treatment plan needs to be developed and implemented. The plan may include both pharmacological and non-pharmacological interventions.

The presence of modifiable risk factors such as cigarette smoking, obesity, unhealthy diet and physical inactivity can be treated by several interventional techniques. Other cardiovascular risk factors such as blood pressure, blood cholesterol and blood glucose require not only lifestyle modifications, but also pharmacotherapy (New Zealand Guidelines Group 2003).

Figure 2.3 summarises the stages for instituting non-pharmacological interventions by health care professionals and identifies the stages at which pharmacotherapy will be required.
Figure 2.3 Treatment protocols and goals for the cardiovascular disease patient

1. Adult treatment panel 2001
2. Ncayiyana 2006
3. Differences in risk level for blood pressure discussed elsewhere (Ncayiyana 2006)
5. Value indicated specifically for South African populations (Ncayiyana 2006)
2.4.1.4 Step 4: Setting individualised treatment goals

Once an individual patient treatment plan has been implemented, disease monitoring is required. Monitoring is essential to determine both the “benefits and harm” of the treatment plan. (Glasziou et al 2005)

In order to achieve this, it is necessary to develop desired treatment goals for the individual cardiovascular risk factors. The patient that presents with risk factors should be closely involved in the treatment process (New Zealand Guidelines Group 2003) and treatment should primarily aim to reduce the risk factors to optimal levels.

Various guidelines are available that assist in guiding the health care professional during the disease management process. Figure 2.3 illustrates the desired treatment goals as well as integrates the desired treatment goals in patients that are suffering from co-morbid cardiovascular diseases.

2.4.1.5 Step 5: Follow-up and disease monitoring

After the initial diagnosis of a patient with chronic disease, the patient will need to return for a series of follow-up consultations with the general practitioner and/or pharmacist to obtain their repeat medication and for monitoring of their disease parameters. The monitoring aims to determine if the patient’s disease condition has progressed, to determine the response to treatment and identify any adjustments necessary and to detect the presence of specific side effects (Glasziou et al 2005).

2.4.2 Integration of the five-step disease management approach with the Kaiser Permanente Pyramid Model

The five steps, outlined in Section 2.4.1, that should be undertaken by health-care professionals in the management of patients with cardiovascular disease contains elements that can be linked to the three distinct management levels of chronic disease patients, as classified by the Kaiser Permanente Pyramid Model.
During the identification of “at risk” patients, the health-care professional will focus on cardiovascular risk factors that are both modifiable and non-modifiable. This provides a perfect opportunity for the professional to initiate lifestyle modification counselling with the patient. Additional counselling on point-of-care testing and the implication of the obtained result can also be provided. Counselling the patients on these aspects can improve patient self-care practices, which is an important component of Level One of the Kaiser Permanente Pyramid Model. Patient self-care practices can also be improved by utilising technology, through the provision of home monitoring devices, such as glucometers and blood pressure monitors that will assist patients in monitoring their own condition (Ho & Rumsfeld 2006). The authors’ also indicated that providing these home-based monitoring devices can assist in improving patient compliance and adherence to the treatment plan (Ho & Rumsfeld 2006).

Comprehensive chronic disease management requires a team approach. The team can consist of various health care professionals that have experience and knowledge in a variety of specialities that will contribute to counselling patients on desirable lifestyle modifications, medicine management practices, screening and monitoring services. In certain instances, complications may arise or disease progression occur and additional disease management practices might need to be introduced. It generally involves the development of a treatment plan specific to the patient. The patient may need to be referred to a specialist practitioner and with the assistance of other health care team members, disease management practices will become more intensive and patient specific. This can be linked to level 2 of the Kaiser Permanente Pyramid Model.

Level 3 of the Kaiser Permanente Pyramid Model requires case management, during which the disease management of a patient is placed under the responsibility of a health professional.
The existing network of community pharmacists is of great benefit, not only for identifying patients at risk of cardiovascular disease and the subsequent provision of screening services to assist in risk assessment, but also for the initiation of chronic disease management practices. The type of role that pharmacists can play in continuous disease management practices is to assist in the development and institution of treatment guidelines and provision of cardiovascular disease monitoring services. A chronic disease patient has more contact with the pharmacist than with any of the other health care professionals. Most of this contact occurs during the dispensing of repeat medication, which enables the pharmacist to not only continue providing counselling and support, but also identify any changes that may require the patient to be referred to their practitioner. (National Health System 2004)

It is therefore important that community pharmacists play an active role in the management of patients with cardiovascular disease, by ensuring adherence to medication regimens and by contributing to chronic disease management practices.
CHAPTER THREE
THE ROLE OF THE COMMUNITY PHARMACIST IN CARDIOVASCULAR DISEASE MANAGEMENT

3.1 INTRODUCTION

This chapter describes how the roles and responsibilities of the community pharmacists have changed and evolved with time and identifies the role that a community pharmacist can play in cardiovascular disease management. This is followed by a discussion on the specific roles that can be played by community pharmacists in each step of the five-step cardiovascular disease risk management process.

3.2 THE CHANGING ROLE OF THE PHARMACIST

Historically, pharmacy, one of the oldest professions known, has always been closely connected to medicine. However, with the advancement in scientific knowledge, the activities allocated to each profession were categorised into two separate entities, resulting in a split between pharmacy and medicine. Since then, pharmacists have seemingly been unable to define their professional boundaries and subsequently uncertainty has continuously existed with regards to their relationship with patients and other health care professionals. Gilbert commented that the pharmacy profession is in transition and filled with “ambiguity and uncertainty concerning its status as a health care profession” (Gilbert 1998a). This uncertainty negatively affects the image and the development of pharmacy as a profession. Pharmacists have been “overtrained for what they do and underutilised for what they know” (Gilbert 2001).
Al-Shagqa and Zairi (2001) proposed that the role of the pharmacist has in recent years evolved from being primarily drug-focused to a more patient-focused approach. This evolution, according to the authors, took place in three stages:

**Stage One: Compounding and dispensing practices**
Initially, the pharmacist was primarily involved in the compounding of medicinal products, with little focus on patient care practices. In the early part of the 20th century, the pharmacist was primarily involved in developing drug formulations, while the medical practitioner focused on the effects of the drug on the patient (Gilbert 1998b). By the mid-part of the 20th century, large pharmaceutical companies were established for the manufacture of drugs, limiting the pharmacist’s involvement to the dispensing function (Al-Shagha & Zairi 2001; Gilbert 1998b). As technological knowledge increased, more specialised medications were developed. This development created a need for medicine specialists in order to advise both medical practitioners and patients on appropriate drug usage (Moskowitz 2003). The result was a shift within the pharmacy profession away from a product and technology centered approach to “judging the rights and wrongs of drug use” (Al-Shagha & Zairi 2001).

**Stage Two: Clinical pharmaceutical practices**
The move towards “specialists in all aspects of medicine use” signalled the birth of the clinical pharmacist. Clinical pharmacy can be defined as the “provision of structured services by pharmacists to meet the drug related needs of the patients, physicians and nurses in a commitment to the optimisation of drug treatment” (Al-Shagha & Zairi 2001). These clinical-care orientated pharmacists worked in hospital and ambulatory settings and were not usually found in community pharmacies (Al-Shagha & Zairi 2001). The clinical pharmacist provided the drug therapy prescribed for the patient but also utilised their knowledge in not only ensuring appropriate use of the medication by the patient but also appropriate prescribing practices by the medical professionals (Al-
Shaqha & Zairi 2001). However, Al-Shaqha & Zairi (2001) suggested that “in addition to clinical knowledge and basic dispensing skills, there must be an appropriate philosophy of practice and organisational structure within which pharmacists can practice.”

**Stage Three: Pharmaceutical care practices**

The move in the direction of patient care resulted in the development of the concept of “Pharmaceutical Care”, which is defined as “the responsible provision of drug therapy for the purpose of achieving definite outcomes that will aim to improve the patient’s quality of life” (Hepler & Strand 1990). This requires the pharmacist to apply a higher degree of drug knowledge, clinical skills and independent judgement in the disease management process as well as accepting greater responsibility for their part in the management of patients (Al-Shaqha & Zairi 2001).

Pharmaceutical Care is a patient-centred treatment approach (Nichols-English, Provost, Koompalum, Chen, & Athar 2002). Hepler and Strand (1990) stressed that pharmaceutical care involves the process during which the pharmacist interacts with both the patient and other health care professionals in designing, implementing and monitoring a therapeutic plan that will produce specific patient treatment outcomes. The services that form part of pharmaceutical care are aimed at achieving several objectives including: curing the disease condition; reducing or eliminating the symptoms experienced by the patient; slowing the progression of disease particularly chronic diseases and providing patient services aimed at prevention of the disease or its symptoms. (Hepler 1990)

Examples of pharmaceutical care services that can be provided by pharmacists to patients include the monitoring of patient symptoms and disease parameters by utilising point-of-care technology, counselling patients on their medications, resolving any present drug-related problems, facilitating communication channels with other health care professionals and providing pharmacist interventions when indicated
(Amsler, Murray, Tiernay, Brewer, Harris, Marrero, & Weinberger 2001).

These pharmaceutical care activities have enabled pharmacists to become more involved in cardiovascular disease management activities, which are aimed at reducing the cardiovascular disease risk profile of the patient.

3.3 THE ROLE OF THE COMMUNITY PHARMACIST IN CARDIOVASCULAR DISEASE MANAGEMENT

As discussed in Section 2.2.5, the community pharmacist is an easily accessible healthcare professional who can play an essential role in the management of the chronic disease patient. Furthermore, Section 2.2.5 described how the pharmacist can play a role in the chronic disease management process by providing point-of-care screening services and counselling of patients. Pharmacists are also involved in the disease monitoring process and are able to identify complications that may arise in the patient.

Current developments in the pharmacy practice arena accommodate greater involvement by the pharmacist in the disease management process. Research on the impact of pharmacist-related cardiovascular disease management services on patient outcomes has been done. Two of these studies, Project ImPACT (Blumi et al 2000) and SCRIP (Tsuyuki et al 2002) were landmark studies that provided evidence of the beneficial patient outcomes that can result when pharmacists provide disease management services.

In this section, the activities performed by the participating pharmacists in these landmark studies as well as findings from other researchers will be discussed and linked to the 5-step cardiovascular disease management approach as identified in Section 2.4.1.
3.3.1 Identification of “at risk” population and the conduction of screening services

3.3.1.1 Identification of “at risk” population

The first step in the disease management process consists of identifying patients who are “at risk” of developing cardiovascular diseases. This identification process can take place by determining the presence of certain cardiovascular disease risk factors in customers entering the pharmacy. Confirmation of the presence of these risk factors can take place through the conduction of point-of-care screening services. The presence of modifiable risk factors such as raised blood pressure or blood glucose or blood cholesterol values can then be determined. Additional services include the evaluation of waist circumference and body mass index. The presence of other risk factors can be identified by an interview with the patient, during which the pharmacist can enquire about risk factors such as low physical activity level, poor dietary habits, smoking, medical history and non-modifiable risk factors such as age, gender and family history. (New Zealand Guidelines Group 2003)

There are several ways in which pharmacists are able to identify the patients that are “at risk” of contracting cardiovascular diseases, such as:

- Identifying patients with cardiovascular medical history such as previous myocardial infarction events or coronary artery bypass grafts (Reilly & Cavanagh 2003).
- Hourihan et al (2003) reported the use of a questionnaire by the pharmacist to assist in the identification of a patient’s cardiovascular risk factors. The authors, through the utilisation of such a questionnaire, identified cardiovascular disease risk factors in 89% of the 212 patients interviewed.
• Identifying patients on prescription medication used to treat cardiovascular risk factors and conditions. (Tsuyuki et al 2002)
• Identifying patients who are non-compliant with their prescribed treatment regimen (Ali et al 2003).
• Identifying patients with additional risk factors such as age, gender, family history and diabetes mellitus (Ali et al 2003).

Another method used was the referral of patients to the pharmacist by their medical practitioners (Blumi et al 2000). Some studies also indicated that patients were recruited through self-referral in response to the screening services advertised in the local press (Hourihan et al 2003; Mangum, Kraenow, & Narducci 2003; Paulos et al 2005).

### 3.3.1.2 Conduction of point-of-care screening services

Following identification of the patients at risk, pharmacists conduct point-of-care screening tests in order to identify abnormal or raised physiological parameters, which can put the patient at risk of developing cardiovascular disease. In addition, pharmacists should also discuss lifestyle changes aimed at targeting the cardiovascular risk factors identified.

The effectiveness of point-of-care testing services in the screening and monitoring of patients with chronic disease such as cardiovascular disease was discussed in Section 2.4.2.2.

Historically, in South African community pharmacies, cardiovascular-related point-of-care screening services initially started with the measurement of blood pressure and blood glucose. Total cholesterol measurements followed. Current technological advancements enable the community pharmacy to provide a full lipogram as well as HbA1C measurements. Unfortunately, the costs associated with the provision of these types of services are extensive and will influence the extent to which they are employed in the community pharmacy sector. With this
improvement in services provided, community pharmacies had to
develop specific clinic facilities in their pharmacy, in which these
services can be provided.
In America, sources have indicated that with the presence of a clinic
facility in a pharmacy and the ability of the community pharmacist to
perform a variety of point-of-care screening services, community
pharmacists have become more involved in other areas of health
promotion such as weight management clinics (Ahrens, Hower, & Best

Community pharmacist involvement in the provision of point-of-care
screening services has been frequently reported in the literature. The
pharmacists perform cholesterol measurements (Blumi et al 2000;
Hourihan et al 2003; Tsuyuki et al 2002), blood pressure
measurements (Mangum et al 2003), blood glucose measurements
(Baran, Crumish, & Patterson 1999), HbA1c assessment (Odegard,
Goo, Hummel, Williams, & Gray 2005), waist circumference and body
mass index assessments (Lloyd et al 2007) as well as point-of-care
screening programmes that test for a combination of cardiovascular
risk factors in the patient (Garrett & Blumi 2005; Lloyd et al 2007; Nau
& Ponte 2002; Paulos et al 2005; Shuk Ching Lee, Cheung, & Chow
2004).

Not only has the ability of pharmacists to screen patients for
cardiovascular risk factors been explored, but so has the process of
referral of patients by a pharmacist to medical practitioners should a
patient be identified as high-risk. One such a study conducted by
Hourihan et al (2003) investigated the ability of pharmacists in rural
Australia to screen for the presence of cardiovascular risk factors in
patients and the ability of these pharmacists to refer. Hourihan et al
(2003) concluded that pharmacy point-of-care screening services have
improved the community's access to cardiovascular health promotion
services, since 28% of the patients participating in the study had not
been screened for cardiovascular disease prior to this specific study.
addition, 30% of the patients were referred to their medical practitioners and a further 50% were requested to return to the pharmacy within six weeks. Thus the positive role of the community pharmacist in the provision of point-of-care testing screening services was clearly identified.

A similar study screened patients for hypertension and subsequently referred the patients at high risk to their medical practitioners (Mangum et al 2003). The authors specifically focused on the ability of community pharmacists to provide blood pressure screening services to patients and to evaluate the result and refer if the pharmacist considered it necessary. Of the 351 patients screened for elevated blood pressure, 121 patients were referred to their practitioner. Of these patients, six were newly diagnosed with hypertension and a further 43 had a change in their prescribed treatment regimen (Mangum et al 2003). Therefore it was possible to conclude that pharmacists are able to screen patients for conditions such as hypertension and stroke and subsequently refer the patients to their medical practitioners if necessary. Another study, conducted by Lloyd et al (2007) provided blood pressure screenings along with several other cardiovascular risk factors for patients visiting the weight management clinic in the pharmacy. Of the 289 patients included in the study that presented with uncontrolled blood pressure at the initial interview, 60% had controlled blood pressure by the last visit.

Project ImPACT (Blumi et al 2000) and Project SCRIP (Tsuyuki et al 2002) investigated the effect of continued pharmacist involvement as a first step in the chronic disease management process and the subsequent impact on patient outcomes. In these studies the pharmacists conducted point-of-care screening services and the researchers used the values obtained from these initial screenings as baseline measurements, for comparison with tests results obtained during the last consultation with the study population. In the period between the initial and last assessment, community pharmacists were involved in providing several interventions. The differences obtained
can be used to determine the effectiveness of community pharmacists’ intervention on patient disease management.

Pharmacist involvement in the measurement of blood cholesterol is extensive. Blumi et al (2000) and Tsuyuki et al (2002) reported on studies in which pharmacists were involved in performing fasting fingerprick blood cholesterol point-of-care screening services. The equipment was able to screen for total cholesterol, HDL cholesterol and triglycerides. The LDL cholesterol levels were subsequently calculated. Repeat assessments were performed at regular intervals by the pharmacists (Blumi et al 2000) and at the conclusion of the studies (Blumi et al 2000; Tsuyuki et al 2002). The eventual results obtained from both these studies were significant and provided evidence that patient benefits can be achieved through pharmacist intervention. Project SCRIP was, in fact, terminated prematurely due to the additional benefit that was obtained in the intervention group compared to the control group. The primary study end point (defined as a definite improvement in the process of cholesterol risk management) was attained in 57% patients of the intervention group compared to 31% patients in the control group. The authors concluded that their studies provided conclusive evidence for the value of pharmaceutical services to patients at high risk of cardiovascular disease. SCRIP-plus, a study that investigated the long-term effect of pharmacist involvement on patients with hypercholesterolaemia was initiated after termination of the original SCRIP study (Johnson, Yamada, Robertson, Pearson, & Tsuyuki 2005). Patients that took part in the original SCRIP study were invited to participate in SCRIP-plus. The rationale behind the extended study is that hypercholesterolaemia is a condition that requires treatment over a prolonged time-period and short-term assessment might not have been able to sufficiently determine the effect of pharmacist intervention. Point-of-care testing services were provided during the initial consultation and performed again one year later. The authors concluded that no statistically significant differences were obtained in the lipid levels of the patients.
one year after the SCRIP study. The authors however indicated that continued pharmacist involvement can result in the patients maintaining adequate cholesterol levels. (Johnson et al 2005)

In Project ImPACT, statistically significant improvements were found in the lipid profiles of the study participants over the 24.6 months of the study. Favourable changes occurred in total cholesterol (12.8% decrease), triglycerides (10% decrease), LDL-cholesterol (22.1% decrease) and HDL-cholesterol (14.2% increase). High patient medication compliance levels were also attained with 90.1% of the study sample being compliant with their medication regimen. The authors attributed the beneficial results obtained from the study to the community pharmacist providing screening services and realised that once collaboration takes place with both medical practitioners and patients, beneficial results can be obtained. (Blumi et al 2000)

In South Africa, Schoeman (1993) conducted research on the availability of blood cholesterol measurements in South Africa. The study included 160 community pharmacists that provided blood cholesterol measurements. The author found that community pharmacists were readily involved in the provision of cholesterol point-of-care testing services and 88.1% of the pharmacists attended formal training courses. Cholesterol point-of-care testing services were provided in a private, enclosed consultation area in 73.8% of community pharmacies. The author concluded that the willingness of the pharmacists to utilise an area in the pharmacy for providing a low-income service is an indication of their commitment to health care. (Schoeman 1993)

Point-of-care testing of blood glucose has shown great benefit in preventing the long-term complications of diabetes mellitus (Kendall 2005). The results obtained from the testing can be used to determine medication effectiveness and subsequently provide a basis for the alteration of the medication dosages. Continued counselling of the patients by the community pharmacists, on self-monitoring of blood glucose is important (Anon 2002). Regular self monitoring of blood
glucose allows for a better prediction of blood glucose levels as well as better glycaemic control (Kendall 2005). Other benefits of self-monitoring of blood glucose include avoidance of hypoglycaemia, increased lifestyle flexibility and changes in self-care behaviour (Del Prato, Felton, Munro, Nesto, Zimmet, & Zinman 2005). It has been recommended that pharmacists utilise glucometers in their counselling with the patients and stress the importance of adhering to the treatment regimens, including medication and lifestyle modifications, regular monitoring for signs of diabetic complications and regular check-ups with pharmacists and medical practitioners (Terrie 2007).

The effectiveness of assessing HbA1c was already indicated in Section 2.3.4.1 and therefore increasingly community pharmacists are becoming more involved in measuring HbA1c. Furthermore, it is well established that HbA1c measurements assist in determining glycaemic control as well as the effectiveness of the prescribed treatment regimen (Hawkins et al 2002; Society for Endocrinology Metabolism and Diabetes of South Africa 2002)

HbA1c measurements were performed in a study conducted by Nau and Ponte (2002) and the results obtained were used to determine what the effect of intervention by the community pharmacist was on the outcome of glycaemic control in the study population (Nau & Ponte 2002). The resultant change in mean HbA1c (from 7.8% to 7.4%) was not statistically significant. However, the number of patients with a pre-intervention HbA1c value of more than 8% displayed a significant decrease of 1.2% after pharmacist intervention. Additional improvements were found in LDL-cholesterol, which decreased by 4.8% over the six-month study period. (Nau & Ponte 2002)

Baran et al (1999) assessed the effectiveness of a pharmacist-managed diabetes mellitus programme on aspects of diabetes management such as adherence to medication and achievement of therapeutic goals. The pharmacists frequently monitored blood glucose and HbA1c levels. Up to 60% of the study population achieved their treatment goals (Baran et al 1999).
A more extensive study conducted by Garrett and Blumi in 2005 investigated the effect of long-term community pharmacists services on several patient outcomes including glycaemic control, LDL levels, systolic blood pressure levels and frequency of patient eye and foot examinations. The pharmacist interventions consisted of a series of structured visits with the patients which focused on patient knowledge, skills and performance. The results obtained after the initial year of interventions were favourable: mean HbA1c decreased from 7.9% to 7.1%, LDL-cholesterol decreased significantly and the mean systolic blood pressure level decreased from 136.2 mmHg to 131.4 mmHg. Additional outcomes that were provided included an increase in the percentage of patients that underwent foot (from 38% to 80%) and eye (from 46% to 82%) examinations. Additional positive benefits demonstrated in the study outcomes were attributed to an improved relationship between the pharmacist and the medical practitioner. During the study, the pharmacist provided the medical practitioner with patient progress notes, and consulted with the medical practitioner on establishing treatment goals for the patients. (Garrett & Blumi 2005)

Community pharmacists are also involved in advising patients on weight loss. In a study by Lloyd et al (2007) a weight management service in a community pharmacy was implemented. During the initial consultation with the patient, risk factors were identified and several screening services including body mass index assessments, waist circumference measurements, HbA1c measurements, blood cholesterol measurements and blood pressure assessments were performed. Body mass was measured regularly over the study period and continued until the patient attained their goal weight and maintained that weight for at least three months. (Lloyd et al 2007) Some of the beneficial results that were obtained by the patients at the weight clinic included a mean nett weight loss of 3.6kg. Sixty percent of the patients who presented with uncontrolled hypertension at the initial interview had controlled blood pressure at the end of the 26 week study period. Lloyd et al (2007) concluded that the pharmacists were able to
determine pharmaceutical needs of patients and that the provision of a weight management service is an area of growth for pharmacy as a profession.

As was mentioned in Section 2.2.4.1, the concept of self-care is very prominent in the first two steps of the cardiovascular disease management process. An important aspect of self-care addressed by the community pharmacists participating in the studies discussed in this chapter has been the counselling and education provided to the patient to assist them in becoming more involved in their own disease management practices.

During the initial patient consultation, an integral component of all the studies, pharmacists were involved in the provision of health education. Education was either provided verbally to the patient or through the utilisation of flip-charts (Nau & Ponte 2002), pamphlets (Ali et al 2003) and brochures (Tsuyuki et al 2002). Counselling activities focused primarily on:

- Cardiovascular risk factors (Shuk Ching Lee et al 2004; Tsuyuki et al 2002)
- Cardiovascular disease conditions (Shuk Ching Lee et al 2004)
- Importance of medication compliance (if the patient is already on medication) (Baran et al 1999)
- Possible treatment options (Blumi et al 2000)

The benefit of intensive patient counselling by pharmacists on cardiovascular risk parameters to an intervention group was the objective of a randomized controlled trial conducted by Shuk Ching Lee et al (2004). The pharmacists counselled patients on various risk factors and treatment options available. The pharmacist also conducted point-of-care screening services including blood cholesterol, blood glucose and blood pressure measurements. Over the three month study period, the authors indicated that in both the intervention and
control group patients, significant reductions were found in total cholesterol, LDL-cholesterol and triglycerides. Up to 80.8% of the patients in the intervention group attained the recommended ATP III LDL-cholesterol goals compared to 58.3% in the control group.

An essential component in some of the studies was the *educational sessions*, which were provided to the participating pharmacists by the study coordinators. Nau and Ponte (2002) indicated that the provision of training sessions to participating pharmacists on diabetes disease management at the commencement of the study was beneficial in the achievement of positive outcomes for the study patients. Similar improvements in patient outcomes following adequate training of participating pharmacists in the area of patient-focused disease management was reported in Project ImPACT (Blumi *et al* 2000). The training provided was on patient-focused disease management services and was conducted over a two-day period. All pharmacists who had participated in Project ImPACT were invited to attend the course. Apart from providing similar training programmes to their participating pharmacists, the SCRIP study also provided a 24 hour-Helpline to assist the pharmacists with any queries regarding the study or specific patient management queries (Tsuyuki *et al* 2002). Training was also provided on how to use the different types of point-of-care testing equipment utilised in the study. The training not only focused on how to perform the screening, but also on infection control, hygiene and calibration of the machine. (Hourihan *et al* 2003)

Thus, from the literature, it is evident that pharmacists are actively involved in the identification of patients who are at risk of developing cardiovascular disease. Furthermore, pharmacists have shown competency in providing point-of-care screening services to patients and evidence of beneficial patient outcomes exists.

In South Africa, several recommendations have been made for pharmacists to become more involved in the provision of screening
services. The most prominent of these recommendations was published in the Good Pharmacy Practice guidelines. The guidelines provide recommendations on the following aspects related to point-of-care testing services:

- Minimum standards for pharmacy premises, facilities and equipment, including recommendations for a private or semi-private area in the pharmacy for the provision of information and advice as well as for a consultation area, in which screening and monitoring services can be provided. (Refer to Section Three of the Questionnaire in Appendix One for an indication of the recommendations listed in the guidelines)

- Minimum standards for screening and monitoring services in pharmacies. This section provides recommendations for point-of-care blood pressure, blood glucose and blood cholesterol screening and monitoring services in pharmacies. The guidelines provide recommendations on areas such as equipment used, procedure and interpretation of the results, documentation and record-keeping facilities. Additional recommendations exist for screening services including peak flow measurements and HIV-tests. (Osman 2005)

South African pharmacists are exposed at undergraduate level to the importance of health promotional activities and are educated on point-of-care testing services, counselling of patients with chronic diseases and the importance of collaborative relationships with both the patient and other health care professionals.

Little research has been done on the role of the community pharmacists in cardiovascular disease management in South Africa, however several sources have indicated the need for the pharmacy profession in South Africa to broaden its horizons and move towards pharmaceutical care (Gilbert 1997) and in doing so be able to provide benefit to both the profession and the public (Williams 2006).
3.3.2 Step 2: Assessment of cardiovascular risk

The next step in the cardiovascular disease management process is the assessment of the patient’s complete cardiovascular risk profile. This assessment takes place after the identification of patients “at risk” of cardiovascular disease and after conducting point-of-care screening services to determine the extent of the risk.

It has already been established in Section 2.4.1.2 that cardiovascular risk calculator tools are frequently utilised by health care professionals in the complete risk assessment process. The most frequently utilised tool is the Framingham Cardiovascular Risk Calculator Tool (Adult Treatment Panel III 2001). This tool was used as part of the pharmacist intervention process in two of the studies previously discussed (Shuk Ching Lee et al. 2004; Simpson, Johnson JA, Biggs, & Tsuyuki 2004). The tool was also utilised in a sub-study of SCRIP. The study aimed to investigate the effect of pharmacist involvement in patients with hypercholesterolaemia, complicated by the presence of an additional risk factor in diabetes mellitus (Simpson et al. 2004). The study compared the 10-year risk assessment between the usual care group (patients without diabetes mellitus) and the intervention group (patients with diabetes mellitus). The study found a mean 10-year risk estimate of 15.2% and 19.7% respectively.

Utilisation of the tool allowed pharmacists to counsel patients on their overall risk and was demonstrated to be an effective method for pharmacists to inform patients of the extent of their risk.

The SCRIP sub-study also required pharmacists to re-assess the complete patient cardiovascular risk profile by performing a repeat Framingham Risk assessment in order to determine the impact on the 10-year risk estimate of the patients with or without diabetes (four months of pharmaceutical interventions). Mean end point estimates of 18.4% and 14.5% for patients with or without diabetes, respectively, were achieved (Simpson et al. 2004). The significant differences that took place in the 10-year risk estimate pre-and post intervention demonstrated the beneficial patient outcomes obtained from
continuous pharmacist intervention, especially if it is considered that risk factors such as smoking, total and HDL cholesterol and systolic blood pressure measurements are the variables used in the tool to calculate the risk (Adult Treatment Panel III 2001).

Other risk assessment tools that have been utilised include the American Health Association Stroke Test that was implemented with patients following routine blood pressure measurement and an electrocardiograph. The information obtained from the screening services and the counselling was used in assessing patients risk of suffering a stroke (Mangum et al 2003).

Not all of the studies used a specific cardiovascular risk calculator tool. Lloyd et al (2007) reported that pharmacists performed a complete risk assessment in patients after various screening services were conducted on the patients that visited the pharmacy weight management clinic (Lloyd et al 2007). The patients risk was established through assessment of the information obtained from the initial interview, which included complete medical and family history and the results obtained from the point-of-care testing services (Lloyd et al 2007). After evaluation of all of these aspects, the community pharmacist then determined the patient’s risk of developing cardiovascular disease.

Cardiovascular risk calculators are being recommended for use in the South African context. One such a tool was recommended by Blom and Firth (2006), which was derived from the Framingham Risk Assessment. The authors indicated that the risk estimate obtained should be utilised in determining the patient treatment plan that should be implemented.

3.3.3 Step 3: Develop a treatment plan

After the assessment of the patient’s cardiovascular risk profile, an individual treatment plan needs to be implemented, that will specifically
cater for the needs of the patient. This treatment plan should include pharmacological and non-pharmacological components (Blom & Firth 2006; New Zealand Guidelines Group 2003). Pharmacists, as medication specialists, are involved in this step as was clearly evident from studies such as Project ImPACT (Blumi et al 2000) and SCRIP (Tsuyuki et al 2002). It is important that effective communication channels exist with both the patient and the medical practitioner to allow for the attainment of beneficial patient outcomes. Building these collaborative relationships among the health professionals also allows for the patient to receive care on multiple levels (Babb & Babb 2003).

The first step after the assessment of cardiovascular risk is to refer the patient, whom is regarded as being at risk of developing cardiovascular disease to their medical practitioner. Pharmacists that participated in the SCRIP study, referred patients to their medical practitioner, through written referral forms, that were faxed to the practitioner and included the results obtained from the point-of-care screening service as well as recommendations or suggestions regarding possible treatment (Tsuyuki et al 2002).

Pharmacists were also found to refer patients verbally. The pharmacist contacted the medical practitioner via telephone and provided the medical practitioner with information on the study as well as the specific patient results obtained (Ali et al 2003; Mangum et al 2003). This was followed up with a specific referral form that detailed the screening services provided and also contained information on the cardiovascular risk factors identified as well as additional suggestions for treatment (Mangum et al 2003).

Pharmacist referral did lead to changes in the medication prescribed. Magnum et al (2003) indicated that pharmacist referral led to the diagnosis of hypertension and the subsequent initiation of antihypertensive treatment in 6% of the participants, following referral, changes in the prescribed medication of a further 36% of participating patients were made. In Project ImPACT, the pharmacists contacted the medical practitioner to provide treatment suggestions and also obtain
mutual agreement with the practitioner regarding patient progress monitoring. The pharmacists communicated with the medical practitioner and recommended that either certain treatments were instituted or specific guidelines followed. The specific types of interventions that were recommended consisted of the optimisation of drug therapy, side effects experienced and possible drug interactions and contraindications. The authors indicated that the pharmacist interventions resulted in medication changes in 76.6% of the patients. This emphasises the importance of adequate referral processes to ensure that patients do visit their medical practitioner and that the suggestions by the pharmacist can assist in patient management. (Blumi et al 2000)

Not all of the studies reported overwhelmingly beneficial results. During the SCRIP study, community pharmacist interventions in recommending initiation of cholesterol medication or alterations in current prescribed dosages resulted in few changes. The reason for this, according to the authors, could be attributed to the short duration of the study, which took place over a 4-month period (Tsuyuki et al 2002). SCRIP-plus, a study that investigated the effect of extended pharmacist involvement on patients with hypercholesterolaemia, reported that pharmacists frequently recommended changes in the patients’ pharmacotherapeutic regimen. A total number of 168 changes were made by the medical practitioners and consisted of interventions such as addition of new agents, change in drug dosage as well as withdrawal of therapy (Johnson et al 2005).

Lloyd et al (2007) reported that following assessment of the patient cardiovascular risk profile, patients visiting a weight management clinic in a community pharmacy were included in the development of a treatment plan with the pharmacist. The treatment plan was individualised and generally consisted of a 6-month period in which the pharmacist would recommend that the patient institute lifestyle changes. After the 6-month period, the pharmacist would then refer the
patient to their medical practitioner, if needed. If referral was necessary, the pharmacist would then assist the doctor in developing a patient treatment plan. (Lloyd et al 2007)

The use of a Decision Aid document in managing the patients with chronic disease was reported by Lalonde, O’Connor, Duguay, Brassard, Drake & Grover in 2006. This is a document that utilises a four-step approach to patient disease management (Lalonde, O’Connor, Drake, Duguay, Lowensteyn, & Grover 2004). Using this document as a guideline, during a consultation session with the patient, the pharmacist counselled on various lifestyle modifications and pharmacological treatment options available. Step three of the Decision Aid document, in particular, allowed for the patient in collaboration with the pharmacist to develop a treatment plan that could be implemented over a three month period. The responses achieved by the patients, when the pharmacist utilised the document during the consultation session, were satisfactory, with the majority of the patients indicating that the document provided them with sufficient information on the disease and how to manage the disease effectively (Lalonde, O’Connor, Duguay, Brassard, Drake, & Grover 2006).

Pharmacists were also involved in providing continuous lifestyle modification counselling to the patients and were involved in implementing several non-pharmacological interventions. Section 3.3.1.2 already indicated the type of counselling that was provided to the patient. During the follow-up meetings with the patients, continuous counselling on non-pharmacological risk factors was also provided as indicated by a variety of studies (Blumi et al 2000; Lloyd et al 2007; Tsuyuki et al 2002)

After a treatment plan has been designed and instituted, treatment goals should be determined that will assist both the health professional and the patient.
3.3.4 Step 4: Set individualised treatment goals

Community pharmacists involvement in the establishment of patient-specific treatment goals was shown by studies, such as Project ImPACT (Blumi et al 2000), a weight management clinic (Lloyd et al 2007) and an assessment of a Decision Aid document to assist with patient disease management (Lalonde et al 2006).

In Project ImPACT, pharmacists were involved in pre-determining specific patient treatment goals and counselled patients on what to expect from their prescription therapy as well as lifestyle changes and how they may affect the treatment process and the attainment of treatment goals. Pharmacists were also in constant communication with the patients’ practitioners and provided regular progress notes to the practitioners that detailed each aspect of the pharmacist intervention and how the patient was progressing towards their specified treatment goals. (Blumi et al 2000)

As described by Lloyd et al (2007), individual weight loss and dietary goals were determined for the patients visiting a pharmacy weight management clinic. Patients visiting the clinic aimed for a weight loss of 0.45-0.9 kg/week which pharmacists indicated was possible through combinations of recommendations such as a calorie-restricted diet of between 500-1000 kcal/day and frequent physical activity. The pharmacist also established a specific target weight that needed to be attained by the patient. (Lloyd et al 2007)

Another study also investigated the role of the community pharmacists in helping patients to achieve their goal weight. Lenz (2005) suggested that an initial weight loss goal should be set at about 10% over a 6-month period. If additional weight loss is needed, new therapeutic goals can be determined and weight management programmes can be developed which include a multifactorial approach including dietary intervention, exercise programmes, behaviour therapy and pharmacotherapy if needed, (Lenz 2005)
Treatment goals can be derived from disease management guidelines. Several guidelines are available in South Africa, which assist health professionals in determining which treatments to include and are available for conditions such as hypertension (Ncayiyana 2006), hypercholesterolaemia and diabetes mellitus (Society for Endocrinology Metabolism and Diabetes of South Africa 2002).

3.3.5 Step 5: Follow-up and disease monitoring

The last step in the disease management process involves patient follow-up processes. Pharmacists were frequently involved in follow-up meetings with patients in many of the research studies reported upon. Several of the studies indicated that the pharmacist made frequent follow-up appointments after the initial consultation with the study participants, at 2-weekly intervals (Lloyd et al 2007; Tsuyuki et al 2002), monthly intervals (Blumi et al 2000) and 3-monthly intervals (Ali et al 2003).

During these follow-up appointments, the community pharmacists were involved in providing the following services:

- Perform point-of-care reassessments frequently during the study duration (Blumi et al 2000; Johnson et al 2005; Lloyd et al 2007)
- Continuous disease management counselling (Johnson et al 2005).

In the majority of studies, final point-of-care testing services were also provided during the last scheduled consultation with the patients. The findings of several of these studies were already discussed in Section 3.3.1.2 and the results indicated that pharmacist’s involvement in follow-up and continuous disease management could have a beneficial impact on patient outcomes.
In summary, it is evident from the variety of studies discussed that the community pharmacist is able to provide pharmaceutical care services aimed at improving patient outcomes. Community pharmacists are able to play a critical role in each step of the disease management process and are therefore a critical component of any chronic disease management program.

The role, which community pharmacists in South Africa play with regard to cardiovascular disease management, has not been given much attention, since little evidence in the published literature was found that detailed the involvement of the community pharmacists in any of the five steps discussed above.

With all the evidence that community pharmacies are involved in the five steps of cardiovascular disease management and with the similarities that can be drawn between the services provided by community pharmacies internationally and in South Africa, opportunities exist for a definite role for South African community pharmacists in cardiovascular disease management practices.
CHAPTER FOUR
RESEARCH METHODOLOGY

4.1. INTRODUCTION

The chapter on the methodology of the study will be discussed in seven sections:

- The study design
- The study site
- The study population
- The submission of the research proposal
- Ethical considerations
- The data collection process
- Data collation and analyses

4.2. STUDY DESIGN

A non-experimental, descriptive study using a cross sectional survey was conducted. All community pharmacies within the Nelson Mandela Metropole that provided point-of-care testing services, were identified in a previous study (Venter 2005) and invited to participate in the study. The survey involved an interview with each of the willing participating pharmacists during which a three-part questionnaire was administered by the researcher. Both Section One and Section Three of the questionnaire were completed by the researcher. Section Two of the questionnaire was to be completed by the participating pharmacist. The completed questionnaires were then collected a week later.

The study was non-experimental in that there was no manipulation or intervention with the participants taking part in the research description (Patten 2007). The study was descriptive in that it required the community pharmacists to indicate the different activities they perform
during cardiovascular disease screening as well as voice their opinions regarding cardiovascular disease management (Smith 2002). The participating community pharmacists are representative of a larger group of community pharmacists, thus the research population was a cross-sectional sample representative of community pharmacists in South Africa. (Mouton 2001). The study required that the pharmacists provide retrospective data regarding the provision of cardiovascular-related services within the pharmacy.

4.3. STUDY SITE

The study site included all pharmacies, in the Nelson Mandela Metropole (Port Elizabeth, Uitenhage, Despatch), currently registered with the South African Pharmacy Council as community pharmacies and providing cardiovascular screening services. These pharmacies were identified during a previous study conducted in 2005 (Venter 2005).

4.3.1. Exclusion criteria

Pharmacies located on the same premises as medical practitioners were excluded from the study, since the pharmacists at these medical practices provide limited cardiovascular-related services since these functions are primarily performed by either the medical practitioner or the resident nursing sisters. These included private sector hospital pharmacies, pharmacies run by dispensing doctors and the Pharmacross dispensaries.

4.4. STUDY POPULATION

The study population included the community pharmacists employed in the community pharmacies within the Nelson Mandela Metropole (Port Elizabeth, Despatch and Uitenhage).
4.5. SUBMISSION OF RESEARCH PROPOSAL

The research proposal was developed and submitted to the Advanced Degrees Committee at the Nelson Mandela Metropolitan University for approval.

4.6. ETHICAL CONSIDERATIONS

The research proposal was submitted to the Research Ethics Committee (Human) of the Nelson Mandela Metropolitan University for ethical approval. The proposal was accepted on the 26th of August 2007 with approval number H06Hp-031/Approval.

The research required the participating pharmacist to provide information on the provision of cardiovascular-related services in their pharmacies and their own involvement therein. Since this information was sensitive in terms of business practice, each pharmacist was asked for consent to participate and informed consent forms were signed prior to the survey. The pharmacist was given the opportunity to decline participation in the study and therefore his/her willingness to participate was voluntary. The three sections of the questionnaires did not request any personal identifying information. Each questionnaire was coded with a unique number, which could not be connected with the relevant participating community pharmacist. Section Two, collected one week later, was provided with a number that linked it to Sections One and Three.

4.7. DATA COLLECTION

The process of data collection will be discussed under the following headings:-

- Development of the survey questionnaire
  - Section One (researcher-led interview with pharmacist)
  - Section Two (completed by pharmacist)
  - Section Three (researcher-led facility inspection)
• Testing of the survey questionnaire using a pilot study
• Approach followed for data collection from each community pharmacist.
• Time period for data collection
• Data collation and analysis

The process of data collection is illustrated in Figure 4.1

Fig 4.1 The steps that were followed in the process of data collection
4.7.1 Development of a data collection tool
The study design used a survey technique to collect data from the community pharmacies. Thus in order to obtain the relevant information from each pharmacy in a structured and standardised manner, a data collection tool in the form of a questionnaire was developed by the researcher. The questionnaire was divided into three sections which are described below. A copy of the questionnaire is provided in Appendix One.

4.7.1.1. Survey Questionnaire - Section One
Section One of the questionnaire was completed by the researcher during a personal interview with a community pharmacist from the participating community pharmacy. In this section the pharmacy particulars, information on the provision of cardiovascular screening services, cardiovascular disease monitoring and management within the pharmacy were obtained. Details of the type of information requested are described below.

• Pharmacy particulars (Questions 1.1 – 1.6)
General information on the community pharmacy was first obtained from questions 1.1 to 1.6.
Question 1.1 enabled the researcher to differentiate between the cardiovascular services provided by the different types of community pharmacies: independent and corporate-owned community pharmacies.

Question 1.2 provided information on the staffing of the pharmacy. The staff was classified as either dispensary personnel or non-dispensary personnel. Dispensary personnel included pharmacists (permanent and part-time), pharmacist assistants, pharmacist interns and pharmacy students. The non-dispensary personnel include front shop assistants, beauticians, clinic sisters, drivers and administration personnel. The staffing demographics would enable the researcher to relate the number and type of staff to the extent of cardiovascular
services offered and whether the cardiovascular screening services provided by pharmacies with one pharmacist were different to those pharmacies with multiple pharmacists or pharmacies with a clinic sister. The answers could be utilised to determine the role additional staff play in cardiovascular disease management.

Questions 1.3 and 1.4 dealt with the operating hours of the pharmacy and the availability of cardiovascular services during the hours of opening. Question 1.5 asked whether the pharmacy had a health clinic available to perform the point-of-care screening. Question 1.6 provided options for clinic size: smaller than 10 m², equal to 10 m² and larger than 10 m².

• Cardiovascular screening services (Questions 1.7 – 1.30)

Questions 1.7 to 1.30 of Section One dealt with the cardiovascular screening services. Question 1.7 sought information regarding the type of cardiovascular screening services provided within the pharmacies, while questions 1.8 and 1.9 determined the fee, if any.

Pharmacies usually advertise the screening services they provide. Question 1.10 was aimed at identifying how the pharmacies advertise their screening services. Options included visual advertising (television, posters and pamphlets), audio advertising (radio advertisement) and point of sale advertising. Determining the degree to which pharmacies advertise the screening services is useful in terms of determining the extent to which pharmacists actively promote public awareness of the expanding role of the pharmacist.

The staff responsible for the provision of screening services was then identified by Question 1.11. The response could be utilised to assess the type of service provided by the pharmacist alone compared to pharmacies with clinic sisters providing the screening or even utilising a combination of both pharmacist and nursing sister.

Questions 1.12 to 1.16 referred to the screening equipment utilised by the community pharmacy. Questions 1.13 and 1.14 were aimed at determining how the pharmacies calibrated the screening equipment
and how frequently these calibrations were done. Calibration is essential to ensure the validity of the screening result.

Apart from the general screening equipment available, some pharmacies might also have a Reflotron® lipogram machine available in their pharmacy. The machine not only tests for total cholesterol level, but also tests LDL, HDL and triglycerides. These additional services could be helpful in providing a more intensive and higher quality cardiovascular disease management service as it will provide the pharmacist with an opportunity to obtain a broader view of the patient’s cardiovascular health, as well as to assist the pharmacist in the completion of cardiovascular risk calculators.

A greater variety of additional screening services, such as the testing of hepatic enzymes, uric acid and haemoglobin levels can be provided by the machine and will provide the community pharmacy with the opportunity to improve their disease management practices beyond just cardiovascular disease.

Questions 1.17 to 1.29 dealt with the administrational aspects of the cardiovascular disease point-of-care screening service provision in the pharmacy clinic and the type of record-keeping documentation utilised in the pharmacy. The questions determined if standard operating procedures and informed consent forms were used to assist in the screening process. The type of record-keeping documents utilised were also assessed. This included determining if a standardised document, displaying all necessary pharmacy and patient details, when providing the patient with a copy of their screening results or referring the patient to their medical practitioner, was used.

A Likert Scale approach was used in question 1.28 to assist the researcher in determining how frequently certain aspects of the screening process such as explanation of screening test procedures, additional counselling on lifestyle modifications were performed by the pharmacist. A value of 1 was used to indicate that the action was never performed whilst a value of 5 indicated that it was always performed.
Question 1.29 dealt with the presence of health education posters in the clinic as well as easily accessible guides to what constitutes normal screening results. The presence of such posters may enable better counselling.

- **Cardiovascular disease monitoring and management**  
  *(Questions 1.30 – 1.31)*

Cardiovascular disease management includes all the activities performed following the diagnosis of cardiovascular disease in the patient. Activities integral to disease management practices such as continuous monitoring of disease parameters, lifestyle counselling and drug therapy management were addressed by Question 1.30. Question 1.31 dealt specifically with repeat prescriptions and utilised a Likert Scale to assess how strict the participating pharmacists were on requesting 6-monthly prescriptions.

4.7.1.2 **Survey questionnaire - Section Two:**

This section focused on the views and perceptions of the participating community pharmacist towards cardiovascular disease management. This section was completed by pharmacists in the participating community pharmacies after the initial interview and was collected one week later.

- **Participant demographics (Questions 2.1-2.3)**

  General information on the participating pharmacists was collected by questions 2.1-2.3. The participants were classified according to their level of experience and gender. Analysis of their respective responses to the questions of Section Two was performed to determine any differences or similarities between the groups.

- **General views on patient care (Question 2.4- 2.8)**

  The view of the participating pharmacist on patient care was determined by questions 2.4 – 2.8. The level of satisfaction of the
participating community pharmacists was determined by question 2.4. Responses to this question could be used as a basis for investigating if there was correlation between the level of occupational satisfaction and extent of cardiovascular disease management practices. The participation and view of the participating pharmacist on health promotion and continuing professional development evenings was assessed by questions 2.5, 2.7 and 2.8. Question 2.6 utilised a Likert Scale to assess how frequently the pharmacists provided a variety of services such as recommend a screening service, counselling on lifestyle modifications or referring a patient.

- **Barriers to the provision of disease management services (Question 2.9)**

  A Likert Scale method was the basis, in question 2.9, for determining to what extent certain barriers influence the ability of the pharmacist to provide cardiovascular disease screening services. The least influential barrier was denoted with a 1, whereas the most influential barrier was denoted with a 5.

- **Cardiovascular risk assessment practices (Questions 2.10 – 2.19)**

  The following set of questions focused on how the participating pharmacist assessed a patient’s cardiovascular risk. The questions focused on the utilisation of risk assessment questionnaires (Questions 2.12 and 2.13) and risk assessment calculators (Questions 2.14 to 2.16).

  Questions 2.11 assessed which risk factors the participating pharmacist would look for when identifying a patient at risk of cardiovascular disease. Comments can be made on what risk factors were most frequently mentioned by the community pharmacist as well as determine which risk factors were overseen or rarely mentioned. Questions 2.17 and 2.18 were open-ended questions, which allowed for the participating pharmacist to enter their different cardiovascular
screening and assessment practices following the provision of a screening service. Question 2.17 referred to the screening test results that were not indicative of cardiovascular disease, whereas in Question 2.18, the results were abnormal and the pharmacists needed to explain how this result would be handled. Question 2.18 is divided into three sections: elevated blood glucose, elevated blood pressure and elevated blood cholesterol. The responses obtained would assist in identifying similarities or differences in the services provided or counselling provided by the pharmacists.

4.7.1.3 Survey Questionnaire - Section Three
Section Three was developed from the checklist of requirements that have been developed by the South African Pharmacy Council and published in the Good Pharmacy Practice guidelines regarding the clinic waiting area, clinic location and size as well as other clinic-related particulars (Osman 2005). Section Three was completed by the researcher after permission to enter and inspect the clinic site was obtained from the pharmacy manager. The inspection took place after completion of Section One of the survey questionnaire. The percentage of community pharmacies that adhere to each guideline recommended by the Good Pharmacy Practice was determined.

4.7.2 Testing of the data collection tool
A pilot study of the questionnaire was conducted in four community pharmacies in Grahamstown. These sites closely resembled the proposed study population since they included three independently owned pharmacies as well as one corporate pharmacy – all four pharmacies conducted cardiovascular screening services.

A short interview was held with the pharmacist during which an overview of the study was provided and Section One of the survey questionnaire was completed. The pharmacist was then requested to complete Section Two. Whilst completing the questionnaire, the pharmacist was asked to voice any uncertainties regarding the
questions and to provide comments which would assist in providing clearer and more focused questions. All these comments were discussed with the pharmacist and also documented. After completion of both questionnaires, a request was made to inspect the clinic facility in the pharmacy in order for the researcher to complete Section Three of the questionnaire.

At the end of the interview and on completion of the questionnaire, the community pharmacist was requested to respond to the following three questions:
1. Was the questionnaire easy to understand and complete?
2. Was the time required for completion of the questionnaire reasonable?
3. Did the pharmacist feel that the questions were relevant to the study and were any areas of cardiovascular disease monitoring not covered in the questionnaire?

Feedback from pharmacists:
During the completion of the questionnaire, certain ambiguous questions and printing mistakes were discovered.

General comments:
- One pharmacist complained that she got confused during completion of the questionnaire whether she should fill in with an X or a tick. The questionnaire was therefore standardised with the use of a tick throughout.

Section One:
- **Question 1.19 (Are any records of the screening service kept?)**
  One pharmacist said that they would document the results on patient’s clinic card. Question 1.20, in which the pharmacist was asked to indicate the type of records kept from a list, was added to the questionnaire.
Question 1.22 (Do you provide patients with the results in a written format?)
If the answer was yes, question 1.23 only asked if a standard document was used. Two of the pharmacists commented that they provide the screening results on a piece of paper with the pharmacy stamp on top. Question 1.24 was included to request pharmacists to indicate the format of documentation utilised to provide results to the patient.

Question 1.30 Are you involved in monitoring patient outcomes in patients on cardiovascular-related medication?
The original wording of this question created confusion. The participating community pharmacists commented that they could not understand the question and were unsure of how to complete the question. The question was rephrased in order to remove any ambiguous interpretations and examples of monitoring outcomes were provided.
Modified version:
(Ongoing management of the cardiovascular patient includes monitoring patient outcomes. Which of these patient outcomes do you monitor?)

Section Two:
Question 2.10 (A variety of barriers exist that may prevent the implementation of prevention strategies in the community pharmacy. Please indicate the extent to which these barriers influence your provision of health promotion strategies by ticking the appropriate box.)
Three of the pharmacists were unsure of how the question should be answered. The question was rephrased to facilitate easier understanding.
Modified version:
Question 2.9: A variety of barriers exist that may prevent the implementation of prevention strategies in the community pharmacy. Please indicate the impact of these barriers on your provision of health promotion strategies by ticking the appropriate box.

Piloting the questionnaire at community pharmacies in Grahamstown was beneficial in several ways since:

- It provided the researcher with a chance to conduct an interview with the community pharmacist in a community pharmacy setting.
- It provided an opportunity to ensure that the wording of the questionnaire was easy to understand and that no questions were ambiguous and unclear.
- Interruptions were frequent in three of the participating community pharmacists - only one interview took place in an office. The time for the interview and completion of the questionnaire was 20 minutes.

4.7.3 Data collection process

The process of data collection took place as shown in Figure 4.1:

- The community pharmacies were approached and provided with an introductory letter from the researcher. The letter contained a short overview of the research as well as information on what was expected from the pharmacist.
- If the pharmacist verbally consented to participate in the study, an appointment was made for the researcher to administer the questionnaire. The pharmacist was requested to contact the researcher with any queries or uncertainties regarding the study.
- The appointment consisted of an interview conducted by the researcher with the participating pharmacist. The interview started with a short overview of the changing role of the community pharmacist as well as the different type of screening
services that can be provided in a community pharmacy. This was followed by the completion of Section One of the questionnaire. The researcher would ask the questions, explain any uncertainties and record the answer.

- Once the first section was completed, the pharmacist was asked to complete the Section Two of the questionnaire at their own convenience. If more than one pharmacist was employed at the pharmacy, additional Section Two questionnaires were provided to additional pharmacists who consented to participate in the research. The pharmacists were informed that a follow-up telephone call would be made within one week to confirm that they had completed Section Two and to arrange for a collection time.
- After the interview, permission was obtained from the pharmacist to complete Section Three of the questionnaire, which involved the researcher evaluating the pharmacy clinic against a standardised check-list.
- The pharmacist was then thanked for their participation in the study and was encouraged to contact the researcher with any further queries or recommendations.

4.7.4 Time frame utilised for data collection
A period of 6 months was planned for the data collection period.

4.8 DATA COLLATION AND ANALYSIS

The data was entered into a Microsoft® Excel spreadsheet. Descriptive statistical analysis was used, using graphical representation where relevant. Most of the data was expressed numerically as a percentage of the total population involved. Additional statistical techniques such as log odds ratio tests were performed using a Statistica® software package. The response obtained from the pharmacists for the open-
ended questions were grouped into distinct themes for ease of discussion.
CHAPTER FIVE
RESULTS AND DISCUSSIONS

5.1 INTRODUCTION

This chapter presents and evaluates the results obtained from the analysis of the responses by the community pharmacists to the questions in the data collection tool, which was distributed to community pharmacies in the Nelson Mandela Metropole. This chapter will be presented as follows:

- Demographics of the participating community pharmacies and community pharmacists completing the questionnaires.
- General views and opinions of the participating community pharmacists with respect to cardiovascular disease management.
- A discussion on pharmacist involvement in the five steps of chronic disease management.

As the responses of the pharmacists are discussed, each section will be accompanied with the corresponding question number as found in the questionnaire. A copy of the questionnaire is provided in Appendix One.

As mentioned in Chapter Two, Section 2.2.4.1 the Kaiser Permanente Pyramid Model (United Kingdom Department of Health 2004a) can assist in developing programmes aimed at managing people with chronic conditions. A five-step approach to managing patients with cardiovascular risk was also adapted from the New Zealand’s Cardiovascular Guidelines Group (New Zealand Guidelines Group 2003). Figure 5.1 illustrates how these five steps to effective cardiovascular disease management can be linked with the three levels
of chronic patient care as described by the Kaiser Permanente Pyramid Model.

Figure 5.1: Comparison of the Kaiser Permanente Pyramid Model and the five-step approach to cardiovascular disease management.

As evident from Figure 5.1, Step One and Two can be linked with Level One of the Pyramid, Step Three with Level Two of the Pyramid and the remaining Steps Four and Five correspond with Level Three of the Pyramid. The results and discussion relating to pharmacist involvement in the five steps of chronic disease management will follow as outlined in Figure 5.1.
5.2 STUDY POPULATION

5.2.1 Questionnaire response rates
As discussed in Section 4.7.1, the data collection tool consisted of a questionnaire. Section One of the questionnaire was completed by the researcher during the interview. Section Two was completed by participating pharmacists and collected one week later. After completion of Section One, permission was sought to enter the pharmacy clinic and to complete Section Three of the questionnaire. Data collection took place over a seven month period, from October 2006 to April 2007.

Venter (2005) identified 61 pharmacies in the Nelson Mandela Metropole. Of these pharmacies, 14 pharmacies were excluded according to the exclusion criteria identified in Section 4.3.1. The remaining total of 47 community pharmacies were included in the study conducted during 2005 and it was established that cardiovascular point-of-care testing services were provided (Venter 2005). The current study included 43 of those community pharmacies. The remaining four pharmacies could not be reached to participate in the current study. Four additional newly opened corporately-owned pharmacies were invited to participate. The pharmacies were approached by the researcher and 41 agreed to participate in the study, thus achieving a response rate of 87.2% for Section One of the questionnaire. Six pharmacies did not participate in the study for the following reasons:

- Two community pharmacies had closed down.
- Two community pharmacies no longer provided cardiovascular point-of-care screening services.
- One community pharmacy had moved premises to a medical centre and was therefore excluded according to the exclusion criteria identified in Section 4.3.
- One community pharmacist did not want to participate in the study.
Section Two of the questionnaire was provided to 57 community pharmacists employed at the participating 41 community pharmacies. Of the 57 questionnaires distributed, 47 were completed, resulting in a response rate of 82.5%. The remaining 10 community pharmacists did not manage to complete the questionnaire within the time period designated for collection of questionnaires of one week after the initial interview. Repeated visits were made to the pharmacists, but the researcher failed to obtain the questionnaires over the 7 month study time frame.

Section Three of the questionnaire was completed by the researcher for 34 of the 41 participating community pharmacies, which resulted in a response rate of 82.9%. Only 37 of the 41 community pharmacies that participated had a clinic facility. The researcher was denied permission to enter the clinic facility in three of the 37 community pharmacies.

5.2.2 Demographic information of the participating community pharmacies

A total of 41 out of the possible 47 community pharmacies participated in the survey and completed Section One of the questionnaire.

5.2.2.1 Ownership of the community pharmacies

The pharmacist was asked in Question 1.1 to indicate whether the pharmacy was independently or corporately owned.

Figure 5.2 indicates that 85.4% (35, n=41) of the community pharmacies were independently owned by pharmacists.

The other six pharmacies were owned by corporate companies. Recent legislative changes in South Africa, regarding the ownership of community pharmacies (Sections 6 and 7 of the Ownership Regulations in the Pharmacy Act No.53 of 1974 (Osman 2005)) has resulted in an increase in the number of corporately-owned community pharmacies over the past two years.
This change in community pharmacy ownership was also commented on by Hill & Dowse (2007) who reported that independent ownership dominated the community pharmacy landscape of South Africa, but that corporate chain pharmacies are rapidly increasing in number.

5.2.2.2 Staffing in the community pharmacies

The participants were asked in Question 1.2 to indicate the composition of the staff complement employed in the pharmacy. The staff in the pharmacies, for the purpose of this study was classified into two groups: dispensary staff and non-dispensary staff. Dispensary staff included pharmacists, pharmacist assistants, pharmacist interns and pharmacy students. Non-dispensary staff included front shop assistants, beauticians, clinic sister and other administrative personnel. The focus of this study will predominantly be on the dispensary staff, since they are involved in the provision of the point-of-care screening services and provision of services related to chronic disease management.

The clinic sister, classified as non-dispensary staff, can play an essential role in the provision of point-of-care screening services and will subsequently be included in the following discussions.
Dispensary Staff

- Pharmacists employed at the community pharmacies

As illustrated in Figure 5.3, most of the pharmacies, 41.5% (17, n=41) had two permanent pharmacists available. Single-owner pharmacies made up 39% (16, n=41) of the study population. Only 19% (8, n=41) of the pharmacies were staffed by three or more pharmacists. Two of these indicated that they employed 5 pharmacists.

The extent to which the number of pharmacists relates to the provision of point-of-care screening services will be discussed in Section 5.4.2.4.

\[
\begin{array}{|c|c|}
\hline
\text{Number of pharmacists} & \text{\% of pharmacies} \\
\hline
1 & 39 \\
2 & 41.5 \\
3 & 12.2 \\
4 & 2.4 \\
5 & 4.9 \\
\hline
\end{array}
\]

**Figure 5.3 The number of pharmacists employed per pharmacy (n=41)**

Up to 43.9% (18, n=41) of the community pharmacies indicated in Question 1.2 that they utilise the services of locum pharmacists. The role of the locum pharmacist was described by several participating pharmacists as primarily focused on the dispensing process, and not involved in the provision of cardiovascular screening services.

- Other dispensary staff

Support dispensary staff included pharmacists’ assistants, pharmacist interns and pharmacy students. The degree to which these staff were
involved in the provision of screening services and the resultant effect on the services provided by the pharmacist will be assessed and discussed in Section 5.4.2.4. The support provided by the additional staff members can either be assistance in the conduction of point-of-care screenings services or assistance during the dispensing process, allowing for the pharmacist to devote more time to counselling and screening services.

As seen in Figure 5.4, 58.5% (24, n=41) of the pharmacies employed pharmacist assistants.
This was followed by 46.3% (19, n=41) of the participating pharmacies that employed pharmacy students. Pharmacies were able to employ pharmacy students due to the presence of a Pharmacy Department at the Nelson Mandela Metropolitan University located in Port Elizabeth. Only 29.3% (12, n=41) of the community pharmacies employed a pharmacist intern.
Non-dispensary staff

The community pharmacies also employed several non-dispensary personnel, such as front shop assistants, beauticians, drivers and clinic sisters. Front shop assistants were the most prevalent staff member in the community pharmacies ranging from 1 assistant to 10 assistants per pharmacy. Clinic sisters were employed in 48.8% (20, n=41) of the pharmacies. A discussion on how the number of clinic sisters available in the pharmacy influenced the participation of the other staff members in providing cardiovascular point-of-care screening services will be provided in Section 5.4.2.4.

5.2.3 Demographic information of the community pharmacists

Section Two of the questionnaire was completed by 47 of the 57 pharmacists working in the 41 participating community pharmacies.

5.2.3.1 Gender distribution of the community pharmacists

The majority of pharmacists completing Section Two of the questionnaire were male, specifically 61.7% (29, n=47).

5.2.3.2 Age distribution of the community pharmacists

The age distribution of the pharmacists completing Section Two of the questionnaire is illustrated by Figure 5.5.

Figure 5.5 Age distribution of the participating pharmacists (n=47)
The majority of the respondents (74.5%; 35, n=47) were below 50 years of age. The work experience was classified into five groups as illustrated in Figure 5.6.

![Bar chart](chart.png)

**Figure 5.6 Level of experience according to gender (n=47)**

A total of 59.6% (28, n=47) of the respondents had less than fifteen years working experience. The pharmaceutical care concept only arose in the late 1980’s and the early 1990’s, so pharmacists with less than fifteen years experience, were more likely to have been exposed to training in point-of-care screening services at an undergraduate level. The remaining 19 respondents with more than fifteen years experience were probably not trained as undergraduate pharmacy students for the expanded clinical role of the community pharmacist, and their practice could reflect this.

All the respondents with over twenty years of experience were male. The opposite was true for the gender distribution of the younger pharmacists with less than twenty years of experience in which the majority of the respondents (18) were female. The increasing number of female pharmacists has also been noted in the United States of
America, where projections indicated that by 2020, up to 62% of the pharmacy workforce in the USA will be female (Knapp & Cultice 2007).

5.3 GENERAL VIEWS AND OPINIONS OF THE COMMUNITY PHARMACISTS ON CARDIOVASCULAR DISEASE MANAGEMENT SERVICES

5.3.1 Level of satisfaction experienced by the community pharmacists

The respondents were asked in Question 2.4 of the questionnaire to indicate the extent of their satisfaction with their current employment. With all the uncertainties and ambiguities in the South Africa pharmacy profession at the moment, pharmacists may feel discouraged and dissatisfied with their current employment. This negativity could influence the extent to which they are involved in health related activities.

As shown in Figure 5.7, the majority of respondents 67.4% (31, n=46) indicated that they were “very satisfied”, “fairly satisfied” or “satisfied” with their current employment. However 32.2% (15, n=46) of the

* Only 46 community pharmacists responded to this question
community pharmacists indicated a degree of dissatisfaction. In this study, one pharmacist, in particular was discouraged and dissatisfied with her current employment. The pharmacist explained that patients were only interested in a “quick fix” for their conditions and were not at all interested in preventative health care services. She indicated that she felt despondent and this resulted in her merely providing a screening service, rarely with additional counselling.

It has been suggested that community pharmacists could become more satisfied with their employment if they had closer contact with patients, for example, through the provision of point-of-care screening services (Edmunds & Calnan 2001).

5.3.2 Views of the community pharmacists on health promotion strategies.

The extent to which the provision of health promotion activities plays a role in the everyday life of the community pharmacist and the extent to which they themselves participate in providing these activities was investigated in Questions 2.5 and 2.7 of the questionnaire. The responses to these questions are reflected in Figure 5.8.

The majority of community pharmacists (89.3%; 42, n=47) indicated that health promotional services were perceived to be an “essential component” of their everyday activities, thus suggesting that community pharmacists are aware of the importance of promoting health and providing disease prevention programmes. O’Loughlin et al (1999), assessed the interest of community pharmacists in health promotion activities and found that up to 60.6% of the community pharmacists reported the integration of health promotion activities in their daily practice (O’Loughlin, Masson, Dery, & Fagnan 1999).

A total of 42.5% (20, n=47) of the pharmacists indicated that they either “always” or “frequently” participate in health promotion activities. However, the majority of the community pharmacists (57.5%; 27, n=47) indicated that they are “seldom” or “never” involved in participating in
health promotion activities and one respondent indicated no interest in participating in health promotion activities.

![Perceived importance of health promotion activities](image1)

**Figure 5.8 (a) Importance of health promotion activities (n=47)**

![Frequency of involvement in health promotion activities](image2)

**Figure 5.8 (b) Participation in health promotion activities (n=47)**

**Figure 5.8 Views of community pharmacists on health promotion activities (n=47)**

This is concerning, since it indicates that even though the pharmacists identified the importance of health promotion activities, less than half are actively involved in providing them. If these activities are provided by pharmacists in the cardiovascular disease management process,
improved patient outcomes could be achieved. In fact, as evident from Figure 2.1, health promotion activities is the foundation on which all three levels of the Kaiser Permanente Pyramid Model are based. The pharmacists did identify several barriers that could prevent them from participating in health promotion activities and these will be discussed in Section 5.3.4.

During the interview process with the pharmacists, respondents indicated that they participate in the provision of free blood cholesterol and blood sugar measurements as part of health promotion events, usually sponsored by the pharmaceutical industry. The pharmacists themselves were involved in the provision of the screening services. Additional activities that were also mentioned included community pharmacists becoming involved in health promotion activities during the annual Pharmacy Week in September.

5.3.3 Participation in Continuing Professional Development (CPD) events

Continuing Professional Development (CPD) events are an opportunity for community pharmacists to expand their knowledge and gain exposure to innovations and improvements in various areas of healthcare such as preventative healthcare and cardiovascular disease management. The respondents were asked in Question 2.8 of the questionnaire to indicate their participation in cardiovascular-related CPD events.

All pharmacists indicated attendance at CPD events as illustrated in Figure 5.9. The majority, 63.8% (30, n=47) “frequently” or “always” attended CPD events.

Kairuz (2000) surveyed 281 South African community pharmacists and discovered that the 70.1% of the 281 participants were interested in participating in voluntary, structured continuing education programmes. The researcher further commented that it is essential for continuing professional development activities to take place since they promote the professionalism of the pharmacy profession (Kairuz 2000).
5.3.4 Barriers to the implementation of preventative and screening services

Question 2.9 of the questionnaire asked the pharmacists to indicate the extent to which the barriers identified prevented or influenced their ability to provide preventative services and point-of-care screening services in their pharmacies. The responses to this question are illustrated in Figure 5.10.

The majority of pharmacists, 51.3% (25, n=47) felt that insufficient personnel “sometimes” influenced the pharmacist’s ability to provide the screening services. A further 23.4% (11, n=47) indicated that a lack of personnel “frequently” prevented adequate screening services from taking place. Thus a major factor identified by most pharmacists was lack of staff.

Several factors were identified during analysis of the results which supported this comment.
Not all the community pharmacists completed this question. No response bar will indicate the number involved.

A log odds ratio test (Statistica®) revealed that there was a significant difference \((p-value = 0.03355)\) in the number of clinics in the community pharmacies with single owners compared to pharmacies
with more than one pharmacist employed. In the single owner pharmacies, only 75% (12, n=16) indicated that they have a clinic facility available. This was significantly less when compared to the 100% clinic availability in pharmacies employing more than one pharmacist. The lack of support personnel means that the bulk of the pharmacist’s time is taken up by the dispensing process. However with the increased utilisation of additional staff such as pharmacist assistants and interns, there are more opportunities for pharmacist involvement in patient counselling.

In another study, the pharmacists involved suggested that the combined effects of a shortage of support staff and the low numbers of pharmacists working each shift, made it more difficult for the pharmacists to perform their expected activities as well as be involved in performing the activities related to the study (Simpson, Tsuyuki, Johnson, Biggs, Biggs, Semchuk, Taylor, & Farris 2001). The activities required to be performed by the pharmacists included point-of-care screening tests, as well as the provision of additional counselling on risk factor reduction and medication compliance to the study participants (Simpson et al 2001).

A lack of sufficient reimbursement was also identified as a major barrier to service provision. A number of participants, indicated that the lack of sufficient reimbursement “always” (23.4%; 11, n=47) and “frequently” (19.1%; 9, n=47) influenced their ability and motivation to provide point-of-care screening services and counselling. As will be discussed in Section 5.4.2.3, pharmacists do charge for the provision of screening services, but do not charge a consultation fee for additional professional advice and counselling provided to the patient.

A lack of sufficient time to provide the services was another barrier identified. Several pharmacists, 44.7% (21, n=47) mentioned that a lack of time “sometimes” prevented the provision of effective screening services and a further 21.3% (10, n=47) of the pharmacists indicated that they were “frequently” prevented by lack of time. Of the
pharmacists that identified that a lack of personnel influenced their provision of health promotion activities, 57.5% (27, n=47) also identified a lack of time as a barrier. From this result, there appears to be a link between a lack of personnel and a lack of time. The combined presence of these two barriers may negatively influence provision of health promotion activities by pharmacists.

Pharmacists also identified that inadequate skills or knowledge on cardiovascular disease and health promotional activities “always” (2.1%; 1, n=47), “frequently” (25.5%; 12, n=47) or “sometimes” (34.0%; 16, n=47) influences their ability to provide health promotion activities. The large number of pharmacists that identified this barrier indicates that there might be a need for greater participation by pharmacists in CPD events or increased utilisation of CPD events to provide the pharmacist with the necessary skills and knowledge.

The three barriers that were least commonly identified were a lack of interest in conducting point-of-care screening services, lack of equipment and the comment regarding preventative activities not being part of a pharmacist’s role.

The majority of the community pharmacists, 66.0% (31, n=47) indicated that a lack of interest “never” influenced the provision of health promotion activities. This indicates that many pharmacists are already becoming more interested in expanding the services that they provide to patients. This is supported by the number of pharmacists, 61.7% (29, n=47) that did not agree with the comment that health promotion activities are not the role of the pharmacist.

Similar results were obtained by O’Loughlin et al (1999) in their assessment of barriers that prevented community pharmacists from being involved in health promotion activities. The most prominent barriers experienced by the community pharmacists in that study were lack of time, lack of instrumentation and a lack of personnel. Similarly,
pharmacists did not agree that prevention was not the pharmacist's role and that prevention does not interest pharmacists. (O'Loughlin et al 1999)

5.4 RISK IDENTIFICATION AND CONDUCTION OF POINT-OF-CARE SCREENING SERVICES

As discussed in Chapter Two and Chapter Three, the first step in the provision of cardiovascular disease management is the identification of risk factors present in the patient that can contribute to the development of cardiovascular disease. Once these risk factors have been identified, they can be quantified by the conduction of point-of-care screening services. The prominent role played by the community pharmacist in this step has already been identified in Section 3.3.1. The extent to which the community pharmacies in the Nelson Mandela Metropole were involved in this specific area will be discussed in this section.

5.4.1 Identification of cardiovascular disease risk factors by the community pharmacists

The risk factors that contribute to the development of cardiovascular disease have been discussed in Section 2.3.4. The pharmacists were asked in Question 2.11 to name the risk factors that they would look out for when a patient enters their community pharmacy, the presence of which would suggest the possibility of cardiovascular disease risk. This assists in determining which signs and symptoms for the development of cardiovascular disease, the pharmacists considered important. Responses of the pharmacists are indicated in Figure 5.11.

The most frequently identified cardiovascular disease risk factor was obesity. A total of 76.6% (36, n=47) of the community pharmacists indicated that it is one of the risk factors they would notice immediately. This is understandable, since it is a risk factor that is physically visible and is known to have various implications for patient health, such as
raised triglyceride levels and insulin resistance, which could contribute to the development of type 2 diabetes mellitus (New Zealand Guidelines Group 2003).

Figure 5.11 Cardiovascular risk factors identified by community pharmacists (n=47)
Other frequently identified risk factors included respiration complaints (42.6%; 20, n=47), smoking (27.7%; 13, n=47), chest pain (23.4%; 11, n=47) and water retention (21.3%; 10, n=47).

Some important risk factors were largely ignored. One of the more important risk factors ignored was abdominal obesity. Only 4.2% (2, n=47) of the pharmacists reported that they would include an assessment of waist circumference of the patient as part of their risk identification practice.

This is in stark contrast to recommendations by Raja et al (2004), who cited that abdominal obesity measurement should be part of every screening programme because there is much evidence to link cardiovascular disease and abdominal obesity. Furthermore, the New Zealand Cardiovascular Guidelines Group (2003) identified that measurement of abdominal obesity provided the health professional with a better method of predicting cardiovascular disease than the BMI measurement. Of the non-modifiable risk factors, age was identified as a risk factor by 14.9% (7, n=47) of the community pharmacists. The other risk factors, such as gender (2.1%; 1, n=47) and family history (4.3%; 2, n=47) were largely ignored. This is surprising since the link that exists between these risk factors and cardiovascular disease has been well established and advocated by various health care professionals and publications as discussed in Section 2.3.4.2.

When asked in Question 2.6 how frequently they would approach a patient to initiate a health care conversation about health care, 42.6% (20, n=47) of the pharmacists indicated that they would “sometimes” do it. Slightly fewer pharmacists, 38.3% (18, n=47) indicated that they “frequently” initiated discussions while only 10.6% (5, n=47) indicated that they “always” initiated talks about health care. From these results, it is clear that the majority of pharmacists (91.5%; 43, n=47) are becoming more involved in initiating health education conversations with patients.
5.4.2 Conduction of point-of-care cardiovascular risk screening services

5.4.2.1 Clinic facility available in pharmacy

The presence of a designated area in a community pharmacy can be of great assistance in the provision of point-of-care screening services. Such an area can be regarded as a clinic facility, the presence of which was determined by Question 1.5 of the questionnaire. An investigation into the presence of these facilities found that 90.2% (37, n=41) of the participating community pharmacies had a clinic facility in the pharmacy. This is more than reported by a previous study conducted by Schoeman in 1993. In this study, the author reported that cholesterol point-of-care screening services were provided in a private and enclosed consultation area in 73.8% (118, n=160) of the South African pharmacies investigated. The increased prevalence of clinic facilities in pharmacies supports the increasing trend of providing pharmaceutical care by the pharmacists.

As already mentioned in Section 5.3.4, 75% (12, n=16) of the single-owner pharmacies, had a clinic facility available compared to 100% in pharmacies where more than one pharmacist was employed (n=25). This reinforces the observation that the provision of point-of-care screening services can take time and that it can be influenced by the number of pharmacists available.

5.4.2.2 Particulars of the clinic facility

In order to ensure that these point-of-care screening service facilities are of a high quality, the South African Pharmacy Council, in 2004, published the Good Pharmacy Practice Guidelines. The specific recommendations related to the health clinic facilities are found in Section 1.2.13 of the Good Pharmacy Practice Guidelines published in the Pharmacy Act No 53 of 1974 (Osman 2005).

In order to complete Section Three of the questionnaire, permission was sought from the pharmacists to enter and inspect the clinic facility within their pharmacy. The facilities present in the clinic were assessed
in terms of the criterion identified in the Good Pharmacy Practice Guidelines. Tables 5.1 and 5.2 list the requirements and the number of clinic facilities that adhered to the guideline.

**Waiting area**

As indicated in Table 5.1, only 32.4% (11, n=34) of the pharmacies had a waiting area available for the patients to be seated and relaxed prior to the carrying out of the screening services. Comfortable seating was only available in 23.5% (8, n=34) of the pharmacies and only 11.8% (4, n=34) had health-related literature available. This is unfortunate since comfortable seating and the presence of health-related information would encourage patients to read the material while they are waiting for their consultation, which could initiate interest and improve patient knowledge. Additionally, a professional, neat and well-placed waiting area supports the professional image of the consultation and service to be provided by the pharmacy.

<table>
<thead>
<tr>
<th>Table 5.1 Inspection of clinic waiting area (n=34)*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommendation</strong></td>
</tr>
<tr>
<td>Waiting area available</td>
</tr>
<tr>
<td>Waiting area under cover</td>
</tr>
<tr>
<td>Comfortable seating available</td>
</tr>
<tr>
<td>Health-related literature available</td>
</tr>
<tr>
<td>Sign indicating waiting area</td>
</tr>
<tr>
<td>Situated close to dispensary</td>
</tr>
<tr>
<td>Professional appearance</td>
</tr>
<tr>
<td>Area clean and tidy</td>
</tr>
</tbody>
</table>

*Of the 37 health clinic facilities available in the community pharmacies, only 34 pharmacies gave permission to inspect the premises.

**Clinic facility**

Table 5.2 includes the recommendations provided by the Good Pharmacy Practice Guidelines of South Africa with regards to the clinic facility.
<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Number of pharmacies (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td></td>
</tr>
<tr>
<td>Situated close to dispensary</td>
<td>30 (88.2)</td>
</tr>
<tr>
<td>Sign indicating that it is the clinic</td>
<td>12 (35.3)</td>
</tr>
<tr>
<td>Professional appearance</td>
<td>32 (94.1)</td>
</tr>
<tr>
<td>Clean and tidy</td>
<td>32 (94.1)</td>
</tr>
<tr>
<td>Sufficient space ( at least 15 m²)</td>
<td>13 (38.2)</td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td></td>
</tr>
<tr>
<td>Examination couch</td>
<td>28 (82.4)</td>
</tr>
<tr>
<td>Spare sheets</td>
<td>23 (67.6)</td>
</tr>
<tr>
<td>Trolley or cabinet</td>
<td>34 (100)</td>
</tr>
<tr>
<td>Wash-basin</td>
<td>18 (52.9)</td>
</tr>
<tr>
<td>Wash-basin with cold and hot water facility</td>
<td>14 (41.1)</td>
</tr>
<tr>
<td>Closable rubbish bin with lid and disposable plastic liners</td>
<td>34 (100)</td>
</tr>
<tr>
<td>Biohazardous materials bin and sharp containers</td>
<td>33 (97.1)</td>
</tr>
<tr>
<td>Refrigerator or cooler</td>
<td>8 (23.5)</td>
</tr>
<tr>
<td>Disinfectants</td>
<td>33 (97.1)</td>
</tr>
<tr>
<td>Sphygmanometer</td>
<td>30 (88.2)</td>
</tr>
<tr>
<td>Stethoscope</td>
<td>30 (88.2)</td>
</tr>
<tr>
<td>Glucometer</td>
<td>34 (100)</td>
</tr>
<tr>
<td>Disposable rubber gloves</td>
<td>28 (82.4)</td>
</tr>
<tr>
<td>Tissues</td>
<td>31 (91.2)</td>
</tr>
<tr>
<td>Towels/paper towels</td>
<td>26 (76.5)</td>
</tr>
<tr>
<td>Scale</td>
<td>25 (73.5)</td>
</tr>
<tr>
<td>Height chart</td>
<td>23 (67.6)</td>
</tr>
<tr>
<td>Tape measure</td>
<td>29 (85.3)</td>
</tr>
<tr>
<td>Posters on health education/normal screening values**</td>
<td>23 (67.6)</td>
</tr>
</tbody>
</table>

*Of the 37 health clinic facilities available in the community pharmacies, only 34 pharmacies gave permission to inspect the premises.

**Value obtained from response to Question 1.29.

Adherence by the community pharmacies to the recommendations for the health clinic facility was generally high.
With respect to the provision of cardiovascular screening services, 88.2% (30, n=34) of the clinic facilities had a sphygmomanometer present. The remaining four pharmacies utilised digital blood pressure machines only.

In order to perform a body mass index calculation, a scale and height chart is necessary. Only 73.5% (25, n=34) of the clinic facilities had a scale available and even fewer pharmacies, 67.6% (23, n=34) had a height chart available. From these results it is clear that body mass index may not regularly be performed in these facilities. The majority of the clinics, 85.3% (29, n=34) had a tape measure available. This enabled the pharmacies to perform waist circumference measurements in the clinics. This is important, since the measurement of waist circumference has already been established as being of greater value in assessing cardiovascular risk than body mass index measurements. However, abdominal obesity was largely ignored by community pharmacists in the identification of risk factors as indicated in Section 5.4.1. It was therefore unclear whether pharmacists are measuring waist circumference, although the equipment was available to perform the measurements.

Overall, the majority of the recommendations were adhered to in the community pharmacies, except for aspects such as the lack of sufficient waiting areas, refrigerators, wash-basins and signage.

Very few clinics, 23.5% (8, n=34) had a refrigerator available in the clinic. A wash-basin with hot and cold water was only found in 52.9% (18, n=34) of the clinic facilities. However, even though a fridge and wash basin facility was not present in the clinic, it is likely that it was located in a different area of the pharmacy. Signage was also only present in 35.3% (12, n=34) of the community pharmacies.

The availability of the clinic facility in relation to the opening hours of the pharmacy was also determined. Both Questions 1.3 and 1.4 of the questionnaire asked the pharmacist to provide the pharmacy business
hours and whether point-of-care testing services were provided in those times. Of the community pharmacies, 78.1% (32, n=41) indicated that the services were provided during opening hours. Six of the community pharmacies indicated that they only provide these services when the clinic sister was available. The four community pharmacies that did not have a clinic facility present in the pharmacy indicated that they provided the services during opening hours. Three community pharmacies indicated that the screening services were only provided if there was time to perform the screening and during regular office hours when all the permanent pharmacists were present. Through the provision of point-of-care testing services, pharmacists are able to provide cardiovascular disease management services of a higher quality.

5.4.2.3 Point-of-care cardiovascular risk screening services provided

The nature and extent of the cardiovascular-related point-of-care screening services provided by the community pharmacies is illustrated by Figure 5.12.

When asked in Question 1.7, all of the community pharmacies (n=41) indicated that they provided blood glucose and blood pressure point-of-care screening services. In contrast only 87.8% (36, n=41) of the community pharmacists provided blood cholesterol screening services. Various reasons for this can be proposed. Measurement of blood cholesterol takes significantly longer than other point-of-care screening tests and it has already been established that time is a significant barrier to the provision of point-of-care screening services.

The majority of screening equipment used measured the total cholesterol levels and therefore most pharmacists would refer the patient to their general practitioner for a full lipogram. In 7.3% (3, n=41) of the participating pharmacies, a lipogram service was provided. Conducting a full lipogram can provide a better quality cardiovascular disease management practice, since it will allow for the measurement
of the total cholesterol levels and the HDL, LDL and triglycerides. This provides the pharmacist with a better indication of the patient’s cardiovascular disease risk, which in turn can influence the treatment plan decided upon.

A study conducted during 1999 in South African community pharmacies in Pretoria, Klerksdorp and Potchefstroom aimed to investigate the availability of point-of-care screening services in 172 community pharmacies. The study concluded that only 57% (98 pharmacies) of the community pharmacies regularly provided point-of-care screening services of which the most prevalent was blood pressure measurement. (Flobbe et al. 1999)

The results of the current study, if compared to the study by Flobbe et al. (1999) clearly indicates that community pharmacists are becoming more involved in providing point-of-care screening services.

Question 1.12 of the questionnaire asked the participating pharmacists to indicate the point-of-care screening equipment utilised by the pharmacy. There is a wide variety of point-of-care screening equipment
and this variety is reflected in the range of equipment utilised by the community pharmacists.

Up to eight different glucometers were used to measure blood glucose levels. The most commonly encountered glucometers being the Accutrend GC® and Accuchek®. The Accutrend GC® was used in all of the 36 pharmacies that provided blood cholesterol point-of-care screening services. Three pharmacies indicated that apart from utilising an Accutrend GC® glucometer to assess the total cholesterol level they also have a Reflotron® instrument available to assist in determining the patient’s full lipid profile.

The reason for the majority of pharmacies utilising the Accutrend GC® is the ability of the instrument to screen for both blood glucose and blood cholesterol level and therefore requires the purchase and maintenance of only one instrument.

The majority of the community pharmacies, 73.2% (30, n=41) utilised a sphygmomanometer to conduct blood pressure measurements. The mercury-type sphygmomanometer was the most common, being used in 90% (27, n=30) of the community pharmacies. The remainder of the community pharmacies used the aneroid version. A number of pharmacies, 41.5% (17, n=41) also used a digital blood pressure machine. The combination of both a digital and mercury sphygmomanometer was used in 19.5% (8, n=41) of the pharmacies.

Calibration of equipment is essential for ensuring the validity of the results and the extent to which the community pharmacists calibrated the screening equipment in their pharmacy was assessed by Questions 1.13 and 1.14 of the questionnaire. The majority of community pharmacies calibrated the point-of-care screening equipment. Blood glucose machines were calibrated in 75.6% (31, n=41) of the community pharmacies. Fewer pharmacies calibrated blood cholesterol equipment, 68.3% (28, n=41) and blood pressure equipment 58.5% (24, n=41). Table 5.3 summarises the frequency of calibrations.
It is clear from Table 5.3 that calibration of the screening equipment usually took place every three to six months for blood glucose, blood cholesterol and blood pressure equipment.

| Table 5.3 Calibration frequency of point-of-care screening equipment |
|---------------------------------|----------------|----------------|----------------|
| **Frequency**                   | **Number of responses (%)** | **Blood glucose (n=31)** | **Blood cholesterol (n=28)** | **Blood pressure (n=24)** |
|--------------------------------|----------------|----------------|----------------|
| Weekly                         | Weekly         | Weekly         | Weekly         |
| 1 (3.2%)                       | 1 (3.6%)       | 0              |
| Monthly                        | Monthly        | Monthly        | Monthly        |
| 5 (16.1%)                      | 6 (21.4%)      | 3 (12.5%)      |
| 3-6 monthly                    | 3-6 monthly    | 3-6 monthly    | 3-6 monthly    |
| 17 (54.8%)                     | 13 (46.4%)     | 12 (50%)       |
| Yearly                         | Yearly         | Yearly         | Yearly         |
| 8 (25.8%)                      | 8 (28.6%)      | 9 (37.5%)      |

It is important to note that several of the community pharmacies may have regarded the coding of the glucometers and blood cholesterol meters that is required with each new container of measurement strips, as calibration. This would have influenced the number of actual calibrations performed by the community pharmacists. It is essential that pharmacists are aware of the differences between the calibration of equipment as well as the re-coding of screening equipment and this aspect should be considered as an area of future education for the pharmacist.

As was previously suggested, a lack of reimbursement was identified as a barrier to provision of services. Studies have tried to determine to what extent the pharmacists can charge for these services as well as how much the patient is willing to pay. One study determined the willingness of South African patients to pay for cognitive pharmaceutical services provided by community pharmacists (Hill & Dowse 2007), whereas another assessed the willingness of patients to pay for asthma-related services by community pharmacists (Munyikwa, Burton, & Gold 2007). In the current study, the community pharmacists...
were asked in Question 1.8 and 1.9 to indicate the fees the pharmacy charge for providing point-of-care screening services. Responses are illustrated in Figure 5.13.

Blood pressure measurements were provided at the lowest fee of all the point-of-care testing services provided by the pharmacies, with 27% (11, n=41) of the pharmacies reporting that they provided the service free of charge. The majority of the pharmacies, 44% (18, n=41) indicated that they charged between R1-R9. Some pharmacists indicated that although they charged for providing blood pressure services they do not charge regular customers or customers that requested a blood pressure measurement when they obtained their repeat medication. A reason that can be provided for the lower cost of providing blood pressure is the lower cost involved in the provision of the service due to the lack of consumable costs such as measurement strips or lancets. Except for the initial purchase of the blood pressure
machine and frequent calibration, few other additional costs to the pharmacy are involved.

In comparison, blood cholesterol and blood glucose screening equipment requires consumables such as measurement strips, lancets and frequent calibration to ensure valid results. These additional costs are reflected in the fee charged by the pharmacies for providing the service. None of the community pharmacies indicated that they provided blood glucose or blood cholesterol point-of-care screening services free of charge. As illustrated in Figure 5.13, blood cholesterol measurements were provided at a higher price than blood glucose. Only 36 of the community pharmacies provided blood cholesterol screening services. Of these pharmacies, the majority, 53% (19, n=36) charged between R30 and R39 for providing the service. A further 29% (14, n=36) of the pharmacies charged between R20 and R29 for providing the service. Blood glucose measurements however were less expensive since the majority of pharmacies, 54% (22, n=41) charged between R10 and R19 for providing blood glucose assessment. The remaining pharmacies, 46% (19, n=41) charged between R20 and R29 for their service.

Currently, the South African Pharmacy Council is in the process of establishing guidelines that can be utilised by community pharmacists in the establishment of fees for the provision of pharmaceutical services including point-of-care screening services.

5.4.2.4 Staff involved in the provision of point-of-care screening services

In Question 1.11 of the questionnaire, pharmacists were asked to indicate the pharmacy staff involved in providing the point-of-care screening services. The relationship between the number of pharmacy staff able to provide point-of-care screening services and the extent of the provision of these services was of particular interest.
As indicated in Figure 5.14, 85.4% (35, n=41) of the pharmacies indicated that the pharmacist was involved in the provision of these point-of-care screening services. The remaining 14.6% of pharmacies (6, n=41) employed a clinic sister who was responsible for the provision of these screening services. By providing these screening services, the pharmacists are able to develop a relationship with the patient. This service also supports and encourages professional relationships with other health care professionals. One community pharmacist indicated that the pharmacy has a mutual agreement with a medical practitioner and would refer the patients that the community pharmacy screened to the medical practitioner. The practitioner in turn will recommend that the patient visits the pharmacy frequently for frequent disease monitoring.

The extent to which the pharmacist and the other health care professionals were involved in the provision of point-of-care screening services is illustrated in Figure 5.15.
As indicated in Figure 5.15, the pharmacists were the only provider of point-of-care screening services in 36.7% (15, n=41) of the community pharmacies. Of these 15 community pharmacies, 8 were single-owner pharmacies. The pharmacists were also assisted by other health care professionals in the conduction of the screening services. The pharmacist and assistants (including pharmacist assistants, pharmacist interns and pharmacy students) provided a combined service in 14.6% (6, n=41) of the pharmacies and the same percentage of pharmacies indicated that all the dispensary staff with the assistance of the clinic sister provided the screening services.

Clinic sisters were employed in 48.7% (20, n=41) of the community pharmacies. The clinic sister was the only staff member providing the services in 14.6% (6, n=41) of the pharmacies.

The majority of the pharmacies, 70.8% (29, n=41) reported that a combination of the pharmacist and the clinic sister provided the services.

The smaller number of pharmacies that used the pharmacist intern and/or pharmacy students in the provision of screening services was of
concern, since the undergraduate training of the interns and students includes point-of-care screening services.

The services provided also depended on the number of pharmacists available. Out of the five pharmacies that did not provide blood cholesterol measurement services, four were single-owner pharmacies. This suggests that provision of these services requires time from the pharmacists. As was discussed in Section 5.3.4, respondents identified that a lack of personnel in the pharmacy was a barrier to the effective provision of health promotion activities. Therefore the presence of more staff in the pharmacy could allow for greater available time for provision of point-of-care screening services.

Pharmacists were asked in Question 1.28 of the questionnaire to indicate the frequency with which they provide the various aspects related to point-of-care screening services provision. The responses of the pharmacists are indicated in Figure 5.16.

Pharmacists’ involvement in the provision of screening services was mixed. Relatively few pharmacists, “always” (14.6%; 6, n=41) recommended screening tests. More pharmacists indicated that they “frequently” (43.9%; 18, n=41) recommended that patients undergo a point-of-care screening service.

Several factors could be influencing the results obtained from the screening service, such as for example the time of the last meal when taking a blood glucose or blood cholesterol measurement. For blood pressure measurements, it is important to determine if the patient is not taking any over-the-counter medications or has not had caffeine or nicotine in the 30 minutes prior to carrying out of the screening service. The participating pharmacists “frequently” assessed for the presence of these influential risk factors. The majority of participating community pharmacists, 80.5% (33, n=41) “always” asked about the time of the last meal when measuring blood glucose and blood cholesterol. Fewer pharmacists assessed influential factors prior to the measurement of blood pressure, with 34.1% (14, n=41) representing the pharmacists
that “always” assessed for the presence of other influential factors that could have interfered with the screening result.

In terms of counselling provided during the screening service, the majority of community pharmacists “always” (31.7%; 13, n=41) or “frequently” (39.0%; 16, n=41) provided pre-test counselling to the patients. The types of pre-test counselling provided included for example: the different types of cardiovascular disease risk factors, the screening services provided and the relevance of the results obtained. Following the provision of the point-of-care screening services, post-test counselling was also readily provided by the participating pharmacists.
community pharmacists, 53.7% (22, n=41) “always” performed post-test counselling and a further 26.8% (11, n=41) “frequently” provided counselling.

In order for the point-of-care screening services to contribute to the promotion of health in the patient, it is essential that the provision of services should be advertised to the public. The type of advertising techniques utilised by the community pharmacists was investigated in Question 1.10 of the questionnaire and the responses by the pharmacists are illustrated in Figure 5.17.

![Figure 5.17 Advertising techniques of the community pharmacies (n=41)](image)

Point-of-sale advertising, reported by 95% (39, n=41) of the pharmacies, was the most commonly identified means of advertisement. Pamphlets were also frequently utilised, as indicated by 62% (25, n=41) of the pharmacies investigated. Advertisements were also published to a lesser extent in newspapers as well as advertising slots on radio and television. Television advertisements were only placed by the corporately-owned community pharmacies.
5.4.2.5 Administration of the clinic facility

Providing an effective point-of-care screening service requires the community pharmacist to utilise various documentation methods.

**Standard operating procedures**
The extent to which the community pharmacies utilise standard operating procedures (SOP’s) as guidelines for the provision of cardiovascular point-of-care screening services was asked in Question 1.17 of the questionnaire. Less than half of the community pharmacies, 39% (16, n=41) had developed standard operating procedures for blood glucose and blood pressure screening services. Standard operating procedures for blood cholesterol measurements were available in 36.5% (15, n=41) of the community pharmacies. Standard operating procedures can assist the pharmacy in providing screening services that are consistently of good quality and can improve the type of service provided.

**Utilisation of informed consent forms**
Few pharmacists, 14.6% (6, n=41) indicated that they utilise informed consent forms prior to the carrying out of cardiovascular risk screening procedures.

**Recording of patient details and screening services conducted**
It is essential that the results obtained from the provision of the screening services be recorded. The records assist the health care professional in obtaining information on the patient’s cardiovascular risk status over a specific time period, which can be valuable when making decisions regarding treatment. There are various means of keeping records of the screening services and the community pharmacists were asked in Questions 1.19 to 1.27 of the questionnaire to indicate the extent to which they used the different methods of documentation.

Of the 41 community pharmacies investigated, the majority (75.6%; 31, n=41) reported that they kept records of the screening services.
Records were kept in the form of a daily clinic log book that detailed the date, name of patient and procedure performed for the patient. A number of pharmacies, 77.4% (24, n=31) indicated that they entered the screening results in the daily clinic log. Screening results and additional relevant information was also entered onto individual patient record cards. The majority of the community pharmacies (80.6%; 25, n=31) indicated that they kept individual patient cards in the clinic facility. A number of pharmacies, 51.6% (16, n=31) kept both a daily clinic log and individual patient clinic cards. Nearly half of the pharmacies, 48.4% (15, n=31) indicated that they provided the patient with their own cards, to be kept with the patient. The pharmacy then entered the details of the procedures performed on the card.

The type of information recorded by the community pharmacies is listed in Table 5.4. The table also provides an indication of the number of pharmacies that reported recording the information in the daily clinic log or individual patient cards.

As indicated by Table 5.4 the most frequently recorded information was the results obtained from the point-of-care screening services. Other information included the date of consultation and need for further referral in 93.5% (29, n=31) and 83.9% (26, n=31) of the pharmacies respectively. Information on some of the cardiovascular disease risk factors was also kept in the record facilities. Age and gender were recorded by 87.1% (27, n=31) and 83.9% (26, n=31) of the community pharmacies respectively. Family history, however was recorded the least - only 58.1% (17, n=31) documented details of family history. The smoking history of the patient was recorded by just over half of the pharmacies of the community pharmacies. The link that exists between a family history of cardiovascular disease, smoking and cardiovascular disease has been established in Section
2.3.4.2 - yet just under half of the pharmacies did not record the presence of these risk factors.

<table>
<thead>
<tr>
<th>Information recorded</th>
<th>Number of pharmacies (n=31*) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>27 (87.1)</td>
</tr>
<tr>
<td>Contact details</td>
<td>27 (87.1)</td>
</tr>
<tr>
<td>Age</td>
<td>27 (87.1)</td>
</tr>
<tr>
<td>Gender</td>
<td>26 (83.9)</td>
</tr>
<tr>
<td>Weight</td>
<td>11 (35.5)</td>
</tr>
<tr>
<td>Height</td>
<td>10 (32.3)</td>
</tr>
<tr>
<td>Smoking history</td>
<td>17 (54.8)</td>
</tr>
<tr>
<td>Alcohol usage</td>
<td>13 (41.9)</td>
</tr>
<tr>
<td>Family history</td>
<td>18 (58.1)</td>
</tr>
<tr>
<td>Acute medications</td>
<td>25 (80.6)</td>
</tr>
<tr>
<td>Chronic medications</td>
<td>26 (83.9)</td>
</tr>
<tr>
<td>Screening results</td>
<td>31 (100)</td>
</tr>
<tr>
<td>Date of consultation</td>
<td>29 (93.5)</td>
</tr>
<tr>
<td>Need for further referral</td>
<td>26 (83.9)</td>
</tr>
<tr>
<td>Follow-up appointments</td>
<td>20 (64.5)</td>
</tr>
</tbody>
</table>

*Only 31 of the 41 community pharmacies kept records of the point-of-care screening services provided.

The information that was recorded the least often was weight (35.5%; 11, n=31) and height (32.3%, 9, n=31). In Section 5.4.1, the importance of abdominal obesity measurements in the assessment of cardiovascular risk, was recognised by only two community pharmacists. If this response is viewed alongside the failure of the community pharmacists to recognise the importance of waist circumference measurements and the low number of pharmacy clinics with a weight scales and height chart, an assumption can be made on the lack of the provision of additional screening services such as body mass index and waist circumference measurements. These services
are easy to provide and are not costly or invasive compared to other point-of-care screening services such as blood glucose and blood cholesterol measurements.

The method utilised to provide the patient with the results of their point-of-care screening was identified in Questions 1.22 to 1.24. Most of the community pharmacists, 97.6% (40, n=41) indicated that they provided the patients with the results from the point-of-care screening assessment in a written format. Of these, 62.5% (25, n=40) indicated that they utilised a standardised document to enter the information from the point-of-care screening service. The type of documents referred to by the pharmacists included: patient screening cards (64%; 16, n=25), computer printouts (12%; 3, n=41) and pharmaceutical company sponsored point-of-care screening forms (24%; 6, n=41).

The remaining 15 community pharmacies that did not utilise standardised screening forms indicated that they provide the patient with the results on a random piece of paper. This method of documentation is not ideal as no record exists for future reference and the result is easily lost.

**Referral forms**

The means of referral used was determined in Questions 1.25 to 1.27. A written referral form was provided to the patient’s medical practitioner by 73.2% (30, n=41) of the community pharmacies. A number of pharmacies (40%, 12, n=30) indicated that they regarded the screening results form they provided to the patient as the means of referral. The remaining pharmacies did not specify a method of referral. A quarter of the community pharmacies, 26.8% (11, n=41) indicated that they verbally referred the patient to their medical practitioner.

5.4.2.6 General comments regarding the role of the community pharmacist and point-of-care testing services

Question 2.10 determined the pharmacists perceptions of their role in the provision of point-of-care testing services. The responses by the
pharmacists with regards to these comments are indicated by Figure 5.18.

As indicated by Figure 5.18, the first comment made was on the responsibility of the community pharmacist to provide point-of-care cardiovascular screening services. The majority of community

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsibility of community pharmacist</td>
<td>2</td>
<td>7</td>
<td>14</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Assist in improving profession</td>
<td>0</td>
<td>3</td>
<td>21</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Only nurses and doctors can provide service</td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Pharmacist have knowledge and skills</td>
<td>0</td>
<td>4</td>
<td>16</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Pharmacist competent in providing screening</td>
<td>1</td>
<td>5</td>
<td>15</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Service can improve patient health outcomes</td>
<td>0</td>
<td>5</td>
<td>18</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Assist in generating profit</td>
<td>1</td>
<td>4</td>
<td>10</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>
pharmacists, 66% (31, n=47) “agreed” with the statement to a certain extent. This positive response obtained indicates that community pharmacists have identified that they have a role to play in the chronic disease management process.

Almost all the pharmacists either “strongly agreed” (44.7%; 21, n=47) or “agreed” (46.8%; 22, n=47) that providing point-of-care screening services will enable the pharmacy profession to be enhanced and improved. Improving the professionalism of the profession and ensuring that pharmacists become more involved in areas outside dispensing could lead to improved job satisfaction.

A number of pharmacists, 66% (31, n=47) “disagreed” with the statement that point-of-care screening services should only be provided by nurses and medical practitioners.

A total of 22 pharmacists (46.8%, n=47) also “strongly agreed” with the comment that pharmacists have the ability to provide point-of-care screening services and that they have the necessary skills and knowledge. Almost the same number of pharmacists (48.9%; 23, n=47) indicated that they “strongly agreed” with the comment that pharmacists are competent in the provision of point-of-care screening services.

This response contrasts to the response of the pharmacists in Section 5.3.4, where the lack of appropriate knowledge and skills was identified as a barrier to effective provision of health promotion activities. This ambiguous response could indicate uncertainty what pharmacists view their role to be in cardiovascular disease management, possibly contributing to the number of pharmacists feeling not at all competent in providing point-of-care testing. It can therefore be recommended that Continuing Professional Development activities are utilised to a greater extent to provide the pharmacists with the adequate knowledge and skills to become competent in providing disease risk management.
Community pharmacists were aware of the beneficial health benefits obtained from pharmaceutical care services. Half of the pharmacists, 51.1% (24, n=47) “strongly agreed” with the statement that the pharmacist’s involvement in the provision of cardiovascular disease management can improve health outcomes of the patients.

The vast majority of pharmacists indicated that they “strongly agreed” (21.3%; 10, n=47) or ‘agreed” (51.1%; 24, n=47) that screening services can assist in generating profits within the pharmacy.

Thus, in summarising the above findings with respect to the conduction of point-of-care screening services, it is evident that community pharmacists of the Nelson Mandela Metropole are extensively involved in Step One of the five-step cardiovascular disease management process. Evidence has been presented that pharmacists identify patients that are at risk, conduct point-of-care screening services and subsequently counsel the patient on how to manage their condition. A number of community pharmacists (89.3%; 42, n=47) indicated that they regarded health promotional strategies to be an essential component of their everyday activities. However, only 42.6% (20, n=47) of the pharmacists indicated that they are actively involved in these activities.

From the responses obtained, it is evident that these community pharmacists were readily able to identify important cardiovascular risk factors such as obesity (76.6%; 36, n=47), cigarette smoking (27.7%; 13, n=47) and respiratory complaints (42.6%; 20, n=47).

Point-of-care screening services were usually provided in a clinic facility with 90.2% (37, n=41) of the community pharmacies having a clinic within the pharmacy. All of the pharmacies provided blood glucose and blood pressure point-of-care screening services and 88.2% (36, n=41) provided blood cholesterol screening services. The community pharmacists,
themselves were also becoming more involved in providing point-of-care screening service as part of their health promotion activities. Results also indicated that the greater the staff complement, the greater the extent of the services provided. In four of the pharmacies that do not provide blood cholesterol testing (n=5), only one pharmacist was employed. Furthermore all four pharmacies without a clinic facility were single-owner pharmacies.

The pharmacies charged the patient for the provision of the screening services. Generally, blood pressure provision cost the least with 27% (11, n=41) indicating that they provided the service free of charge. The most expensive screening service was blood cholesterol, with the majority of the pharmacies, 53% (19, n=36) charging between R30-R39. Pharmacists were charging for the provision of screening services. The fee was sufficient to cover the consumable costs associated with the screening equipment, but did not include a component for professional consultation.

The majority of the pharmacies, 75.6% (31, n=41) kept records of the screening services provided. The types of records included a daily clinic log (24 pharmacies), individual patient screening cards (25 pharmacies) and screening cards kept by the patient (15 pharmacies).

Certain aspects of the results raised concerns. Pharmacists failed to identify several essential risk factors for cardiovascular disease such as abdominal obesity (4.3%; 2, n=47), gender (2.1%; 1, n=47) and family history (4.3%; 2, n=47).

Pharmacists also identified aspects such as a lack of personnel, lack of time and lack of reimbursement as barriers that prevent them from providing point-of-care screening services. This was more noticeable in single-owner pharmacies, where only 75% (12, n=16) had clinic facilities.
5.5 CONDUCTION OF RISK ASSESSMENT

5.5.1 Utilisation of cardiovascular risk calculators

As discussed in Section 2.4.1.2, the use of Cardiovascular Risk Calculator Tools has become more widespread in the cardiovascular disease management process and these are readily available in journal articles and on internet websites (See Table 2.6).

The pharmacists were asked in Questions 2.14 to 2.15 of the questionnaire if they were aware of cardiovascular risk calculators and if they had ever utilised such a tool during the counselling process. Question 2.16 asked the pharmacist to indicate the source or the name of the tool they have utilised.

![Figure 5.19 Pharmacists awareness of cardiovascular risk calculators](n=46*)

* Only 46 community pharmacists responded to the question.

As evident from Figure 5.19, only 17.3% (8, n=46) of the respondents indicated that they had heard of cardiovascular risk calculator tools. Furthermore, not one of these community pharmacists indicated that they utilised such a tool.

As seen in Chapters 2 and 3, cardiovascular risk calculators can be of great benefit in the cardiovascular disease management process and
as such have been included in several studies. Simpson et al (2004) utilised the Framingham Tool to assess the risk profile of the patients prior to and after the pharmacist intervention. Changes in the risk estimate calculated by the tools were regarded as a secondary end-point of the study (Simpson et al 2004).

In the current research, the participating pharmacists frequently attended Continuing Professional Development events and therefore the use of calculator tools and overall cardiovascular risk assessment practices could be introduced at these sessions.

5.5.2 **Utilisation of cardiovascular risk questionnaires**

Several studies have already focused on providing patients with questionnaires focusing on identifying cardiovascular disease risk factors that can contribute to disease development (Hourihan et al 2003; Lalonde et al 2006). The questionnaire not only assists in identifying risk factors but also allows the patient to identify the factors which influence their health, which in turn motivates patients to become more health-conscious (Hourihan et al 2003).

Only 12.8% (6, n=47) of the pharmacists indicated that they had such a risk identification questionnaire available and utilised it during the counselling session with the patient.

Even fewer community pharmacists, 4.3% (2, n=47) had questionnaires available in their pharmacy to assess the cardiovascular disease knowledge of the patients.

In summary, although the community pharmacists were extensively involved in risk factor identification and point-of-care screening, there was a lack of involvement in overall cardiovascular risk assessment. Few of the community pharmacists (14.9%; 7, n=47) were aware of Cardiovascular Risk Calculator Tools and not one of the pharmacists indicated that they had utilised such a tool. Only six pharmacists (12.8%; n=47) utilised questionnaires to assist in the risk identification and assessment practice.
5.6 PHARMACISTS INVOLVEMENT IN ONGOING CARDIOVASCULAR DISEASE MANAGEMENT

This section includes responses by the community pharmacists to Questions 2.17 and 2.18 of the questionnaire. Question 2.17 asked the pharmacist to indicate the steps he/she would take if the screening results indicated that the patient was not yet “at risk”. Question 2.18 asked what steps the pharmacist would take if the screening results obtained were elevated. Both questions were open-ended, which allowed the pharmacist to elaborate on their approach to patient disease management. The responses obtained from the pharmacists have been classified into several distinct themes, as illustrated in Tables 5.5 and 5.6. Only 43 of the 47 community pharmacists completed Question 2.17. Question 2.18(a) was answered by 41 and Question 2.18(b) and (c) by 39 of the pharmacists.

Patients with “normal” screening results

As indicated in Table 5.5, the majority of pharmacists indicated that they would recommend frequent monitoring (60.5%; 26, n=43) of risk factors and counsel patients on the implementation of various lifestyle changes (67.4%; 29, n=43). Pharmacists, in certain instances, specified when repeat monitoring should take place, with the majority recommending 6-monthly assessments.

The most commonly identified lifestyle modifications were the introduction of a healthier diet (48.8%; 21, n=43), regular exercise (46.5%; 20, n=43) and smoking cessation (25.6%; 11, n=43). Once again, as was true in Section 5.4.1, few pharmacists indicated that they would assess the patients medical history (4.7%; 2, n=43) and family history (2.3%; 1, n=43). Few pharmacists also indicated that they would explain to the patient the importance of risk factor reduction (4.7%; 2, n=43) or handed out pamphlets on disease risk management (7.0%; 3, n=43) to the patients.
Furthermore, even though the patient was not yet regarded as “at risk”, 18.6% (8, n=43) referred the patient to their medical practitioner. This did not include pharmacists that recommended additional assessments such as electrocardiograph assessments or lipograms.

Table 5.5 Responses of the community pharmacists when counselling the patient who is not yet “at risk”. (n=43)*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Response</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Regular monitoring</td>
<td>Total response</td>
<td>26 (60.5)</td>
</tr>
<tr>
<td></td>
<td>Specified</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-monthly</td>
<td>1 (2.3)</td>
</tr>
<tr>
<td></td>
<td>6-monthly</td>
<td>6 (13.9)</td>
</tr>
<tr>
<td></td>
<td>Yearly</td>
<td>4 (9.3)</td>
</tr>
<tr>
<td>2. Introduce lifestyle</td>
<td>Total response</td>
<td>29 (67.4)</td>
</tr>
<tr>
<td>modification</td>
<td>Specified</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Smoking cessation</td>
<td>11 (25.6)</td>
</tr>
<tr>
<td></td>
<td>Healthy diet</td>
<td>21 (48.8)</td>
</tr>
<tr>
<td></td>
<td>Regular exercise (especially cardiovascular)</td>
<td>20 (46.5)</td>
</tr>
<tr>
<td></td>
<td>Hobbies/ extramural activities</td>
<td>2 (4.7)</td>
</tr>
<tr>
<td></td>
<td>Weight loss</td>
<td>4 (9.3)</td>
</tr>
<tr>
<td>3. Risk assessment</td>
<td>Patient medical history</td>
<td>2 (4.7)</td>
</tr>
<tr>
<td></td>
<td>Patient family history</td>
<td>1 (2.3)</td>
</tr>
<tr>
<td>4. Additional information</td>
<td>Provide education pamphlets</td>
<td>3 (7.0)</td>
</tr>
<tr>
<td></td>
<td>Explain importance of risk factor reduction</td>
<td>2 (4.7)</td>
</tr>
<tr>
<td></td>
<td>Explain increased risk of risk factors with age</td>
<td>3 (7.0)</td>
</tr>
<tr>
<td></td>
<td>Perform a BMI assessment</td>
<td>1 (2.3)</td>
</tr>
<tr>
<td></td>
<td>Send for ECG</td>
<td>1 (2.3)</td>
</tr>
<tr>
<td></td>
<td>Recommend natural products</td>
<td>1 (2.3)</td>
</tr>
<tr>
<td></td>
<td>Suggest purchase of CVD screening equipment</td>
<td>1 (2.3)</td>
</tr>
<tr>
<td></td>
<td>Compliance to current medication</td>
<td>2 (4.7)</td>
</tr>
<tr>
<td></td>
<td>Reduce stressful life</td>
<td>3 (7.0)</td>
</tr>
<tr>
<td>5. Refer</td>
<td>Referral to medical practitioner</td>
<td>8 (18.6)</td>
</tr>
</tbody>
</table>

* Only 43 pharmacists completed this section.

One pharmacist also recommended that the patient purchase their own cardiovascular disease management equipment and said:

“Would suggest purchase of their own BP monitor, which I believe to be better than just
the occasional pharmacy test”

Other responses by pharmacists on this question included:

“I want to change the patient’s mind to a healthy way of thinking.”

“Inform patient of the absolute necessity of regularly checking his condition/risk without alarming patients”

Only 4.7% (2, n=43) of the pharmacists indicated that they would assess the patient’s compliance to medication or enquire if the patient had taken any medication prior to the measurement. Compliance to medication is an essential component of every disease management practice and it is essential that pharmacists advocate it’s importance.

Patients with an “abnormal” screening result

As indicated in Table 5.6 (a-c), most of the pharmacists would refer the patient to their medical practitioner.

As shown in Table 5.6 (a), the majority of pharmacists, 75.6% (31, n=41) indicated that they would refer patients with elevated blood glucose results. In case of elevated blood cholesterol values (Table 5.6 (b)), 38.5% (15, n=39) of the pharmacists indicated that they would refer the patient, regardless of the value obtained. A further 7.7% (3, n=39) mentioned that elevated blood cholesterol would require immediate referral and 10.3% (4, n=39) indicated that they would refer the patient with elevated blood cholesterol values, even in the absence of other cardiovascular disease risk factors.

As indicated in Table 5.6 (c), an elevated blood pressure value was the reason for immediate referral by 48.7% (19, n=39) of the community pharmacists. Three pharmacists even indicated that they would provide the patient with emergency blood pressure lowering medication.
Fewer pharmacists mentioned that they would follow-up after an initial elevated screening result. As evident from Table 5.6 (a), for patients with elevated blood glucose, 19.5% (8, n=41) of the pharmacists indicated that they would perform a reassessment. Of these 8 pharmacists, 75% (6, n=8) did not specify when this reassessment will take place. The remaining two respondents indicated that they would recommend that the patient return the next day to perform the test. Only 14.6% (6, n=41) pharmacists indicated that they ensured there were no factors present that could influence the results, such as a recent meal or use of medication prior to the test. The low number of pharmacists that mentioned this aspect is of concern, since this could result in referrals based on inaccurate blood glucose results.

<table>
<thead>
<tr>
<th>Themes</th>
<th>Response</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Referral</td>
<td>Refer to medical practitioner immediately</td>
<td>31 (75.6)</td>
</tr>
</tbody>
</table>
| 2 Reassess and then refer | Inform patient on normal blood glucose levels  
Determine presence of influential risk factors  
Repeat the test  
• Unspecified  
• The next day  
Refer if results still elevated | 1 (2.4)  
6 (14.6)  
8 (19.5)  
6 (14.6)  
2 (4.9)  
4 (9.8) |
| 3 Additional tests | Recommend additional tests  
• Fasting blood glucose  
• Glucose tolerance test  
• Blood pressure and blood cholesterol measurement  
• Patient BMI | 2 (4.9)  
5 (12.2)  
1 (2.4)  
2 (4.9) |
| 4 Risk assessment | Perform risk assessment  
• Assess family history  
• Assess physical fitness level  
• Assess diet  
• Assess current medication and compliance thereto | 4 (9.8)  
5 (12.2)  
7 (17.1)  
3 (7.3) |
| 5 Lifestyle     | Recommend lifestyle modifications  
Importance of avoiding sugar  
Recommend additional natural medications | 17 (41.5)  
3 (7.3)  
1 (2.4) |
| 6 Follow-up     | Regular visits to doctor and pharmacy                                                     | 5 (12.2)   |

*Only 41 pharmacists completed this section*
### Table 5.6 (b) Response by the community pharmacists when the patient presents with elevated blood cholesterol levels (n=39*)

<table>
<thead>
<tr>
<th>Themes</th>
<th>Response</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Referral</td>
<td>Refer immediately regardless of value</td>
<td>15 (38.5)</td>
</tr>
<tr>
<td></td>
<td>Refer immediately if elevated results</td>
<td>3 (7.7)</td>
</tr>
<tr>
<td></td>
<td>Value high even though patient lack risk factors</td>
<td>4 (10.3)</td>
</tr>
<tr>
<td>2 Reassess</td>
<td>Recommend lifestyle modifications after elevated measurement</td>
<td>6 (15.4)</td>
</tr>
<tr>
<td>and then refer</td>
<td>Refer if not improved</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Not specified</td>
<td>4 (10.3)</td>
</tr>
<tr>
<td></td>
<td>• After 1 month</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td></td>
<td>• After 3 months</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td>3 Additional</td>
<td>Recommend additional tests</td>
<td></td>
</tr>
<tr>
<td>tests</td>
<td>• Specifically requesting a fasting value</td>
<td>5 (12.8)</td>
</tr>
<tr>
<td></td>
<td>• Refer for a lipogram</td>
<td>10 (25.6)</td>
</tr>
<tr>
<td>4 Risk</td>
<td>Perform risk assessment</td>
<td></td>
</tr>
<tr>
<td>assessment</td>
<td>• Unspecified</td>
<td>15 (38.5)</td>
</tr>
<tr>
<td></td>
<td>• Family history</td>
<td>5 (12.8)</td>
</tr>
<tr>
<td></td>
<td>• Obesity</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td></td>
<td>• Smoking</td>
<td>5 (12.8)</td>
</tr>
<tr>
<td></td>
<td>• Diet</td>
<td>9 (23.1)</td>
</tr>
<tr>
<td></td>
<td>• Exercise</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td></td>
<td>• Assess current medication compliance</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td>5 Lifestyle</td>
<td>Recommend lifestyle modifications</td>
<td>20 (51.3)</td>
</tr>
<tr>
<td></td>
<td>Recommend additional natural medications</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td>6 Follow-up</td>
<td>Regular visits to doctor and pharmacy</td>
<td>3 (7.7)</td>
</tr>
<tr>
<td></td>
<td>• Unspecified</td>
<td>2 (5.1)</td>
</tr>
<tr>
<td></td>
<td>• Monthly</td>
<td>1 (2.6)</td>
</tr>
</tbody>
</table>

*Only 39 pharmacists completed this section

In the case of elevated blood pressure values, as indicated in Table 5.6 (b), 34.1% (14, n=41) of the pharmacists indicated that they would recommend that the patient return for a repeat blood pressure test. Of these 13 pharmacists stated that two additional blood pressure assessments be performed and indicated that this should take place within the next day (2.6%; 1, n=39), next 2-3 days (7.0%; 3, n=39) or the next week (2.6%; 1, n=39).
Table 5.6 (c) Response by the community pharmacists when the patient presents with elevated blood pressure levels (n=39*)

<table>
<thead>
<tr>
<th>Themes</th>
<th>Response</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(n=39*)</td>
</tr>
<tr>
<td>1 Referral</td>
<td>Refer immediately</td>
<td>19 (48.7)</td>
</tr>
<tr>
<td></td>
<td>Treat with emergency medicines:</td>
<td>3 (7.7)</td>
</tr>
<tr>
<td>2 Reassess and then refer</td>
<td>Perform BP test, rest and retake</td>
<td>2 (5.1)</td>
</tr>
<tr>
<td></td>
<td>Question regarding symptoms experienced</td>
<td>2 (5.1)</td>
</tr>
<tr>
<td></td>
<td>Reassess patient BP</td>
<td>14 (35.9)</td>
</tr>
<tr>
<td></td>
<td>Retake two measurements</td>
<td>13 (33.3)</td>
</tr>
<tr>
<td></td>
<td>• in 24 hours</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td></td>
<td>• 2-3 days</td>
<td>3 (7.7)</td>
</tr>
<tr>
<td></td>
<td>• 1 week</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td></td>
<td>Refer if result remain high</td>
<td>11 (28.2)</td>
</tr>
<tr>
<td>3 Additional tests</td>
<td>Recommend additional tests</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td></td>
<td>• Blood glucose</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td>4 Risk assessment</td>
<td>Perform risk assessment</td>
<td>3 (7.7)</td>
</tr>
<tr>
<td></td>
<td>• Family history</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td></td>
<td>• Smoking</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td></td>
<td>• Exercise</td>
<td>3 (7.7)</td>
</tr>
<tr>
<td></td>
<td>• Diet</td>
<td>2 (5.1)</td>
</tr>
<tr>
<td></td>
<td>• Stress</td>
<td>2 (5.1)</td>
</tr>
<tr>
<td></td>
<td>• Acute medication</td>
<td>3 (7.7)</td>
</tr>
<tr>
<td></td>
<td>• Chronic medication</td>
<td></td>
</tr>
<tr>
<td>5 Lifestyle</td>
<td>Recommend lifestyle modifications</td>
<td>8 (20.5)</td>
</tr>
<tr>
<td>6 Follow-up</td>
<td>Follow up after 1 month</td>
<td>2 (5.1)</td>
</tr>
</tbody>
</table>

*Only 39 pharmacists completed this section

One pharmacist indicated the following:

“Reassess the patient’s blood pressure on a further two follow-up visits within a week. If the blood pressure remains constantly high the patient would then be referred to their doctor. If the blood pressure is normal on follow-up visits, regular monthly screenings would be advised.”
This is the correct method and is the recommended approach according to the South African Hypertension Society Guidelines (Ncayiyana 2006).

For elevated blood cholesterol levels, no respondent specifically mentioned that the test should be repeated, but 12.8% (5, n=39) indicated that they would request the patient to return for a fasting blood cholesterol level and 25.6% (10, n=39) indicated that they would refer patients for a full lipogram assessment. Only a few pharmacists mentioned that they would refer the patient to their medical practitioner if the reassessments were also elevated - for both elevated blood glucose (9.8%; 4, n=41) and blood pressure (28.2%; 11, n=39) values.

Lifestyle modifications were recommended by the pharmacists. However, the recommendations made were fewer in number if compared to the number of pharmacists that mentioned referral of the patient. Some pharmacists mentioned in Section 5.4.2.6 that the lack of sufficient knowledge and skills impaired their ability to be involved in effective health promotion activities. This lack of confidence could contribute to pharmacists not actively taking part in chronic disease management.

Other results which were concerning included the lack of assessment of patient medication compliance. In order to determine to what extent pharmacists were involved in requesting repeat prescriptions of chronic medications, Question 1.31 asked the pharmacists to indicate how frequently they recommend follow-up medical practitioner appointments and repeat prescriptions. Pharmacists indicated that they “always” (59%; 23, n=39) and “frequently” (25.6%; 10, n=39) recommended that the patient visit their medical practitioner for follow-up assessments. The majority of the pharmacists, 92.3% (36, n=39) indicated that they “always” recommended that the patient provide the pharmacy with a six-monthly repeat prescription and another 76.9% (30, n=39) of the
pharmacists reported that they always recommended that the patients should return to their pharmacy for the subsequent repeat prescriptions. These results could be seen as encouraging, since it indicates that even though pharmacists have not mentioned assessment of medication compliance to a great extent, they are aware of the importance of recommending that patients return for their repeat prescriptions and visit their doctor frequently. However, it needs to be stated that many of the pharmacists might have viewed the legal aspects associated with medical aids and the required six-monthly repeat prescriptions as their primary motivation behind this recommendation.

Also, the number of pharmacists that indicated in Question 2.18, that they would recommend follow-up, were less than the number of pharmacists that indicated in Question 1.31 that they would recommend frequent appointments with the medical practitioner and are therefore contradictory.

Only one pharmacist indicated, in response to elevated blood glucose and blood pressure, that they would recommend that the patient also undergo additional screening tests. It has been mentioned that the current treatment paradigm for cardiovascular disease management has been changed from treating risk factors in isolation to a universal risk factors approach (World Health Organisation 2002). It is evident from the number of pharmacists that recommended additional tests and assessments of other risk factors, that community pharmacists are still focused on treating each risk factor in isolation and have not adapted their approach to include an universal approach on risk management.

Lastly, the pharmacists were asked in Question 2.19, to indicate how frequently, in their experience, they have found that patients return to their pharmacy with a prescription, after being referred to their medical practitioner. The majority of the pharmacists indicated that patients “frequently” (48.9%; 23, n=47) and “sometimes” (36.2%; 17, n=47) return with a repeat prescription. This is encouraging, since it may indicate that the patients appreciated the pharmacists effort and may
be able to contribute to the development of a trusting pharmacist-
patient relationship.

Thus in summary, when a pharmacist performs screening services, and
the subsequent results are normal, the majority of the pharmacists
recommended frequent follow up assessments (60.5%; 26, n=43) to
continually assess the risk factors and also frequently recommended
additional lifestyle changes (67.4%; 29, n=43).
When the results obtained were elevated, pharmacists were more
prone to refer patients with elevated results to their medical practitioner
and fewer pharmacists indicated being involved in additional areas
such as promotion of lifestyle modifications and follow-up.

Involvement in the five-step cardiovascular disease management
approach by community pharmacists in the Nelson Mandela Metropole
seemed to be predominantly centred on activities related to Step One.
Pharmacists indicated that they frequently identified risk factors in the
patients entering the pharmacy and were able to conduct the relevant
point-of-care screening tests. If the activities portrayed by the
pharmacists are extended to include the Kaiser Permanante Pyramid
Model, the majority of the pharmacists provided activities aimed at self-
care of the patient, Level One of the Pyramid. This can be clearly
illustrated by the broad base of the pyramid, which included the
majority of the pharmacists.
However, as the Pyramid narrows towards Level Two and Three,
pharmacists’ involvement decreased, with pharmacists indicating
inadequate and sporadic involvement in activities aimed at risk
assessment, development of treatment plans and involvement in
continuous disease monitoring. This decrease in pharmacist
involvement highlights the need for the community pharmacist to
realise that with their knowledge, skills and expertise, they have a role
to play in patient management at both the Level Two and Level Three
stages of patient care.
The results obtained from the analysis of the responses by the community pharmacists clearly illustrate that community pharmacists are currently playing a role in cardiovascular disease management, but there are several areas in which continued pharmacists involvement needs to be recommended and instituted.
CHAPTER SIX
CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

The study aimed to assess and describe the nature of cardiovascular disease management services provided by community pharmacists in the Nelson Mandela Metropole.

There are 61 pharmacies located within the Metropole. Of these pharmacies, 14 were excluded from the study. Out of the remaining 47 community pharmacies, 41 community pharmacies participated in the study, ie a response rate of 87.2% (41, n=47). Response rates for completion of the three sections of the questionnaire were 87.2% (41, n=47) for Section One, 82.5% (47, n=57) for Section Two and 91.9% (34, n=37) for Section Three.

The research objectives that were developed at the initiation of the study were achieved in the following ways:

Objective One: To describe the nature of cardiovascular risk screening, monitoring and management services provided by community pharmacists in the Nelson Mandela Metropole.

The study identified that cardiovascular point-of-care testing services were readily available in community pharmacies in the Nelson Mandela Metropole. All of the community pharmacies (100%, 41, n=41) included in the study provided blood glucose and blood pressure point-of-care testing services and 88.2% (36, n=41) provided blood cholesterol services.

Point-of-care services were predominantly provided in clinic facilities, which were available in 90.2% (37, n=41) of the community pharmacies. Pharmacists were also involved in providing these services, with 85.4% (35, n=41) of the pharmacies indicating that the pharmacist was involved to a certain extent. The most predominant additional dispensary staff member was
the pharmacist assistant, employed in 58.5% (24, n=41) of the pharmacies. Clinic sisters were also employed by 48.8% (20, n=41) pharmacies and were the sole staff member responsible for the provision of screening services in 14.6% (6, n=41) of the pharmacies.

The pharmacies charged the patient for the provision of the screening services. Generally, blood pressure provision cost the least with 27% (11, n=41) indicating that they provided the service free of charge. The most expensive screening service was blood cholesterol, with the majority of the pharmacies, 53% (19, n=36) charging between R30-R39. However, it seemed that pharmacists predominantly charged to cover the consumable costs associated with the provision of the testing service and did not charge any additional fees for their professional advice and counselling.

The majority of the pharmacies, 75.6% (31, n=41) also kept regular records of the screening services provided. The types of records included a daily clinic log (24 pharmacies), individual patient screening cards (25 pharmacies) and screening cards kept by the patient (15 pharmacies).

**Objective Two: To determine the extent to which the community pharmacist assesses the cardiovascular risk profile of the patients.**

Community pharmacists were able to identify the presence of several cardiovascular risk factors in patients. The most prominent risk factor identified was obesity (76.6%; 36, n=47). Other risk factors identified included cigarette smoking, (27.7%; 13, n=47) and respiratory complaints (42.6%; 20, n=47).

The community pharmacists failed to identify other important cardiovascular risk factors such as abdominal obesity (4.3%; 2, n=47) and non-modifiable risk factors such as gender (2.1%; 1, n=47) and family history (4.3%; 2, n=47). Few pharmacists also indicated that they recorded information on family history and other risk factors such as the weight and height of the patient.

A few of the community pharmacists, 14.9% (7, n=47) indicated that they were aware of Cardiovascular Risk Calculator Tools. None of the community
pharmacists indicated utilising such a tool in the assessment of the patient’s risk. Only six pharmacists, (12.8%, n=47) indicated that they utilised questionnaires in their assessment of the patient cardiovascular risk profile. Participation in cardiovascular disease risk management practices by community pharmacists following the conduction of point-of-care screening services was minimal, if not lacking altogether. If the screening results indicated that the patient is not yet “at risk”, pharmacists predominantly indicated that they would recommend that the patient undergo several lifestyle modifications (67.4%; 29, n=43) and also return for frequent monitoring of the risk factors (60.5%; 26, n=43). If however, the screening results were elevated, the majority of the pharmacists referred the patients to their medical practitioner for further assessment, with little additional activities noted, of which the most prominent was to conduct reassessment screenings, recommendation of lifestyle modifications and frequent follow-up.

Objective Three: To determine what community pharmacists perceive their role to be in the management of the patient with cardiovascular disease. Pharmacists identified several barriers that prevented them from providing effective health promotion activities. The most prominent barrier was the lack of personnel, identified by 76.6% (36, n=47) of the pharmacists especially evident in the pharmacies that did not have a clinic facility present (n=4), which were all single-owner pharmacies. Furthermore, 66% (31, n=47) of the pharmacists indicated that time was another prominent barrier that prevented them from providing effective health promotion activities. However, community pharmacists were interested in health promotion activities, with 66% (31, n=47) indicating that a lack of interest “never” influenced their provision of health promotion. A total of 89.2% (42, n=47) pharmacists indicated that they realise the importance of health promotion activities, but only 42.5% (20, n=47) indicated that they “always” or “frequently” participated in these events. In case of Continuing Professional Development, pharmacists were involved with more than half of the pharmacists, 63.8% (30, n=47) indicating that they attended these sessions.
To conclude, pharmacists realise the importance of health promotion activities as part of an effective cardiovascular disease management programme. The Kaiser Permanente Pyramid Model, as a chronic disease management model and the five-step approach to cardiovascular disease management provides a plan of how to approach a patient with a chronic disease such as cardiovascular disease. Utilisation of these tools to assist in the management of patients by pharmacists could assist in broadening the role of the pharmacist.

From the results obtained, pharmacists are actively involved in identifying the patients “at risk” of cardiovascular disease and also conduct point-of-care screening tests to determine the extent of the risk factors. Therefore it is evident that the majority of pharmacists provide activities aimed at Level One of the Kaiser Permanente Pyramid Model. However, from the results obtained, pharmacists tend to look at the risk factors in isolation and do not readily consider the combination of risk factors in their approach to disease management. Therefore involvement in Level Two and Level Three by the pharmacists is limited. This is unfortunate, since evidence exists that illustrate the ability of pharmacists to become more involved in the upper levels of the Pyramid, such as; the infrastructure (clinic facilities) available in the pharmacy and the knowledge and skills displayed by the pharmacists.

6.2 LIMITATIONS OF THE STUDY

The following limitations of the study were identified:

- The study was only confined to one metropolitan area.
- The sample size was small and may not be representative of the total community pharmacist population in South Africa.
- The study population consisted only of community pharmacists located in an urban area, with no rural community pharmacies included in the study.
- The researcher was dependent upon information provided by the pharmacist. Thus data was not verified by observation of the pharmacists conducting the various activities that had been described.
6.3 RECOMMENDATIONS

Recommendations can be made to improve on some of the aspects obtained from the pharmacists.

Continuing Professional Development activities
Pharmacists indicated that they are frequently involved in Continuing Professional Development activities. These events should therefore be increasingly utilised by community pharmacists to improve their skills and knowledge with respect to chronic disease management practices. The events could include workshops that are aimed at providing up-to-date information to pharmacists on several aspects of cardiovascular disease risk assessment and disease management.

Implementation of fee structures
Pharmacists indicated that the lack of reimbursement for the provision of health promotion activities, including point-of-care testing services and lifestyle modification counselling, were a prominent barrier that prevented pharmacists from participating. Pharmacists should be adequately reimbursed for the services that they provide to the patient. Guidelines need to be developed, that will indicate for what services and how much the pharmacists can charge. Reimbursement by third party agents, such as medical aids, for pharmaceutical care services, needs to be initiated.

Establish relationships with other health care professionals
Collaborative relationships between the pharmacist and other health care professionals produced significant patient outcomes in several of the studies discussed. It is recommended that community pharmacists continually seek avenues through which they can develop these relationships further to assist in providing optimal health outcomes for the patient.

Utilising pharmacy staff
Lack of sufficient staff is another aspect that was identified by the pharmacists as being a barrier to the provision of health promotional services. There are
several categories of support staff available in community pharmacies including pharmacist assistants and interns that are able to provide dispensing services, allowing for pharmacists to spend more time in counselling patients on additional services such as the provision of point-of-care testing and lifestyle modification counselling. Pharmacist interns and students can also assist in providing point-of-care testing services since they have already been exposed to screening services at an undergraduate level. Additional education and training should be provided to staff members, to allow for the utilisation of these staff members in the cardiovascular disease management process.

Implementation of an appointment-based disease management practice
Lack of time to provide point-of-care testing services was also identified as a barrier by many of the community pharmacists. Pharmacists identified that there was not enough time to provide these additional services as well as the original dispensing services. One method of overcoming this barrier, is to recommend that pharmacists employ an appointment-based service in which scheduled meetings are planned with patients prior to the assessment. This could also contribute to the development of a more professional service.

Recommendations can be made for future research in areas related to this study, including:

- The study only focused on one metropolitan area in South Africa, increasing the sample size of the study by focusing on the national community pharmacy population could assist in providing a better view on the role of the community pharmacists.
- Include both urban and rural community pharmacies.
- Include a review of the pharmacist interaction with the patient.
REFERENCES


Anon. 2002, "Blood glucose meters: A dynamic market"  
http://www.uspharmacist.com/index.asp?show=article&page=8_988.htm  Date of access: 2007/10/17


Blenkinsopp, A. and Stuttle, B. 2003, "Chronic disease management: Making the most of nurses’ and pharmacists’ skills in primary care."  
http://www.keele.ac.uk/schools/pharm/Publications/documents/CDMReportJune03.pdf_000.pdf  Date of access: 2007/09/10


http://circ.ahajournals.org/cgi/content/abstract/CIRCULATIONAHA.107.185649v1 Date of access: 2007/08/01


Date of access: 2007/05/30


National Heart Lung and Blood Institute. 2006, "Profile of the Framingham heart study." http://www.framingham.com/heart Date of access: 2007/08/08


Date of access: 2007/09/10


Date of access: 2007/09/10


United Kingdom Department of Health. 2004b, "Improving chronic disease management"


Williams, B. 2005, "Optimising cardiovascular disease reduction in hypertensive patients: Going beyond blood pressure"


Date of access: 2006/03/31
World Health Organisation. 2005, "Preventing chronic diseases - A vital investment"  
Date of access: 2007/06/14
APPENDIX ONE
DATA COLLECTION TOOL
To whom it may concern

M.PHARM RESEARCH PROJECT:
CARDIOVASCULAR SCREENING SERVICES IN COMMUNITY PHARMACIES

Cardiovascular disease is a major contributor to morbidity and mortality worldwide. The community pharmacist is regarded by many to be the first step in health care and can therefore play an important role in the identification and management of the cardiovascular disease patient.

You are being asked to participate in a research study. The purpose of this study is to determine the role that the community pharmacist can play in the screening and monitoring of the patient with cardiovascular disease. The study includes a questionnaire-based survey that is broken down into three sections. Two of these sections will be completed by the researcher during an interview with you. The third section is to be completed by you at your own leisure. The completed questionnaire will be collected at a later stage by the researcher. Please feel free to ask the researcher to clarify anything that is not clear to you.

To participate, you will be required to complete a written consent form, which indicates that you agree to take part in the study.

It is important that you know that the study has been approved by the Research Ethics Committee (Human) of the university. Queries with regard to your rights as a research subject can be directed to the Research Ethics Committee (Human) you can call the Director: Research Management at (041) 504-4536.

Participation in this research project is completely voluntary. Although your identity will, at all times remain confidential the results of the research study may be presented at scientific conferences or in specialist publications.

For any further information, please feel free to contact me at 0722917511.

Yours sincerely
Naas Venter
THE ROLE OF THE COMMUNITY PHARMACIST IN
CARDIOVASCULAR DISEASE MANAGEMENT

SECTION ONE
This section is to be completed by the researcher during the interview with the participating pharmacist.
Please complete all the questions by marking the correct box with a tick (✓) or by filling in the space provided.

PHARMACY PARTICULARS

1.1 Do you classify your pharmacy as:

- Chain
- Franchise
- Independent

1.2 Please indicate the number of employees in your pharmacy:

<table>
<thead>
<tr>
<th>Dispensary Personnel</th>
<th>Non-dispensary Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacists (Permanent)</td>
<td>Front shop assistants</td>
</tr>
<tr>
<td>Pharmacists (Locum)</td>
<td>Beauticians</td>
</tr>
<tr>
<td>Pharmacy Students</td>
<td>Clinic sister</td>
</tr>
<tr>
<td>Pharmacist Interns</td>
<td>Driver</td>
</tr>
<tr>
<td>Pharmacist Assistants</td>
<td></td>
</tr>
</tbody>
</table>

Other (please specify): ____________________________

1.3 Please indicate the operating hours of your pharmacy in the space below.

<table>
<thead>
<tr>
<th>Weekdays</th>
<th>Weekends</th>
<th>Public holidays</th>
</tr>
</thead>
</table>

1.4 Please indicate the hours during which cardiovascular screening services are available in your pharmacy. (Please indicate if the hours do not correspond with your operating hours)

<table>
<thead>
<tr>
<th>Weekdays</th>
<th>Weekends</th>
<th>Public holidays</th>
</tr>
</thead>
</table>

1.5 Do you have a clinic in your pharmacy?

- Yes
- No

1.6 If yes to question 5, what is the approximate surface area of the clinic room?

- Less than 10m²
- About 10m²
- More than 10m²

CARDIOVASCULAR SCREENING SERVICES

1.7 Which of the following screening services do you provide in your pharmacy?

- Blood Glucose
- Blood cholesterol
- Blood Pressure

1.8 Do you charge for these cardiovascular screening services?

<table>
<thead>
<tr>
<th>Blood Glucose</th>
<th>Blood Cholesterol</th>
<th>Blood Pressure</th>
</tr>
</thead>
</table>

- Yes
- No
1.9 How much do you charge for these screening services? Please indicate by ticking the appropriate box of the value that is the closest related to how much you charge for the service in your pharmacy.

<table>
<thead>
<tr>
<th>Service</th>
<th>Free</th>
<th>R1-R9</th>
<th>R10-R14</th>
<th>R15-R19</th>
<th>&gt;R20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood Cholesterol</td>
<td>Free</td>
<td>R0-R19</td>
<td>R20-R29</td>
<td>R30-R39</td>
<td>R40-R49</td>
</tr>
<tr>
<td>Blood Glucose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.10 How do you advertise these services to the public?

<table>
<thead>
<tr>
<th>Advertising Method</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Newspaper</td>
<td></td>
</tr>
<tr>
<td>Pamphlets</td>
<td></td>
</tr>
<tr>
<td>Radio advertisements</td>
<td></td>
</tr>
<tr>
<td>Point of sale</td>
<td></td>
</tr>
<tr>
<td>TV advertisements</td>
<td></td>
</tr>
</tbody>
</table>

1.11 Please indicate which of the following staff are involved in providing the screening service:

<table>
<thead>
<tr>
<th>Staff</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacist</td>
<td></td>
</tr>
<tr>
<td>Pharmacist intern/assistant</td>
<td></td>
</tr>
<tr>
<td>Clinic Sister</td>
<td></td>
</tr>
<tr>
<td>Other (Please specify):</td>
<td></td>
</tr>
</tbody>
</table>

1.12 Please name the equipment that you use for these screening services. (eg Accutrend glucometer)

<table>
<thead>
<tr>
<th>Equipment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Glucose</td>
<td></td>
</tr>
<tr>
<td>Blood Cholesterol</td>
<td></td>
</tr>
<tr>
<td>Blood Pressure</td>
<td></td>
</tr>
</tbody>
</table>

1.13 Do you calibrate this equipment?

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Blood Glucose</th>
<th>Blood Cholesterol</th>
<th>Blood Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.14 If yes to question 13, how frequently do you calibrate this equipment?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Blood Glucose</th>
<th>Blood cholesterol</th>
<th>Blood Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Every three months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yearly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.15 Do you provide a full lipogram service in your pharmacy?

<table>
<thead>
<tr>
<th>Service</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

1.16 What screening tests can be performed on this lipogram?

<table>
<thead>
<tr>
<th>Tests</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.17 Do you have written standard operating procedures (SOP) for the screening process?

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Blood Glucose</th>
<th>Blood Cholesterol</th>
<th>Blood Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1.18 Do you employ the use of Informed Consent forms to be signed by the patient prior to carrying out the screening service?

Yes  No

1.19 Are any records of the screening service kept?

Yes  No

1.20 What types of records are kept?

Pharmacy records (individual)  Patient’s own record
Pharmacy records (daily log)  
Other  

1.21 If records are kept, please tick the information that is recorded during the consultation process.

<table>
<thead>
<tr>
<th>Name</th>
<th>Alcohol usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Family history of cardiac disease</td>
</tr>
<tr>
<td>Contact details (eg telephone number)</td>
<td>Current acute medication</td>
</tr>
<tr>
<td>Medical Aid details</td>
<td>Current chronic medication</td>
</tr>
<tr>
<td>Date of birth/Age</td>
<td>Screening results</td>
</tr>
<tr>
<td>Gender</td>
<td>Date of consultation</td>
</tr>
<tr>
<td>Weight</td>
<td>Need for further referral</td>
</tr>
<tr>
<td>Height</td>
<td>Follow up carried out/performed</td>
</tr>
<tr>
<td>Smoking history</td>
<td></td>
</tr>
<tr>
<td>Other (Please specify):</td>
<td></td>
</tr>
</tbody>
</table>

1.22 Do you provide patients with the results in a written format?

Yes  No

1.23 If yes to question 1.22, do you make use of a standard document to provide the patient with the test results?

Yes  No

1.24 If no to question 1.22, can you please indicate what type of document you utilize to provide the patient with their screening results?

___________________________________________________ __________________

1.25 When referral is necessary, do you provide the patient with a written referral letter?

Yes  No

1.26 If yes to question 23, do you have a standard document for referral?

Yes  No

1.27 If no to question 23, could you please describe what means of referral you employ?
1.28 How frequently do you perform the following actions during a screening service provision?
Please answer by ticking the block of the number that best describes your answer.

1 = I do not perform this action  
2 = I rarely perform it  
3 = Sometimes  
4 = I regularly perform it  
5 = I always perform it

<table>
<thead>
<tr>
<th>Action</th>
<th>1 (never)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 (always)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommend that a patient undergo a screening test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explain the procedure of the screening service to the patient.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engage the patient in a pre-test counselling session (for example focusing on cardiovascular risk factors)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enquire whether the patient has either smoked or had some coffee prior to the blood pressure measurement.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enquire the time of the last meal when taking a patients blood glucose and cholesterol.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide the patient with additional counseling on other cardiovascular risk factors such as obesity and physical inactivity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.29 Do you have wall charts, pamphlets or posters available that provides the normal values to be expected from the screening service?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

CARDIOVASCULAR DISEASE MONITORING

1.30 Ongoing management of the cardiovascular patient includes monitoring patient outcomes. Which of these patient outcomes do you monitor?

<table>
<thead>
<tr>
<th>Outcome</th>
<th>1 (never)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 (always)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement in cardiovascular disease parameters (eg blood pressure, blood cholesterol and blood glucose)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problematic side effects that can be experienced by patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow up on advice given to patient (eg smoking cessation, dietary changes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.31 How frequently are you involved in the following actions during the monitoring of a patient with cardiovascular disease?
Please answer by ticking the block of the number that best describe your answer.

1 = I do not perform this action  
2 = I rarely perform it  
3 = Sometimes  
4 = I regularly perform it  
5 = I always perform it

<table>
<thead>
<tr>
<th>Action</th>
<th>1 (never)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 (always)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involved in continuous lifestyle modification education to the patient.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommendation</td>
<td>1 (never)</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5 (always)</td>
</tr>
<tr>
<td>----------------</td>
<td>----------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>------------</td>
</tr>
<tr>
<td>Recommend that the patient return to your pharmacy for their repeat prescription.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommend that the patient have follow-up screening.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommend that the patient see their doctor every six months for a repeat prescription?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
THE ROLE OF THE COMMUNITY PHARMACIST IN CARDIOVASCULAR DISEASE MANAGEMENT

Researcher: Naas Venter

Contact details: 1 Bulbring Road
Summerstrand
Port Elizabeth
6001

(041) 5834301
0722917511
Instructions

Please complete the following questionnaire by either ticking in the appropriate spaces with a tick √ or by filling in the space provided.

Thank you for taking the time to complete this survey.

This questionnaire will be picked up by the researcher on___________________

Yours sincerely

Naas Venter

<table>
<thead>
<tr>
<th>2.1 How old are you?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ 20-29</td>
</tr>
<tr>
<td>□ 30-39</td>
</tr>
<tr>
<td>□ 40-49</td>
</tr>
<tr>
<td>□ 50-59</td>
</tr>
<tr>
<td>□ 60+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2 Gender?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Male</td>
</tr>
<tr>
<td>□ Female</td>
</tr>
</tbody>
</table>
2.3 How long have you been working in community pharmacy?

years

2.4 Please tick the box that best describes your degree of satisfaction in your current employment:

- [ ] Very satisfied
- [ ] Fairly satisfied
- [ ] Satisfied
- [ ] Indifferent
- [ ] Not at all satisfied

2.5 To what extent do you think health promotion strategies (such as smoking cessation or weight loss programmes) should play a role in the everyday activities of the community pharmacist?

- [ ] Essential component
- [ ] Indifferent
- [ ] Unnecessary

2.6 How often do you do the following as part of your daily activities in the community pharmacy? Please indicate the frequency by ticking the appropriate box.

<table>
<thead>
<tr>
<th>Activity</th>
<th>1 (never)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 (always)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiate a discussion with the client regarding his/her health.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Identify clients at risk of cardiovascular disease.

Counsel patients on desirable lifestyle modifications to prevent further cardiac complications.

Provide the patient with education material regarding his/her cardiac condition or risk factor.

Refer the patient to a medical doctor if you perceive the need.

2.7 How often do you take part in health promotion campaigns? (Example those initiated by pharmaceutical manufacturers or National health days).

- Involved everytime
- Frequently
- Seldom
- Never
- Not interested in participating

2.8 How often do you participate in continuing professional development events related to cardiovascular health management?

- Involved everytime
- Frequently
- Seldom
- Never
- Not interested in participating
2.9 A variety of barriers exist that may prevent the implementation of prevention strategies in the community pharmacy. Please indicate the impact of these barriers on your provision of health promotion strategies by ticking the appropriate box.

1 = Never  2 = Seldom  3 = Sometimes  4 = Frequently  5 = Always

<table>
<thead>
<tr>
<th>Reason</th>
<th>1 (never)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 (always)</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are not enough personnel.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am not interested in prevention strategies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do not have enough time to engage in prevention strategies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There is not enough space in my pharmacy to provide such a service.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am not reimbursed for my health promotion activities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacy management does not encourage such services.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients do not ask for it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do not have the adequate knowledge or skills.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do not think that it is the pharmacist’s role.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do not have the necessary equipment to provide the service.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other reasons: (Please specify)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>


2.10 Indicate the extent to which you agree with the following statements by ticking the appropriate box.

1 = I strongly disagree  2 = I disagree,  3 = indifferent
4 = I agree            5 = I strongly agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>1 (Disagree)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 (Agree)</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is the responsibility of the community pharmacist to provide cardiovascular screening services.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiovascular screening services should only be provided by medical doctors or nurses.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The community pharmacist has the skills and knowledge to provide a cardiovascular screening service.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The community pharmacist is able to read and evaluate the screening result and able to refer if necessary.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The community pharmacist can provide a service that will be able to improve the health outcomes of the patient.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The provision of these services can contribute to profit levels within the community pharmacy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The provision of cardiovascular screening services can contribute to improving the perception of the community pharmacist by the public and other health care providers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.11 What visible signs would prompt you, as the pharmacist to consider recommending that the patient has a cardiovascular risk assessment done?
2.12 Do you have a patient risk factor questionnaire available in your Pharmacy that can be completed by the patient to aid in the Compilation of a risk profile for the patient?

☐ Yes
☐ No

2.13 Do you have a questionnaire available that can be used to assess the extent of the patients knowledge with regards to cardiovascular risk factors and diseases.

☐ Yes
☐ No

2.14 Have you heard of a Cardiac risk assessment tool, such as the Framingham risk assessment tool?

☐ Yes
☐ No

2.15 If yes to question 14, have you ever utilized such a tool in your Pharmacy?

☐ Yes
☐ No
2.16. If yes to question 15, could you please provide the name or source of the tool?


2.17 Please provide a short explanation of the steps that you as a pharmacist would undertake when a screening service is performed on a patient and the results indicate that there is no current cardiovascular pathology present, but the patient runs the risk of contracting cardiovascular disease in the future.


2.18 If the results of the screening tests indicate ‘at risk’, please outline the steps you would follow in the immediate management of the patient in the following three conditions?

a. Elevated Blood Glucose


b. Elevated Blood Cholesterol

2.19 In your experience, how frequently do you find that a patient returns to you with a prescription following a counselling session during which you have screened and eventually referred him/her to their medical practitioner?

☐ Everytime
☐ Frequently
☐ Sometimes
☐ Seldom
☐ Never

Thank you for taking the time to complete this survey.
SECTION THREE

This section is to be completed by the researcher, once permission has been granted by the participating pharmacist.

**Waiting area**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Waiting area under cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2 Comfortable seating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3 Health-related literature available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4 Sign indicating waiting area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 Situated close to dispensary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.6 Professional appearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.7 Area clean and tidy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Clinic room**

<table>
<thead>
<tr>
<th>Location Requirement</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Situated close to dispensary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2 Sign indicating that it is the clinic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3 Professional appearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4 Clean and tidy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 Sufficient space (at least 15m²)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Equipment**

<table>
<thead>
<tr>
<th>Equipment Requirement</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.6 Examination couch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.7 Spare sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.8 Trolley or cabinet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.9 Wash-basin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.10 Wash-basin with cold and hot water facility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.11 Closable rubbish bin with lid and disposable plastic liners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.12 Biohazardous materials bin and sharp containers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.13 Refrigerator or cooler</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.14 Disinfectants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.15 Sphygmomanometer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.16 Stethoscope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.17 Blood glucose meter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.18 Disposable rubber gloves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.19 Tissues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.20 Towels/paper towels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.21 Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.22 Height chart</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.23 Tape measure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.24 Other appropriate screening equipment (please specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Documents
Standard operating procedures available
- Blood Pressure measurement
- Blood Glucose measurement
- Blood Cholesterol measurement

Informed Consent forms

Results documentation
- Results document for patient
- Results document for pharmacy records

Referral letters

### Health Literature
Pamphlets
Posters on cardiovascular-related health
Drug information leaflets

Literature contains information on:
- Cardiovascular risk factors
- Lifestyle modifications
- Dietary therapy
- Blood cholesterol
- Blood Glucose
- Blood Pressure
- Other
Chairperson of the Research Ethics Committee (Human)
NMMU
Tel. +27 (0)41 504-2499  Fax. +27 (0)41 504-2770
Rosa.DuRandt@nmmu.ac.za

Ref: N 01/11/03/07 [H06HP-031/Approval]

Contact person: Mrs U Spies

15 August 2006

Mr IJ Venter
1 Bullbring Road
Summerstrand
PORT ELIZABETH
6001

Dear Mr Venter

TO ASSESS AND DESCRIBE THE NATURE OF THE SERVICES PROVIDED BY COMMUNITY PHARMACISTS IN PORT ELIZABETH W.R.T. CARDIOVASCULAR DISEASE MANAGEMENT

Your above-entitled application for ethics approval served at the August 2006 ordinary meeting of the Research Ethics Committee (Human).

The Committee approved the above-mentioned application.

Please inform your co-investigators of the outcome. We wish you well with the project.

Yours sincerely

Prof R du Randt
Chairperson: Research Ethics Committee (Human)

cc: Department of Research Management
Faculty Officer, Faculty of Health Sciences