

The role of the nurse in a cardiovascular risk management programme

by

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DECLARATION

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I, Wanya Sypkens, hereby declare that:

The role of the nurse in a cardiovascular risk management programme

is my original work, and that it has not been submitted before for any degree or examination at any other institution. All the sources that have been used or quoted have been acknowledged by means of complete references in the text and bibliography.

WANYA D SYPKENS

DATE

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ABSTRACT

TITLE: The role of the nurse in a cardiovascular risk management programme

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Increasingly, the emphasis in health care is on wellness and prevention, and efforts are focused on keeping patients out of costly healthcare centres. High-risk cardiovascular patients are identified and incorporated into risk reduction and management programmes. The aim of this study was to explore the role of the nurse in such a programme and make recommendations about the expansion of this role. By conducting a literature study, the ideal role of the nurse in a risk reduction and management programme was analysed, thereby reaching the study's first objective. The second objective was met by conducting qualitative research on the current role of the nurse in cardiovascular health risk management in South Africa. The researcher then compared the empirical data to the ideal role as it emerged from the literature. The findings were presented as areas for expansion of the role of the nurse in a cardiovascular risk management programme.

Key terms: Risk management; cardiovascular patients; risk reduction programme; role of the nurse.

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LIST OF ABBREVIATIONS

ACE	Angiotensin converting enzyme
ADA	American Diabetic Association
AGE	Advanced glycation end-products
ASSIST	Assessment of implementation strategies
ATP111	Third Adult Treatment Panel
BMI	Body Mass Index
CAD	Coronary artery disease
CBT	Cognitive behavioural therapy
CHD	Coronary heart disease
DASH	Dietary Approach to Stop Hypertension
DSM-111	Diagnostic and Statistical Manual of Mental Disorders (Third Edition)
ECG	Electrocardiogram
ESSI	Enriched Social Support Instrument
Glut 4	Glucose transporters
HbA _{1c}	Glycosylated haemoglobin A fraction/percentage
HDL	High-density lipoprotein
HDL-C	high-density lipoprotein cholesterol
HMG-CoA	3-Hydroxy-3-Methylglutaryl-Coenzyme A
Hyper-Lp(a)	Hyper-lipoprotein(a)
IHD	Ischaemic heart disease
IU	International units
kcal/day	Kilogram calories per day
LDL	Low-density lipoprotein
LDL-C	Low-density lipoprotein cholesterol
Lp(a)	Lipoprotein(a)
MET	Metabolic equivalents
mg/day	Milligram per day
MRFIT	Multiple Risk Factor Intervention Trial
NHLBI	National Heart, Lung and Blood Institute
NCEP	National Cholesterol Education Programme
PAI	Plasminogen activator inhibitor
PAI-1	Plasminogen activator inhibitor-1
PCNA	Preventative Cardiovascular Nurses' Association

PHM	Population Health Management
PMI	Point of maximum impulse
PRIME-MD	Primary Care Evaluation of Mental Disorders
RPE	Rating of Newer Perceived Exertion
SANC	South African Nursing Council
SLE	Systemic lupis erythematosus
TLC	Therapeutic lifestyle change
TNF- α	Tumor necrosis factor- α
USA	United States of America
USDHHS	United States Department of Health and Human Services
VLDL	Very-low-density lipoprotein
WHO	World Health Organization
yr	Year

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CHAPTER 1

OVERVIEW OF THE STUDY

1.1 INCIDENCE OF CARDIOVASCULAR DISEASE

Cardiovascular disease, which includes coronary artery syndrome and strokes, remains the leading cause of mortality in the United States of America (USA). The disease claims more than one million lives annually and places a heavy emotional and financial burden on society (Urden, Stacy & Lough, 2002:395). Strokes are the most common cause of acquired disability and the third most common cause of death in the world. A large percentage (30%) of people suffering from a stroke will die within the first three weeks and, of those that survive, 50 per cent will be significantly disabled, with seven per cent at risk of a recurrent stroke for at least five years afterwards. It is therefore crucial that preventative measures be taken to avoid transient ischaemic attacks progressing to complete strokes or recurrent strokes (Fraser, 1999:17).

Cardiovascular disease, including heart and blood vessel diseases, and strokes, is also South Africa's number one killer, responsible for nearly 20 per cent of deaths each year. This is a considerably higher percentage than for deaths caused by motor vehicle accidents and cancer combined (Bisseker, 1999:55). Atherosclerosis, a chronic, inflammatory disease involving all the arteries and vascular beds, is a major cause of death worldwide. At 40 years of age, 48.6 per cent of men and 31.7 per cent of women are at risk of developing chronic heart disease (Ker, 2004:8).

According to Deaton and Namasivayam (2004:308), coronary heart disease (CHD), also called ischaemic heart disease (IHD), is the leading cause of death in most developed countries. Despite the decrease in mortality, morbidity has increased, with more patients living with the consequences of ischaemic heart damage. Co-director of the Cape Heart Centre, Professor Lionel Opie, says the incidence of coronary artery disease (CAD) is falling in developed countries, such as the USA and Australia, and in parts of Europe, as well as amongst some sectors of South Africa's white population (Bisseker, 1999:55). These populations are taking the necessary precautions as a result of their exposure to educational efforts aimed at the prevention of heart disease. However, cardiovascular disease is on the increase in developing countries where growing disposable income

contributes to an increase in smoking and the adoption of Western diets that are high in saturated fats. In developing countries, close to 50 per cent of all patients with cardiovascular disease have a normal low-density lipoprotein (LDL) level. Multifaceted insulin resistance is now considered as the major cause of acceleration of atherosclerosis in these Westernised societies.

The Global Burden of Disease Study, a worldwide study on atherosclerosis and cardiovascular disease, showed that three times as many deaths occur as a result of cardiovascular disease than as a result of infectious and parasitic diseases. In 2001, the Medical Research Council in South Africa placed the number of deaths per day due to chronic diseases, including IHD, as the third highest. A 6.5-fold higher incidence was projected in the white versus the black population, but this situation was not expected to remain static (Okreglicki, 2002:507). With general and especially economic development, the burden of IHD increases. Changing lifestyles that are the result of social forces such as rapid urbanisation expose people with a traditionally low prevalence of cardiovascular disease to an increased number of risk factors. In the past, cardiovascular disease was the most important cause of mortality and morbidity in developed countries, and it is predicted that it will have the same prominence in developing countries by 2020 (Marais, 2003:363).

According to the World Health Organization (WHO) and the Harvard School of Public Health, the top five causes of death ten years ago were lower respiratory infections, diarrhoea, conditions arising in pregnancy, major depression and heart disease. By 2020, the top five are expected to be heart disease, major depression, road traffic accidents, strokes and chronic chest diseases (Bisseker, 1999:55).

Changing social forces in developing countries and the resulting lifestyle changes lead to an increase in specific risk factors, such as obesity, hypertension, smoking, higher cholesterol levels and higher stress levels. These factors are responsible for an escalation in cardiovascular disease among members of the population, especially those living in rural areas, who are faced with these changing forces (Okreglicki, 2002:507).

What is particularly disturbing about the WHO forecast of escalating cardiovascular disease (Bisseker, 1999:55) is that cardiovascular disease can be prevented by adopting a healthy lifestyle that includes controlling blood pressure and cholesterol levels. Knowledge of the pathology of cardiovascular disease processes, clinical risk

assessment, and the monitoring and measurement of appropriate interventions can assist in directing risk management and healthcare.

1.2 RISK MANAGEMENT FOR THE PREVENTION OF CARDIOVASCULAR DISEASE

1.2.1 RISK FACTORS

Atherosclerosis is not a single disease entity; it manifests as pathological end-organ diseases, depending on the anatomic location, age, genetic and physiological status, and the cardiovascular risk factors involved. Individuals with manifestations of vascular disease, including peripheral arterial disease, often hold their health in their own hands. Nurses have the responsibility to identify these risks, whether non-modifiable, modifiable or lifestyle related, and implement risk management programmes to minimise the physical and psychological distress, and cost of apparent cardiovascular disease (Meetoo, 2004:16). Primary prevention is the same for all vascular events, and the same risk factors, except for haemorrhagic and embolic stroke, must be identified and managed effectively in order to prevent cardiovascular vessel pathology.

According to Wood (2001:S49), in terms of cardiovascular risk, there is a wealth of evidence that the lifestyle associated with Western culture, which includes diets rich in saturated fats and calories, tobacco smoking and little physical activity, plays an important role in the occurrence of CHD. In many individuals, this lifestyle can lead to unfavourable changes in biochemical and physiological characteristics that enhance the development of atherosclerosis and thrombotic complications. Recent research raises the possibility that early life influences contribute to the development of an adverse cardiovascular risk factor profile and CHD later in life.

According to Haskell (2003:245), scientific data over the past few decades support the strong relationship between lifestyle and the risk of developing and/or dying from cardiovascular disease. Clinical complications as a result of atherothrombotic arterial disease are determined by interactions among various environmental and hereditary factors. While hereditary factors, namely a high-risk genetic profile such as low-density lipoprotein cholesterol (LDL-C) receptor deficiency, may be the major determinant for some part of the population, health habits and environmental, lifestyle and cultural exposure are more important factors determining cardiovascular disease risk. If hereditary

factors were the major determinant of cardiovascular disease, there would not have been a rapid increase in cardiovascular disease risk that occurs when the low-risk population adopts the culture of the high-risk population. With a low-risk lifestyle, “bad genes” frequently will not cause clinical cardiovascular disease until later in life. In other words, “bad genes” usually act only in high-risk environments.

There are numerous opportunities to substantially reduce clinical cardiovascular disease events through effective and sustained lifestyle modification. This is according to studies that demonstrate that there are a number of lifestyle risk factors that can act individually or in a synergistic manner, influencing atherosclerotic disease formation and/or progression, and thus triggering clinical events. Cardiovascular disease is a multi-factorial process that is contributed to by the biological and behavioural characteristics of a person, including established risk factors. An effective cardiovascular disease prevention programme includes a lifestyle of not smoking, living a physically active life, following a healthy diet and staying relatively lean, avoiding stress, and combating major depression. The high-risk population group for cardiovascular disease may require medication in combination with a healthy lifestyle in order to minimise their risk of a heart attack or stroke, especially with prevailing conditions that aggravate their high risk, such as hypertension, dyslipidaemia and hyperglycaemia.

Modest but sustained lifestyle changes can lead to a substantial decrease in risk. To successfully achieve and maintain a low-risk profile, knowledgeable and sustained support needs to be provided by the healthcare system. Many people at high risk of developing cardiovascular disease are not able to maintain an effective cardiovascular disease prevention programme without the effective and sustained support of well-organised healthcare providers. One approach that has demonstrated effectiveness in reducing the risk, mortality and morbidity of high-risk patients, has been a nurse-centred or -coordinated management programme using an integrated or multifactor team approach to caring and case management (Haskell 2003:245-6).

Globally, risk factors have been identified as the predecessors of the development of atherosclerosis and as culminating in complications of cardiovascular disease, such as CHD, stroke or other vascular diseases. One of the oldest, but most prominent, cardiovascular heart studies conducted is the Framingham Heart Study of Massachusetts, which calculated the risk for developing CHD within a ten-year period (NHLBI, 2002). In order to get the global picture, several studies in Europe, the USA, the United Kingdom and New Zealand were examined.

According to the Munster Heart Study (PROCAM), there are seven risk variables which independently contribute to CHD:

- A history of cigarette smoking
- Age
- The presence of a personal history of angina pectoris
- The presence of a family history of myocardial infarction
- Hypertension
- Dyslipidaemia (raised LDL-C) and triglyceridaemia (a low high-density lipoprotein cholesterol - HDL-C)
- The presence of diabetes mellitus.

(Cullen, Von Eckardstein & Asseman, 1998:O13.)

Risk factors can be viewed from different perspectives, some of which are represented in the tables below. On behalf of the Joint European Societies Task Force in London, Wood (2001:S50) identified various categories of risk factor characteristics, which are represented in Table 1.1.

TABLE 1.1: CATEGORIES OF RISK FACTORS

Personal Characteristics (Non-modifiable)	Biochemical/Physiological Characteristics (Modifiable)	Lifestyles
Age	Elevated blood pressure	Diet high in saturated fat, cholesterol and calories
Sex	Elevated plasma and total cholesterol (LDL-C)	Excess alcohol consumption
Family history of CHD or other atherosclerotic vascular disease at early age (in men <55yr; women <65yr)	Low plasma (HDL-C)	Physical inactivity
Personal history of CHD or other atherosclerotic vascular disease	Elevated plasma triglycerides	Tobacco smoking
	Hyperglycaemia/ diabetes	
	Obesity	
	Thrombogenic factors	

Risk factors can also be subclassified into modifiable and non-modifiable risk factors, as well as emerging cardiovascular risk factors. European and American medical and governmental agencies were in agreement with the guidelines and classifications of these risk factors.

The major modifiable risk factors for cardiovascular disease are the most important factors. These factors, as well as non-modifiable factors and life habits, are represented in Table 1.2.

TABLE 1.2: MODIFIABLE, NON-MODIFIABLE AND LIFE HABIT RISK FACTORS

Major Cardiovascular Risk Factors		
<i>Modifiable</i>	<i>Non-modifiable</i>	<i>Life Habit</i>
Elevated serum total cholesterol and LDL-C	Age	Obesity
Low levels of HDL-C	Male sex	Physical inactivity
Hypertension	Family history	Atherogenic diet
Diabetes		
Cigarette smoking		

Increasingly, emerging cardiovascular risk factors are receiving attention. These factors are reflected in Table 1.3.

TABLE 1.3: EMERGING CARDIOVASCULAR RISK FACTORS

Emerging Cardiovascular Risk Factors	
Lipid	Nonlipid
Triglycerides	Homocysteine
Lipoprotein remnants	Thrombogenic/haemostatic factors
Small LDL particles	Inflammatory markers
Lipoprotein(a) – Lp(a)	Impaired fasting glucose
Metabolic syndrome	Metabolic syndrome

(Linton & Fazio, 2003:2,3.)

The common risk factors in the studies mentioned above, as well as proposed recommendations for prevention and management strategies, will be discussed more extensively in Chapter 3. The major risk factors as schematically categorised by Aouizerat (2005:140) are discussed in Table 1.4 on page 7.

TABLE 1.4: MODIFIABLE, NON-MODIFIABLE AND EMERGING CARDIOVASCULAR RISK FACTORS

Non-modifiable Risk Factors	Modifiable Risk Factors	Emerging Risk Factors
Age Gender Family history of CHD or other atherosclerotic vascular disease at early age (in men <55yr; women <65yr) Personal history of CHD or other atherosclerotic vascular disease	Dyslipidaemia Smoking Hypertension Overweight and obesity Hyperglycaemia/ diabetes Physical inactivity/lack of exercise Psychological risk factors Excess alcohol consumption Left ventricular hypertrophy	Hypertriglyceridaemia C-reactive protein Fibrinogen Hyperhomocystinuria Hyper-lipoprotein(a) (Hyper-Lp(a)) Microalbuminuria Renin Uricaemia Oxidative stress

1.2.2 RISK MANAGEMENT

Increasingly, the emphasis in healthcare is on wellness, prevention and primary care. This trend has implications for nursing in general, but critical care nursing in particular, as efforts are focused on keeping patients out of costly healthcare centres and critical care environments. Policy makers are also focusing on other outcomes, such as functional status, emotional health, consumer satisfaction, cognitive functioning and quality of life (Clochesy, Breu, Cardin, Whittaker & Rudy, 1996:9,10). Maintaining patients' physical functioning and positive health perceptions should be an integral part of health risk management as facilitated by the nurse. Technology previously restricted to critical care units is now commonly found in general care units and other health settings. Depending on the health risk and needs of the patient, care can be overseen, coordinated or

facilitated by critical care nurses, but provided by other members of the multidisciplinary healthcare team.

According to Clochesy *et al.* (1996:10), the strategy for success is to meet the objective of healthcare reform. This objective is twofold, namely (1) redirection of care delivery toward primary care, health promotion and illness prevention, and (2) the establishment of systems of healthcare delivery that are cost-effective, provide continuity and enable the achievement of outcomes set. The paradigm necessary to healthcare delivery today is represented in Table 1.5.

TABLE 1.5: PARADIGM SHIFT IN HEALTHCARE DELIVERY

FROM	TO
Managing sickness	→ Managing health
Treating patients	→ Covering lives
Discharges	→ Transitions
Rigid organisational structures	→ Flexible structures
Investment in clinical technologies	→ Investment in information systems
Entitling staff and patients	→ Empowering staff and patients

Although health promotion activities have been implemented globally, they have had limited success in bringing rising healthcare costs under control. According to Anderson (2003:6), there may be two main reasons for the limited success of health promotion:

- Disease management is based on the “80/20” rule, that is, in reality, 80 per cent of each year’s health costs are generated by less than 20 per cent of plan enrollees. This has recently been updated by the Population Health Management (PHM) to 85 per cent of the yearly costs generated by 15 per cent of enrollees. Targeting enrollees already generating costs is seen as a means of a return on investment and thus compares to traditional wellness programmes. Although disease management may be a favourable return on investment, it is initiated after an enrollee has already developed a costly chronic disease that will continue to generate elevated costs despite disease management. In addition to this, disease management programmes do not target many of the enrollees that will generate 80 per cent of the next year’s costs because they still fall into the low cost section of the population that is not chronically ill and will not be identified by early preventative screening.

- Health education is not proactively targeted at enrolees' health risks or individual health needs. This is seen in the low percentage (28%) of health programmes that make use of health risk assessments to identify unhealthy behaviours that put enrolees at risk. The result is an important shortcoming in their health promotion. Research has shown that untargeted health promotion and health education efforts have little effect on positive long-term health outcomes.

An example of preventable health risks that lead to expensive disease pathology is the prevalence of obesity and diabetes, with the related healthcare costs four times that of people without diabetes. A high stress level was associated with 46 per cent higher individual healthcare costs, and physical inactivity or a sedentary lifestyle contributing substantially to deteriorating health and spiralling healthcare costs.

The Wellness Councils of America proposed the PHM strategy aimed at improving the overall health of a defined population by segmenting the population based on health-related factors and targeting interventions to meet the needs of each segment cost-effectively (Anderson, 2003:7).

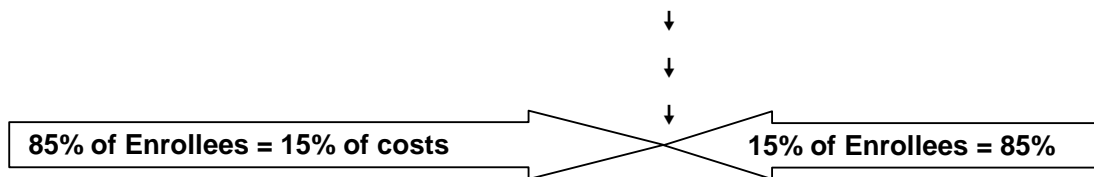
There are four key concepts that underlie this strategy:

- PHM addresses the health needs of all the eligible population, whose health ranges from low-risk to high-risk, chronic conditions and health disabilities.
- PHM provides cost-effective interventions across the entire health continuum, including health risk management, wellness management, disease management and even disability management.
- PHM is data-based and is therefore able to segment the population according to health risks, health status and health costs, stage of readiness to change unfavourable health behaviours so that individual needs can be assessed, interventions planned and programme evaluated.
- PHM components are strategically integrated with the employer's health-related initiatives to achieve the employer's strategic goals.

In Table 1.6 on page 10, segments four and five represent the 15 per cent of the enrolees who generate 85 per cent of the costs. (Refer to Anderson's (2003:7) strategy called PHM – An integrated strategy across the health continuum.)

TABLE 1.6: POPULATION HEALTH MANAGEMENT STRATEGY COMPONENTS

RELEVANT GROUP				
1	2	3	4	5
Health & wellbeing	At risk	Minor illness/injury	Chronic disease	Disability
Low risk Optimal health	Inactivity Obesity Stress High blood pressure	Doctor visits Emergency room visits	Diabetes Heart disease	Traumatic injury Cancer
STRATEGY				
1	2	3	4	5
Wellness management	Risk management	Demand management	Disease management	Disability management
Information Motivation Preventative screening	Targeted intervention Targeted screening	Self care Nurse advice line	Compliance Risk management	Case management Decision support



This study will focus on the segment of the population with cardiovascular health-related risk factors and the interventions aimed at managing these risk factors in order to prevent costly cardiovascular pathology from developing. However, disease management and disability management cannot be totally ignored, as they will always form a part of the picture.

A model for risk and disease management was proposed and discussed with Joubert (2005). A discussion of this model follows.

1.2.3 THE JOUBERT MODEL FOR RISK AND DISEASE MANAGEMENT

According to Joubert (2005), risk management for the prevention of cardiovascular disease can be visualised as a circular graph with five sectors that have financial and patient empowerment implications.

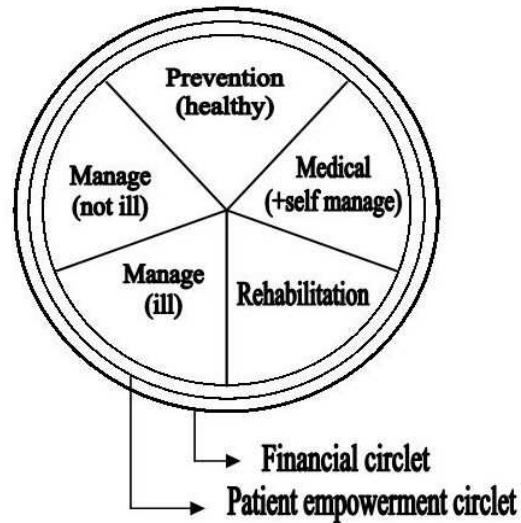


FIGURE 1.1: RISK MANAGEMENT FOR THE PREVENTION OF CARDIOVASCULAR DISEASE

The subdivisions or sectors represent the following phases of risk management:

- *Prevention* of the development of cardiovascular disease. This entails risk management of the 'healthy' individual. According to Riley (2003:ii34), there is a need to move away from individualised interventions directed at patients who already have IHD, and to follow a community approach to preventing cardiovascular disease. In this approach, the structural, economic and cultural issues that impact cardiovascular risk management must be addressed in context.
- *Management* of the 'healthy' or 'low-risk' individual after being screened.
- *Management* of the 'high-risk' individual who has signs and symptoms of impending cardiovascular disease.
- *Rehabilitation* of cardiovascular disease manifestations.
- *Maintenance* of equilibrium between medical treatment and self-management of cardiovascular disease.

The financial and economic sector, which is the main driving force behind health risk management aimed at benefiting the individual, as well as the healthcare provider and the employer, encompasses the subdivisions or sectors of the different phases of risk management represented in Figure 1.1. The financial sector is the driving force behind risk management in healthcare provision, because initial prevention is less expensive than secondary and tertiary prevention or rehabilitation, and has physical, social and psychological benefits as well.

Surrounding the financial and economic sector is the second driving force, patient empowerment. In the figure, the circle represents the function of coordination performed by the nurse facilitator and includes risk screening, end-parameter goal setting, patient education and clinical support. Strategies that could be used by nurses to coordinate risk management performances include the Health Belief Model, motivational interviewing and determining the patient's level of readiness to manage the manageable risk factors.

Modifiable risk factors can be optimally managed by means of medical, paramedical and lifestyle management, whereas non-modifiable risk factors need a greater patient 'buy-in' or involvement in self-management strategies (if he/she is physically able) and compliance with the lifestyle directed by the programme. According to Rutledge, Hyson, Garduno, Cort, Paumer and Kappagoda (1999:226-7), there has been a considerable interest over the past few years in the potential impact of lifestyle modification programmes in patients with cardiovascular disease. These programmes mount an aggressive attack on cardiovascular risk factors, by integrating conventional cardiac secondary prevention programme modalities, such as exercise training, dietary management and stress reduction activities. Lifestyle modification programmes emphasise the importance of patients accepting personal responsibility for their own health and demand that they play a significant role in self-care. Compliance is a major issue in lifestyle modification programmes for patients with cardiovascular disease.

The debatable issue is the question of who is responsible for preventing cardiovascular disease. The patient, healthcare professionals and the organisations that interlink healthcare providers, health insurers and the individual should probably share the responsibility. Nurses make up the largest percentage of healthcare professionals. A health promotion programme, in which specifically the nurse plays a coordinating or facilitating role, and which takes into account the cardiovascular risk factors pertaining to the South African context, needs to be explored and evaluated.

Nursing research has contributed significantly to knowledge about patients with IHD, particularly with regard to acute care and rehabilitation, and provided evidence for improved practice and patient outcomes. Nursing interventions that change the process of care or give more responsibility to nurses for assessment and management of patients with cardiovascular disease would probably most significantly affect the outcomes of mortality, morbidity and costs (Deaton & Namasivayam, 2004:308).

The key goals are to manage these risk factors at a primary level in order to prevent the sequel of cardiovascular disease events developing. This can be achieved through the recommended behavioural changes, such as smoking cessation, regular exercise and the reduction in dietary fat. Several approaches to behavioural change have been investigated, but effective and durable behavioural change continues to be elusive. The Stages of Changes Model used by trained practice nurses in a randomised controlled trial in the Change of Heart Study investigated the latter (Hilton, Doherty, Kendrick, Kerry, Rink & Steptoe, 1999:3). An important aspect of this study was that the practice nurses were trained by a multidisciplinary team with input from psychologists, general practitioners, nurses and experts in smoking cessation and exercise. Training in counselling enabled the nurses to understand the process of helping people to change and the readiness of a patient to change behaviour, as well as appropriate skills used in health promotion interventions.

There are various issues concerning the role of the nurse, which could be uncovered through research by analysing and exploring the role of the nurse in an existing risk management programme.

The following questions are relevant:

- Which tasks and/or skills are relevant in risk management?
- What other significant information should the risk management programme consist of in order to facilitate cardiovascular risk management and health promotion?

The Scope of Practice of registered nurses in South Africa (SANC, 1984) stipulates that the registered nurse's scope entails the actions and procedures that may be performed by scientifically-based physical, chemical, psychological, social, educational and technological means applicable to healthcare practice.

The facilitative role of the nurse as coordinator of the multidisciplinary team in a cardiovascular risk management team has not yet been researched intensively, especially in the South African context.

Questions that emerged are:

- What does the specialist nurse's role in such a team entail?
- How could professional nurses be optimally utilised in a cardiovascular risk management and health promotion programme?

1.3 RESEARCH PROBLEM

An increased awareness of risk, healthcare management and health promotion is vital for economic stability in healthcare provider systems. Risk screening contributes directly to more proficient healthcare management, which embraces awareness of disease prevention and proportionally leads to a decline in end-organ disease. Ultimately, healthcare expenditure is curtailed and savings effected for all the different role players.

After many years of working in the critical care environment, the researcher became interested in the possibility of managing risk factors in order to prevent hospitalisation. According to the researcher, management of modifiable cardiovascular risk factors and the delay in complications could keep the patient out of the multi-million cost and complication critical care unit. Preventing the patient from becoming a critical care statistic (by means of proactive risk management facilitated by a critical care nurse practitioner in such a programme) then becomes the aim.

The role of the nurse has extended to meet the changes in healthcare where increasing emphasis is being placed on health promotion, risk management and disease prevention. The nursing profession has a significant contribution to make in assisting the shift in responsibility for healthcare to patients by empowering them to improve their health outcomes. Nurses can proactively implement risk management and preventative strategies, and advise patients at risk on aspects of health promotion, as they are ideally placed to provide information and give consistent evidence-based advice, improving equity of care generally. The pivotal role of the nurse has been further reinforced by the implementation of secondary prevention through nurse-led clinics (Foxton, Nuttall & Riley, 2004:48).

Certain knowledge and emotional and social skills are required to enable the nurse to be successful in his or her expanded role in health risk management in general. According to Wiles (1997:729), this expanded role is comprised of technical expertise in monitoring chronic illness, knowledge about the specific disease in providing information to patients about symptoms and health education, and social and emotional skills in supporting the patient to adopt changes in their lifestyles. An essential part of a nurse's skill development is training in motivational interviewing in order to enable him or her to help patients make appropriate changes to their lifestyles. However, while the possession of skills is central to the successful pursuance of the nurse's role, the acquiescence of patients is also crucial. For a health promotion and risk management programmes to be successful, patients must view the nurse as accessible, appropriate, credible and efficacious.

In several studies cited by Wiles (1997:730), patients' views of the nurse's role in health management were favourable when they possessed these skills. The expansion of the independent role of the nurse into this area of health promotion and risk prevention, especially secondary prevention, may contribute to their increasing professionalisation.

According to Burke and Fair (2003:257), the literature illustrates the need to elucidate on the skills, attributes and knowledge used in prevention counselling, and which are essential for the healthcare provider in promoting behavioural change and risk reduction. Training of nurses in behavioural change theory and application make them effective interventionists for cardiovascular disease risk reduction. There has been a paradigm shift in the role of the nurse as it pertains to health promotion. More recently the nurse's role emphasises an empowering, patient-centred, collaborative approach with a focus on health and health-influencing behaviour, individual beliefs and values, acquisition of life skills and the enhancement of self-efficacy. These trends support the role of nursing in health promotion and highlight the importance of identifying the skills set and provider attributes necessary for cardiovascular disease prevention and risk management.

Research projects on developing consistently effective strategies for initiating and maintaining healthy behaviours and improving outcomes are greatly needed (Deaton & Namasivayam, 2004:313). The problem is that it is not clear within the South African context how a nurse in a cardiovascular risk management programme could be optimally engaged in a coordinating role in such a programme.

1.4 AIM AND OBJECTIVES

The *aim* of this study is to explore the role of the nurse in cardiovascular risk management programmes and to describe how this role can be extended in order to make optimal use of them in such programmes.

The objectives of the study are as follows:

- To conduct an extensive literature review of cardiovascular health risk management in order to analyse the role the nurse could fulfil in a health risk management programme.
- To explore the role of the nurses currently involved in cardiovascular health risk management.
- To make recommendations for changes to, and improvements in and expansion of, the role of the nurse in such a programme.

1.5 DEFINITION OF KEY CONCEPTS

- *Cardiovascular disease* refers to an insidious, progressive disease that results in the narrowing or complete occlusion of arteries by a process of atherosclerosis. The latter is caused by vascular endothelial dysfunction aggravated by the various cardiovascular risk factors.
- *Risk factors* can be defined as the factors or characteristics associated with an increased probability of experiencing a particular event (Murray & Zentner, 2001:53). A risk factor is “an aspect of personal behaviour or lifestyle, an environmental exposure, or an inborn or inherited characteristic, which on the basis of epidemiological evidence is known to be associated with the occurrence of disease” (Last, 1988, as cited in Newton & Froelicher, 2005:809).
- *Risk management* is viewed as activities that decrease the probability of occurrence of a specific illness or dysfunction in an individual. These activities reduce the incidence of new cases of disorder in the population by combating harmful forces that operate in the community and by strengthening the capacity of people to withstand these forces. (Murray & Zentner, 2001:53.)
- *Health promotion* is defined as activities that increase the level of health and well-being, and actualise or maximise the health potential of individuals, families, groups, communities and societies (Murray & Zentner, 2001:53).

1.6 OVERVIEW OF RESEARCH PROCESS

In this study, mainly qualitative methodology will be used. The study will be done in two phases.

Phase 1: An in-depth exploration of the literature will be done by the researcher to analyse and gain an understanding of the diverse role of the nurse in a cardiovascular risk management programme. This exploration of the literature is more than merely a literature study. The purpose is to describe this role from available literature, as it is relatively new and not well established yet.

Phase 2: Qualitative methodology is used in this phase to explore the role of nurses currently involved in cardiovascular risk management in a South African programme and to determine the current role of the nurse in such a programme.

Finally, the first and second phases of the study will be integrated and considered together in order to make recommendations for change and expansion of this nursing role.

A purposive sample will be used and unstructured guided interviews will be conducted with nurses involved in a risk management programme. Lincoln and Guba's criteria for establishing trustworthiness of qualitative data will be adhered to.

Chapter 2 contains a more detailed discussion of the research design and methodology.

1.7 ETHICAL CONSIDERATIONS

The names of people participating in the programme will remain confidential. Informed consent will be obtained from participants. Consent will be obtained from the authorities of the facility where the research is to be conducted (refer to Annexure A).

1.8 OUTLINE OF STUDY

The study will be presented as follows:

- Chapter 1 Overview of the study
- Chapter 2 Methodology
- Chapter 3 An exploration of the role of the nurse in risk management
- Chapter 4 Discussion of data and literature control
- Chapter 5 Recommendations, limitations and conclusions

1.9 CONCLUSION

In the next chapter, the methodology of the study will be discussed. Due to the character of the phenomena under study, a qualitative approach will be taken. It will be done in two phases, which will be collated in order to make recommendations for changing, improving and expanding the nursing role.

This study will be a significant contribution in that it explores the literature extensively to gain an understanding of the diverse role of the nurse in a cardiovascular risk management programme globally. Risk management as a concept in South Africa is still new and the nursing role in health risk management is not yet described. There is a lack of literature regarding such a programme in the primary healthcare setting in South Africa. Therefore, the researcher proposes to analyse the role of the nurse and set a platform from which to describe this role within a South African context.

The significance of this research also lies in the recommendations that will be made for changing, improving and expanding the role of the nurse in such a programme. The expectation is that such recommendations would give the nurse an independent status, within the appropriate Scope of Practice, as **facilitator and coordinator** of cardiovascular risk management programmes in the South African context.

CHAPTER 2

METHODOLOGY

2.1 INTRODUCTION

An in-depth overview of the research methodology of this research will be conducted in this chapter. The methodology used in the study was mainly qualitative.

The aim of this study is to explore the role of the nurse in cardiovascular risk management programmes and to describe how this role can be extended in order to make optimal use of them in such programmes.

The objectives of the study were as follows:

- To conduct an extensive literature review of cardiovascular health risk management in order to analyse the role the nurse could fulfil in a health risk management programme.
- To explore the role of the nurses currently involved in cardiovascular health risk management.
- To make recommendations for changes to, and improvements in and expansion of, the role of the nurse in such a programme.

2.2 RESEARCH DESIGN

2.2.1 INTRODUCTORY REMARKS

In this exploratory and descriptive study, mainly qualitative methodology was used to explore and describe the role of the nurse as facilitator in cardiovascular risk management.

An extensive literature review also formed part of the methodology. The literature study and explorative or empirical part of the study were integrated in order to make recommendations for change and expansion of this nursing role. This research took place in two phases.

The reasons for the inclusion of the two phases are as follows:

- Cardiovascular health risk programmes have been established in countries abroad for some time. Literature on cardiovascular health risk management in a global context and the nursing inputs is available.
- Nurses were appointed in a health risk management programme in South Africa where cardiovascular risks are also managed. This unique South African setting could be used to explore this nursing role for the South African context but also to indicate areas for improvement and expansion.

2.2.2 QUALITATIVE RESEARCH APPROACH

According to Brink (2006:10), qualitative research has its origins in symbolic interactionism and concentrates on qualitative aspects of meaning, experience and understanding. Qualitative research is characterised, according to Streubert, Speziale and Carpenter (as cited in Brink, 2006:10) by six principles, namely:

- Believing in multiple realities.
- Being committed to identifying an approach to understanding that supports the phenomena studied.
- Being committed to the participants' viewpoints.
- Conducting the enquiry in a way that limits disruption of the natural context of the phenomena of interest.
- Acknowledging the participants in the research process.
- Reporting the data in a literary style rich with participant commentaries.

According to Burns and Grove (2001:61), qualitative research is a systematic, subjective manner used to describe life experiences and give them meaning. It is a manner of gaining insights through discovering meanings and exploring the depth and complexity inherent in the phenomena. In qualitative research, the researcher can explore the meaning, or describe and promote understanding of human experiences that are extremely difficult data to quantify. Thus qualitative research focuses on the qualitative aspects of meaning, experience and understanding, and studies human experience from the viewpoint of the research participants in the context in which the action takes place.

Qualitative research attempts to understand the phenomena in their entirety, rather than focussing on specific concepts. Qualitative research has few preconceived ideas and stresses the importance of people's interpretations of events and circumstances, rather

than the researcher's interpretation. The research approach involves sustained interaction with the people being studied in their own language and on their own turf. According to Brink (2006:33), although qualitative research is regarded as "non-invasive" because it does not involve intervention, the qualitative researcher nevertheless enters the participants' lives. Stake (as cited in Brink, 2006:33) pronounces that the researcher must always remember that they "are guests in the private spaces of the world, that manners should be good and the code of ethics strict".

The research for this study is based on the fact that it is unclear what the current role of the nurse is with respect to a cardiovascular health risk management programme in a specific South African context. As the current role of the nurse is not known, the most appropriate approach to study this phenomenon is a qualitative research approach.

2.2.3 EXPLORATIVE RESEARCH

The aim of using explorative research is to explore the dimensions of phenomena as they manifest and factors to which they relate, providing more insight into the nature of the phenomena. According to Babbie and Mouton (2001:80), exploratory research is engaged in satisfying the researcher's curiosity and a desire for a better understanding of the problem. An exploratory approach develops methods to be employed in the subsequent study, and tests the feasibility of undertaking a more extensive study. It explicates the central concepts and constructs of the study, determines the priorities for future research and develops new hypotheses regarding an existing phenomenon.

The nature of the problem, and the quantity and quality of the information available on the relevant subject, will determine the form and depth of the exploratory study (De Vos, 2004:214). When conducting a qualitative study, it is important to undertake a comprehensive and accurate assessment of the real situation to be investigated, which, in this case, is the role of the nurse in a cardiovascular risk management programme.

2.2.4 DESCRIPTIVE RESEARCH

According to Burns and Grove (2001:52), the purpose of descriptive research is the exploration and description of phenomena in real-life situations. Descriptive research provides an accurate portrayal of information regarding the characteristics of a particular individual, situation, group or phenomenon as it occurs naturally. Variables are described in order to answer the research question with no intention of establishing a cause-effect

relationship (Brink, 2006:102). Through descriptive research, concepts are described and relationships identified that provide a foundation for further quantitative research and theory testing. No manipulation of variables and no attempt to establish causality are involved (Burns & Grove, 2001:248).

In many aspects of nursing, there is a need for a clearer delineation of the phenomena before causality can be examined. Descriptive research in the nursing field involves identifying and understanding the nature of nursing phenomena and the relationships among them. It is important to describe what exists in the nursing practice to discover new information or meaning and to promote understanding of situations (Burns & Grove, 2001:4).

In this study, the researcher aimed to analyse and describe the role of the nurse as facilitator in a cardiovascular risk management programme.

2.2.5 DEFINITION OF CONCEPTS RELEVANT TO THIS RESEARCH

- *Unstructured but guided interviews*: These interviews are initiated with a broad question and the subjects then encouraged to further elaborate on particular dimensions of the topic through guiding questions (Burns & Grove, 2001: 814).
- *Simple observation*: This is described by Babbie and Mouton (2001:293) as observation where the researcher remains an outside observer.
- *Field notes*: Fields notes are notes made by the researcher and are a comprehensive account of the events taking place during the actual discussion and communication, as well as the observer's perceptions and feelings during the research process. It should contain a chronological description of what happens in the setting (Arkava & Lane, 1983:177, as cited in De Vos, 2004:285-6).

2.3 RESEARCH METHODOLOGY

As previously indicated, the research for this study was done in two phases.

2.3.1 PHASE 1

The first phase of this research was conducted in order to meet the **first objective**. An in-depth overview of the literature was done in order to analyse the role of the nurse in

health risk management programmes. This phase is reported on in Chapter 3. In the literature review, the focus was on the role of the nurse as facilitator in a health risk management programme. A systematic study of current literature on the principles of health risk management and clinical risk screening was conducted.

In order to determine the scope of functions of the nurse in these kinds of programmes, the literature review was conducted from a holistic as well as a nursing perspective. The main sources consulted were concerned with risk factors regarding cardiovascular disease, and included books, articles, journals and electronic information services. From a broader perspective, literature on health promotion and prevention of cardiovascular disease and CHD was consulted in an effort to identify the role of the nurse in cardiovascular health risk management. The specific role the nurse plays as facilitator of the multidisciplinary team in this regard as well as management of each risk factor was also explored in the literature.

A literature review was conducted in Phase 1 of the study because risk management as a concept in South Africa is still new and the nursing role in health risk management not yet described. There is a lack of literature regarding such a programme in primary healthcare settings in South Africa. Therefore literature regarding secondary prevention and cardiac rehabilitation was also explored.

2.3.2 PHASE 2

2.3.2.1 PHASE 2: DEFINED

The **second objective**, namely to explore and describe the role of the nurses currently involved in cardiovascular risk management was met by means of qualitative methodology.

In this study, through qualitative methodology, the researcher aimed to capture the participants' "lived experience" in the role of the nurse as facilitator. The study also looked at how the participants understood the functions of the nurse in a cardiovascular risk management programme. The use of descriptive research was appropriate to describe how the participants gave meaning to their role in the programme. The importance of describing the nurse's role in a South African context specifically stems from the lack of literature on this subject, as well as the escalation of heart disease in the country. During

Phase 2 of the study, the participants discussed their perceptions of what a nurse's role is at the moment and what he/she should be doing in the future.

2.3.2.2 PHASE 2: RESEARCH PROCEDURE

◆ Population

There are not many professionals involved in primary cardiovascular risk management in South Africa at present, resulting in a relatively small population. The population consisted of all the professional members registered with the SANC who were involved in risk management in Gauteng. Purposive sampling was done.

◆ Sampling

Purposive sampling or “judgmental” or “theoretical” sampling is a type of non-probability sampling (Burns & Grove, 2001:376), and involves the purposive selection of subjects to be included in the study by the researcher. Non-probability sampling is constructed from an objective judgement of a probable starting point and the researcher's decision of which direction the sampling takes as the study progresses.

According to De Vos (2004:207), purposive sampling is entirely based on the judgement of the researcher, regarding which subjects or objects are representative, possessing typical attributes and containing the most characteristics of the population. They need to be especially knowledgeable about the phenomena studied. This requires the researcher to judge and select those subjects who know the most about the problem at hand and who are able to articulate and explain nuances. The researcher therefore needs to select the sample population, conservatively interpreting the results and replicating the study with new samples (Brink, 2006:132). Clear identification and formulation of criteria for the selection of participants is crucial. Creswell (as cited in De Vos, 2004:334) comments in this regard: “The purposive selection of participants represents a key decision point in a qualitative study”.

The main disadvantages are that this type of sampling does not contribute to generalisation and that the sampling error cannot be estimated because the sample does not represent the population. According to Burns and Grove (2001:376), the purposive sampling strategy may be criticised because there is no manner to evaluate the precision of the researcher's judgement, and bias may exist. On the other hand, the major

advantage of purposive sampling is that it allows the researcher to select participants who are the most knowledgeable of the phenomena studied.

The researcher used this sampling technique as it is commonly used in qualitative research and was the most suitable for this particular study. The researcher did not know in advance how many subjects were needed and sampled continuously until data saturation was reached. According to Seidman (cited in De Vos, 2004:300), data saturation is the point at which new data no longer emerge during the data collection process. Access to a risk management programme, where members of the population were working, was obtained. This population was the most knowledgeable regarding the phenomena studied. One participant from the secondary context (cardiac rehabilitation) was also included. The necessary consent was obtained (refer to Annexure B). According to De Vos (2004:334), researchers using purposive sampling purposively seek typical and divergent data. In this study, the researcher pursued the participants' opinions, experiences and understanding of the role of the nurse in a cardiovascular risk management programme.

◆ **Pilot study**

Seidman (as cited in De Vos, 2004:300) urges researchers to include a pilot study in which the interviewing design and unstructured interview question format are tried out with a small number of participants from the population at hand. The reason for this is to allow the researcher to come to grips with some of the practical aspects of establishing access, making contact, and conducting the interview, and becoming aware of his/her own interviewing skills. The researcher can recognise unforeseen problems and address them by obtaining information for improving the unstructured interview or questionnaire, making adjustments to the instrument (Brink, 2006:54). The time and effort deployed in conducting a pilot study is well spent, as pitfalls and errors that may prove costly in the actual study can be identified, and changes made or avoided (Brink, 2006:166).

A pilot study is especially useful if the researcher has compiled the measuring instrument specifically for the purpose of the research project, as was the case in this research study. The researcher conducted a pilot interview and became aware of certain practical aspects regarding the questions, as well as of the danger of probing participants too much and leading their responses in a certain direction. Adjustments were made before the actual data collection commenced.

2.4 DATA COLLECTION PROCESS

◆ Unstructured interviews

Unstructured interviews are used primarily in qualitative studies of descriptive design (Burns & Grove, 2001:420). Unstructured interviews are free-flowing and structured only according to the focus of the phenomena researched in the study. The interviewer retains his/her own discretion regarding the wording and organisation of the questions, and sometimes even the topic studied. This type of data collection process is particularly appropriate where the researcher does not have adequate knowledge regarding the topic to structure questions in advance (Brink, 2006:152). The researcher may want to understand how the participants organise ideas on a particular topic. Unstructured interviews produce more in-depth information, identifying the participants' beliefs, perceptions, facts, attitudes, opinions, experiences and their reactions to initial findings and potential solutions. Unstructured one-to-one interviews merely extend and formalise a conversation between two people, the researcher and the participant. Unstructured interviews can be referred to as a "conversation with a purpose" (De Vos, 2004:298). The relationship between the researcher and the participant is liquid and changing, but jointly constructed. Mason (as cited in De Vos, 2004:299) speaks of data generation rather than data collection.

The purpose of an unstructured one-to-one interview is an interest of the researcher in understanding the experiences of the participants and the meaning they make of those experiences. It is focused, discursive and allows the researcher and the participants to explore the issues. The researcher should be engaged in the conversation with the participants, implying a willingness to understand the participants' responses to questions in the broader context of the interview. It is essential for the researcher to maintain a balance between flexibility and consistency in data collection.

Prior to interviewing, the researcher must define the information required, so that the information supplied by the interviews clearly relates to specific questions that the researcher would like to be answered. Unstructured interviews require a format and follow a process. Questions to be asked are prepared and can be reviewed with experts in the field.

Unstructured interviews were conducted with each of the participants involved in the programme mentioned. The aim of doing these interviews was to determine the

experiences, skills and knowledge of nurses regarding member education and how they think a nurse should function in his/her role within the broader sense of the programme. In this study, the interviews were done individually in order to give each participant a “voice”.

In an interview, the interviewer may begin with a broad opening question. After the interview has begun, the role of the interviewer is to encourage the participants to continue talking by using techniques such as nodding the head or making sounds that indicate interest or acknowledgement. Depending on how participants reply, the researcher may encourage them to clarify or elaborate further on a particular dimension of the phenomenon under discussion with additional information (Burns & Grove, 2001:421). In this study, the central question was:

From your experience, what do you perceive as the role of the nurse in a cardiovascular risk management programme?

Probing or follow-up questions can be used to increase the detail of exploration. Probes are prompting questions that encourage the participants to elaborate on the topic. They also enhance rapport in that they indicate to the participants that the researcher is really interested in understanding their experiences and opinions (Brink, 2006:152).

In this study, unstructured guided interviews using specific probing questions were conducted in order to gather as much original data regarding the exact perception of the role of the nurse in a cardiovascular risk management programme in South Africa as possible. Unstructured interviews with the participants were done on an individual basis so that they felt free to speak about how they experienced and how they saw their role and function in the programme. Probing questions used in this study are presented as Annexure C.

The number of interviews can usually not be predetermined, but two criteria are of importance in this regard, namely “sufficiency” and “saturation” (De Vos, 2004:300). The question can be asked: are there a sufficient number of participants who reflect that range of members and sites that make up the population so that others outside the sample might have a chance to connect to the experience of those in it? Saturation of information is the point in the study where the researcher begins to get the same responses repeatedly with no new information. In this study, data saturation was reached after ten interviews were

conducted. All unstructured guided interviews were tape-recorded and immediately transcribed. (Refer to Annexure D.)

◆ **Simple observation**

This is described by Babbie and Mouton (2001:293) as observation where the researcher remains an outside observer. Simple observation or unstructured observation involves spontaneously observing and recording what is seen with a minimum of prior planning. Although unstructured observation gives the observer freedom, there is a risk of loss of objectivity and a possibility that the observer may not recall all the details of the observed event. If possible, notes should be taken during the observation period or a sound recording or videotape of the observations made (Burns & Grove, 2001:418).

The researcher made use of simple observation as data collection method for Phase 2 of the study. Participants' responses were observed during the unstructured interviews. Field notes were made as mode of record keeping.

◆ **Field notes**

According to De Vos (2004:304), field notes consist of a written account of everything the researcher sees, hears, experiences and thinks about in the course of collecting data during interviewing or reflecting on the data obtained in the study. The researcher should write down his/her emotions, preconceptions, expectations and prejudices so that he/she can develop them in the final report. Field notes include empirical observations as well as interpretations. Initially this may seem uninteresting or unnecessary, but the researcher is unlikely to know at the beginning of the study what may become important later on. Field notes should contain a chronological description of the participants themselves, the events taking place, the actual discussion and communication, as well as the observer's attitudes, perceptions and feelings. Proper field notes are time consuming, taking up even more time than the actual observation. But by making comprehensive field notes, the researcher can have maximum control over the situation. All the field notes may not necessarily be utilised, but it is better to have too much than inadequate information.

In qualitative research, it is difficult to write down all of the observed data, but the researcher should make accurate and systematic field notes as soon as the observation session has ended. Ideally field notes should be taken down during observation, although this may inhibit the participants. It is important that the researcher keep the objectives of

the study in mind, thus helping him/her to keep direction and distinguish between what is important and what is not (De Vos, 2004:285). Due to the dynamic nature and process of this programme, field notes were taken during all the unstructured interviews and the process of simple observation. This may have inhibited the participants to a minimal extent. These field notes were time consuming, but gave the researcher good control over the situation. All the field notes were not utilised, but adequate information was retained in the final report.

2.5 LITERATURE CONTROL

A literature control serves as a measure to validate the findings of the undertaken study and compare them to those in existing literature to determine similarities or differences. The findings reflect the most current knowledge of the phenomena studied.

2.6 TRUSTWORTHINESS

In qualitative research, trustworthiness means methodological soundness and adequacy (Holloway & Wheeler, 2002:254). Reliability and validity with regard to research findings are of cardinal importance. Collectively, reliability and validity ensure the trustworthiness of the data collection instruments. External criticism or authenticity and the genuine nature of the data establish the validity of data, together with internal criticism, which examines the accuracy of the data and establishes the reliability of the data (Brink, 2006:111).

Miles and Huberman (as cited in Burns & Grove, 2001:406) describe twelve strategies for ensuring the validity of qualitative research, namely:

- Checking for representativeness
- Checking for research effects
- Triangulation
- Weighing the evidence
- Making contrasts and comparisons
- Checking the meaning of outliers
- Using extreme cases
- Ruling out spurious relations
- Replicating a finding

- Checking out rival explanations
- Looking for negative evidence
- Obtaining feedback from informants

According to Agar (1986), cited in Krefting (1991:215), “a different language is needed to fit a qualitative view of research, namely one that will replace validity and reliability with terms such as credibility, accuracy of representation and authority of the researcher”. In this study, Guba’s model (as cited in Krefting, 1991:215) was followed in order to ensure the trustworthiness of the study. Four aspects identified by Guba are *truth-value*, *applicability*, *consistency* and *neutrality*. Holloway and Wheeler (2002:254) suggest that trustworthiness can be judged through developing *credibility (internal validity)*, *transferability*, *dependability*, and *confirmability*. Krefting (1991:214-222) describes specific strategies that can be used throughout the research process to increase the worth of a qualitative study.

2.6.1 STRATEGIES TO ENSURE TRUSTWORTHINESS

2.6.1.1 CREDIBILITY, INTERNAL VALIDITY OR TRUTH VALUE

According to Burns and Grove (2001:228), internal validity is the extent to which the effects detected in the study are a true reflection of reality rather than the result of extrinsic variables. The criterion question that may be asked is: “Is there another reasonable (valid) explanation for the finding other than proposed by the researcher?” According to Holloway and Wheeler (2002:255), credibility or internal validity implies that the participants recognise the meaning that they themselves give to a situation and the “truth” of the findings in their own context.

Truth-value implies how confident the researcher is in the truth of the findings based on the research design, participants and context. The truth-value is obtained from the discovery of human experiences as they are lived and perceived by the participants. The strategy for establishing truth-value is maintaining credibility. In qualitative research, credibility and authenticity are referred to as internal validity (Brink, 2006:119). The goal of credibility is to demonstrate that the inquiry was conducted in such a manner as to ensure that the subject was accurately identified and described.

To establish credibility in a study, the researcher must ensure that descriptions or interpretations of human experience are accurate enough that people who share that experience would immediately recognise the descriptions. Table 2.1 refers.

TABLE 2.1: CREDIBILITY AS A TRUSTWORTHINESS STRATEGY

Criteria	Application
<p><i>Prolonged engagement:</i></p> <p>Prolonged engagement is a mechanism for achieving data credibility (Polit, Beck & Hungler, 2001:468).</p> <p>Sufficient time should be invested in the collection of data to have an in-depth understanding of the culture, language or views of the group or phenomena being studied (Lincoln & Guba, as cited in Polit <i>et al.</i>, 2001:313).</p>	<p>The researcher has been involved in the cardiovascular critical care environment for many years.</p> <p>Sufficient time was spent after the pilot study in the field studied. Participants were interviewed until the researcher received the same responses repeatedly with no new information and data saturation had been reached.</p>
<p><i>Reflexivity:</i></p> <p>Reflexivity is the ability to formulate an integrated understanding of one's own cognitive experience, especially one's influence or role in a set of human relations.</p> <p>The researcher is the "site" or "agent" of integration, seeking new ways of understanding and practising (De Vos, 2004:369).</p> <p>Qualitative researchers need to think critically (reflexive thought) through the dynamic interaction between the self and the data occurring during analysis.</p>	<p>The researcher made use of field notes that were kept throughout the research process.</p> <p>The researcher's own background, perceptions, feelings and role in the research process were assessed. This allowed the researcher to be aware of bias and preconceived assumptions.</p> <p>The researcher developed an integrated understanding of her own cognitive experience in the cardiovascular critical care environment, especially her influence and role in the setting, and her relation to the participants during the interviews.</p> <p>The researcher was "agent" of integration, seeking new ways of understanding the role of the nurse as facilitator in this programme and the practical implications thereof.</p>

<p>Bracketing:</p> <p>Bracketing is the process whereby the researcher identifies and suspends any preconceived beliefs and opinions he/she may have regarding the phenomena under study.</p> <p>The researcher identifies what he/she expects to discover and then deliberately sets aside this idea. Preconceived ideas are “bracketed out” so that the researcher can consider every available perspective or experience reported by the participants (Brink, 2006:113).</p>	<p>The researcher used bracketing during the enquiry process. Preconceived beliefs, opinions, experiences and knowledge regarding cardiovascular risk management were identified and set aside. Information that was expected to evolve from the participants was intentionally set aside or “bracketed out” so that the researcher could reflect on every available perspective or experience reported by the participants in the unstructured interview.</p>
<p>Triangulation:</p> <p>Data triangulation involves the collection of data with the same foci, from multiple sources for the same study. The purpose is to obtain diverse views of the phenomena for validation purposes. These data sources provide an opportunity to investigate how concepts/events are experienced by different participants at different times or in different settings. According to De Vos (2004:352), triangulation enhances a study’s generalisability. There are two types of triangulation, namely:</p> <ul style="list-style-type: none"> • <i>Triangulation of measures</i> <p>The researcher takes multiple measures of the same phenomena. By measuring a concept in more than one way, all aspects of it are likely to be revealed (De Vos, 2004:341).</p> <ul style="list-style-type: none"> • <i>Triangulation of method</i> <p>This means combining qualitative and quantitative methods of research and data.</p>	<p>The researcher made use of triangulation of data by collecting the data through multiple sources (unstructured interviews, field notes during the interviews and exploration of the literature).</p> <p>A pure qualitative strategy with an exploratory, descriptive design was utilised together with a thorough literature review and literature control.</p>

<p>Peer review:</p> <p>Peer review or peer examination is a process of evaluating the validity of the study. The review is “blind”, which means that the reviewer does not know who the researcher is and the researcher does not know who is reviewing the study. Peer examination is concerned with whether the methodology was adequate to address the research objectives and questions and whether the findings are trustworthy (Burns & Grove, 2001: 653). Colleagues, who are competent in qualitative research procedures, listen to the researcher’s concerns and discuss them (Holloway & Wheeler, 2002:259).</p>	<p>The findings of the unstructured interviews were discussed with professionals who were suitably experienced in the research field.</p> <p>An independent coder was also used for the interviews.</p>
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2.6.1.2 TRANSFERABILITY OR EXTERNAL VALIDITY

External validity is defined in qualitative research as the degree to which the results of a study can be generalised to other settings or samples and is referred to as “transferability” or “fittingness”. According to Lincoln and Guba (as cited in Brink, 2006:119), the researcher can ask: “Are the conclusions of the study transferable to other contexts?” In some cases, the findings and knowledge acquired in one context can be transferred to or be relevant to similar situations or participants (Holloway & Wheeler, 2002:255). The researcher establishes a context-rich, detailed database and uses thick description, so that other researchers can determine whether the findings of the study are applicable in another context or setting. Applicability refers to the degree to which research findings fit into contexts outside the study situation. The criterion against which applicability is assessed is transferability. The alternative to transferability or external validity is generalisability, in which the burden of demonstrating the applicability of one set of data to another context lies with the investigator who would make the transfer, rather than with the original researcher (De Vos, 2004:352).

Refer to Table 2.2 on page 34.

TABLE 2.2: TRANSFERABILITY AS A TRUSTWORTHINESS STRATEGY

Criteria	Application
<p><i>Sampling methods:</i></p> <p>Sampling methods should allow for the sample to be composed of elements that contain the most representative or typical attributes of the population (De Vos, 2004:207). Clear formulation of criteria for the selection of the respondents is important.</p> <p>Researchers designing qualitative studies need to provide a rationale for their decisions on the criteria involved.</p>	<p>The sample method was a purposive sampling of nurses registered with the SANC and working in the field of cardiovascular risk management in Gauteng.</p>
<p><i>Dense description:</i></p> <p>Dense or thick description refers to a rich, thorough and detailed description of the research process, context and participants in the research (Polit <i>et al.</i>, 2001:316). It can therefore be seen as a portrayal of the phenomena being studied as well as an account of the processes.</p> <p>Dense description provides a basis for the reader's evaluation of quality. Rich contextual description and analytical language enable the readers to understand the processes and interactions involved in the context, making it possible to generalise. Dense description contributes to the establishment of truth value (Holloway & Wheeler, 2002:262).</p>	<p>The research method and design was discussed in detail to maintain clarity.</p>

2.6.1.3 DEPENDABILITY OR CONSISTENCY

Dependability is another criterion listed by Lincoln and Guba (as cited in Brink, 2006:119) as a strategy to establish the trustworthiness of a research study. According to Holloway

and Wheeler (2002:255), dependability implies that findings should be consistent and accurate. In other words, it is possible to determine the adequacy of the analysis. Often an audit trial is needed to achieve dependability.

The inquiry auditor performs an audit after the research process and determines whether it is acceptable and therefore dependable. This represents assumptions different from those that form the concept of reliability (De Vos, 2004:352). According to Burns and Grove (2001:455), consistency in data collection across subjects is critical. Consistency of data refers to whether the findings would be consistent if the inquiry were replicated with the same subjects or in a similar context. If more than one data collector is used, consistency amongst data collectors is necessary.

Variability is expected in qualitative research as the emphasis is placed on the uniqueness of the human experience. Therefore, consistency is defined in terms of dependability. Variability in qualitative research also deals with the focus on the range of experiences rather than the average experience.

Dependability as trustworthiness strategy and its application in this study are presented in Table 2.3.

TABLE 2.3: DEPENDABILITY AS A TRUSTWORTHINESS STRATEGY

Criteria	Application
<p>Data dependability:</p> <p>Data dependability can be assessed by undertaking an inquiry audit (Polit <i>et al.</i>, 2001:315). An external reviewer scrutinises the data and relevant supporting documents independently.</p> <p>A record is kept of all decision rules used in data analysis and raw data are stored so as to be available for review if necessary. A sample of an interview could be included in the research report.</p> <p>Evidence is retained to support the study conclusions and can be made available on request (Burns & Grove, 2001:593).</p>	<p>Field notes were kept and the coded data audited by a co-coder.</p> <p>Coding was done by meticulously reading through all the interviews and identifying themes that were repeated. More detailed data were coded into the most suitable themes. Data in the themes were divided into categories and subcategories.</p>

<p>Dense description:</p> <p>Dense description refers to a portrayal of the phenomena being studied with an account of the complex processes in a specific context (Polit <i>et al.</i>, 2001:316, 472).</p>	<p>A full, detailed description of the research setting, process, context and participants was given.</p> <p>The combination of transcribed interviews, simple observation, researcher's field notes and literature exploration was used during data collection and analysis.</p>
<p>Code re-code procedure:</p> <p>Code re-code procedure was used. In qualitative research analysis, the data collection phase starts with coding for specific themes and categories. Selected themes are verified through reflection on the data and discussion with other researchers or experts in the field. Refining the categories is a further step in this process. According to Brink (2006:185), coding and categorising can start as soon as data collection begins. The reliability of the coding is checked by re-coding of the same data by another researcher or expert. Coding involves the development of a category system. Continual comparisons are made by the researcher. Data collected from one participant are compared with that of another participant in the determination of the final themes (Brink, 2006:185).</p>	<p>Consensus discussions were held between the researcher and the independent coder and the final themes decided on (see Table 4.1).</p>

2.6.1.4 CONFIRMABILITY OR NEUTRALITY

Confirmability captures the concept of objectivity. Lincoln and Guba (as cited in De Vos, 2004:352) state that the researcher should ask whether the findings of a study could be confirmed by another and by doing so, removes evaluation from the inherent

characteristic of the researcher (objectivity) to the data findings. Neutrality implies freedom from bias in the research procedures and results or the degree to which the findings are a function solely of the participants and conditions of the research, not other biases, motivations and perspectives. Confirmability is the criterion against which neutrality can be measured (Krefting, 1991:214-222).

The findings, conclusions and recommendations should be supported by the data. There should be an internal agreement between the researcher’s interpretation and the actual evidence, and the findings should not be based on the researcher’s prior assumptions and preconceptions (Holloway & Wheeler, 2002:255). According to Brink (2006:119), this is accomplished by incorporating an audit or decision trail where the readers can trace the data to their sources. Intellectual honesty and openness from the researcher, as well as sensitivity to the phenomena, should be incorporated into the decision trail.

Refer to Table 2.4.

TABLE 2.4: CONFIRMABILITY AS A TRUSTWORTHINESS STRATEGY

Criteria	Application
<p>Confirmability audit:</p> <p>A confirmability audit establishes both the dependability and confirmability of data. Several categories of data are important when creating an adequate audit trail, namely:</p> <ul style="list-style-type: none"> • Raw data (e.g. field notes, interview transcripts) • Data reduction • Process notes (e.g. methodological notes) • Materials relating to intentions (e.g. personal notes) • Instrument development information (e.g. pilot form) • Data reconstruction materials (e.g. drafts of the final report) <p>(Polit <i>et al.</i>, 2001:315.)</p>	<p>The research methodology was thoroughly described.</p> <p>An independent coder was utilised in the analysis of data. Raw data in the form of field notes and unstructured interview transcripts were given to the independent auditor in order for the data and relevant supporting documentation to be scrutinised.</p>

<p>Triangulation:</p> <p>To ensure confirmability, triangulation must be applied. Triangulation of data involves the collection of data with the same foci, from multiple sources for the same study. The purpose is to obtain diverse views of the phenomena studied for validation purposes. These data sources provide an opportunity to investigate how concepts/events are experienced by different participants at different times or in different settings. (Burns & Grove, 2001:239).</p> <p>By triangulation, the researcher's intent is to seek several different types of sources that can provide insights about the same events, relationships or phenomena for validation (De Vos 2004:341).</p> <p>Triangulation of measures and triangulation of observers are applicable to this study.</p>	<p>Data were collected and analysed by means of a combination of data collection methods and all the data were reflected on, before integrating it as a whole in order to reach conclusions. First a literature control was done, then field notes were taken and lastly a literature study was conducted in order to be able to apply the criterion of triangulation.</p>
<p>Reflexivity:</p> <p>Reflexivity is the ability to formulate an integrated understanding of one's own cognitive experience, especially understanding one's influence or role in a set of human relations. The researcher is the "site" or "agent" of integration, seeking new ways of understanding and practising.</p>	<p>The researcher constantly reflected on both the research process and the data.</p>
<p>Bracketing:</p> <p>Bracketing refers to the process where the researcher identifies and suspends any preconceived beliefs and opinions he/she may have regarding the phenomena being studied.</p>	<p>The researcher achieved objectivity by constantly reminding herself to "bracket" or put aside her own pre-conceived perceptions and ideas.</p>

(Adapted from Krefting, 1991:214-222.)

2.7 CONCLUSION

This chapter gave an in-depth description of the research methodology. The strategies to achieve trustworthiness based on Guba's model were also discussed. The next chapter deals with the first phase of the research, namely a review of the literature on the role of the nurse in health risk management.

CHAPTER 3

AN EXPLORATION OF THE ROLE OF THE NURSE IN RISK MANAGEMENT

3.1 INTRODUCTION

In the last decade, there has been a paradigm shift from “crash management” and curative survivable health intervention programmes to risk management. Previously, the focus was on containing health care, which resulted in high costs for organisations when their employees became ill. In the USA, the average employer spent US\$5 000 on health care per employee in 2001, of which more than 95 per cent was spent on diagnosis and treatment. Only two to three per cent of this amount was invested in early detection, such as medical screening, and perhaps one to two per cent on prevention (Anderson, 2003:6). The rising healthcare cost spiral can be attributed to poor health as a result of preventable health problems, which are the single most important underlying cost driver.

3.2 RISK MANAGEMENT AND HEALTHCARE REFORM

According to Lindsay and Gaw (2004:30), the Oxford English Dictionary defines a risk as a “hazard, chance of bad consequences, loss, etc”. Knight (1933, in Lindsay & Gaw, 2004:30) says that risks are future outcomes to which it is possible to attach possibilities. Within the health context, a risk factor is regarded as “an aspect of personal behaviour or lifestyle, some kind of environmental exposure, or an inborn or inherited characteristic, which on the basis of epidemiological evidence is known to be associated with“ the occurrence of disease (Last, 1988, in Newton & Froelicher, 2005:809).

In cardiovascular disease, risk factor assessment is concerned with the nature of the risk, where probabilities can be ascribed to the outcome and where modification (risk management) can have a beneficial effect on the individual's health outcome. In this context, risk factors are widely described as those risks that have been shown to relate to the subsequent occurrence of CHD. The management of risk factors is an integral part of preventing CHD. There is scientifically-based evidence that effective management and intervention not only ensure risk reduction, but can also halt the development of

atherosclerosis or even reverse the process (Kunz, 2002, as cited in Lindsay & Gaw, 2004:29).

According to McCauley and Bledsoe (1996:1), risk management can be viewed in broad terms as the practice of identifying and analysing risks or losses and taking the necessary measures to minimise the real or potential adverse effects. Risk management can be broken down into four steps that are essentially similar to the steps of the nursing process:

- ◆ *Identification and analysis* of the exposure to loss. In cardiovascular health risk management, this would mean the identification of the risk factors which could cause the individual to “lose” his health status.
- ◆ *Selection* of the appropriate mechanism(s) to reduce or, if possible, eliminate the possibility of loss. In cardiovascular health risk management, this would be seen as the individualised selection of appropriate risk management interventions.
- ◆ *Implementation* of the chosen technique(s) by providing an appropriate risk management programme.
- ◆ *Monitoring or evaluation* of risk reduction. In cardiovascular health risk management, this would mean that the specific cardiovascular risks that were identified are monitored throughout the programme.

The risk management of cardiovascular disease as described above is focussed on the primary management of cardiovascular risk factors. It may be necessary for the risk factor management to be implemented on a secondary level, in the case of a person with existing cardiovascular disease .

3.2.1 HEALTH REFORM STRATEGIES

Healthcare reform, risk management and high-risk patients (or even low-risk patients who may later become high-cost patients) have become imperative issues in health care worldwide as a result of financial and economic driving forces. Healthcare reform addresses the shortcomings of earlier efforts through three primary strategies, namely: incentives for primary care, expanding the use of certain healthcare providers and incorporating the concept of capitation.

3.2.1.1 INSTITUTING INCENTIVES FOR PRIMARY CARE

This strategy seeks to redirect attention toward wellness, health promotion and disease prevention. These are key sectors in which a nurse could play a more significant role. In the belief that preventing illness is less costly than treating it, the rewards are given to:

- ◆ Healthcare providers for increasing primary preventative care services;
- ◆ Patients for using these services; and
- ◆ Educators for training more practitioners in primary preventative care services.

3.2.1.2 EXPANDING THE USE OF CERTAIN HEALTHCARE PROVIDERS

The Preventative Cardiovascular Nurses' Association (PCNA) states that the presence of cardiovascular disease risk factors demands an integral medical and lifestyle management approach based on lifestyle changes that provide metabolic and psychosocial beneficial effects for the individual (Champagne, Berra, Lamendola, Long, Mason & Sikkema, 2002:8). Cardiovascular disease is a specific chronic condition that has been shown to respond well to a case management risk programme facilitated by nursing professionals.

This case management model for cardiovascular disease has a similar approach to risk management as previously discussed in McCauley and Bledsoe's model, and has been highly successful in reducing cardiovascular risk (McCauley & Bledsoe, 1996:1). The model consists of:

- ◆ Population screening and the identification of people at risk of cardiovascular disease;
- ◆ Risk stratification and triage of people identified as high risk;
- ◆ Establishment of evidence-based risk-reduction interventions;
- ◆ Utilisation of clinical guidelines;
- ◆ Surveillance of safety, efficacy and adherence to the risk reduction programme;
- ◆ Measurement of clinical outcomes, as well as patient satisfaction; and
- ◆ Systematic follow up with therapy modifications indicated for the person.

3.2.1.3 CAPITATION

Capitation is a system of payment in which healthcare providers are allotted a fixed amount per person served, regardless of the extent of the service. Providers thus have an

incentive to keep a patient away from costly care and prevent disease in patients covered. In order to implement capitation, networks or systems within which all care can be provided, must be established. There are two key concepts that must be integrated into these systems, namely service networks and managed care (Clochesy *et al.*, 1996:6).

3.2.2 THE HEALTH BELIEF MODEL

The Health Belief Model is a health promotion model that can assist in behavioural change. This model proposes that behavioural change depends on the degree to which the individual values a particular goal and the particular action to achieve that goal. This model serves as point of departure in a risk management programme to institute health reform.

The Health Belief Model was developed in the 1950s and 1960s by socio-psychologists in the USA. It attempts to explain what motivates people to engage in activities aimed at preventing and avoiding diseases. It assumes that attitudes and behaviour are directly linked, that behaviour can be changed by changing attitudes and suggests that a stimulus or cue is required to trigger the process so that the individual becomes aware of a potential health risk (Kemm & Close, 1995:113). The appropriate behaviours or interventions can then be initiated (Perkins, Simnett & Wright, 2000:354).

Rosenstock (1994, as cited in Pender, 1996:36) states that, according to the model, an individual's motivation to take preventative action is dependent on the following factors (an application relevant to this study is indicated between brackets):

- ◆ *Perceived level of susceptibility*: how vulnerable or at risk to the disease the individual feels (specific cardiovascular risk factors are relevant here);
- ◆ *Perceived severity*: how serious the physical, emotional and social consequences of having the disease are believed to be (specific cardiovascular events are relevant here);
- ◆ *Perceived benefits*: how beneficial or effective the actions are believed to be in preventing the condition or reducing its severity (the attendance of the risk management programme); and
- ◆ *Perceived barriers*: the physical, psychological, financial and other barriers the individual would need to overcome (for example, the barrier of distance, which could be overcome through web-based programmes).

Through this, individual perceptions and modifying factors, and socio-psychological factors and structural variables are identified. The likelihood of action or behavioural change in managing the identified risk factors is determined by the perceived benefits of the action minus the perceived barriers that prevent action. The individual's perception of the seriousness of the disease and his/her susceptibility to the specific cardiovascular risk factors present would then determine the likelihood of his/her taking the recommended preventative health action. Different cues of action or health promotion for managing the risks factors can be implemented. The health educator/nurse has the opportunity to promote the individual's motivation to learn and incorporate new health behaviours.

3.2.3 BRIEF MOTIVATIONAL INTERVIEWING

Brief Motivational Interviewing is an approach to motivating behavioural changes in general healthcare settings. According to research conducted by general practitioners in Cape Town, South Africa, Brief Motivational Interviewing has great potential and has benefits for the participants in a primary health-risk management context.

The use of the Brief Motivational Interviewing model requires a paradigm shift from technical outcome-orientated programmes, which focus on patient control behaviour, to a style and process/patient-centred approach (Mash & Allen, 2004:25). Healthcare providers must be taught the skill of using Brief Motivational Interviewing in a participatory educational style. An essential part of successful healthcare management is the accompanying of Brief Motivational Interviewing with the support of multidisciplinary team experts in the field of behavioural change (Mash & Allen, 2004:21).

Within the broader health education programme, nurses have the task of motivating patients. They should:

- ◆ Assess the individual and use strategies and techniques to enhance the individual's awareness and understanding of the importance of health issues;
- ◆ Create situations where the individual is tempted to do things, such as comment, accept, reject, choose, handle or participate in the health-promotion/risk-reduction programme. In this way, the individual becomes involved in the risk-modification programme and will often stay involved; and
- ◆ Continue to stimulate, challenge and support the individual, by motivating him/her to develop an interest in modifying their cardiovascular risk factors.

3.3 RELATIONSHIP BETWEEN RISK SCREENING AND RISK MANAGEMENT

The concept of risk factor screening for IHD was first introduced in the early 1960s during the course of the landmark Framingham study. Elevated total cholesterol, smoking and raised blood pressure were then linked to an increased incidence of IHD. Despite significant advances in health risk management over the last 40 years, these still remain the major risk factors that must be managed effectively in order to achieve broad cardiovascular wellness (Wellmann, 2000:191).

One of the objectives of risk management is to eventually reduce costs. An effective intervention programme must therefore include the identification of risk factors. In primary prevention, with respect to individuals without clinical atherosclerotic disease but with significant risk factors, the absolute risk of developing IHD or any other atherosclerotic disease during the following ten years, should strongly influence the changes that are made.

Global assessment is used to identify and stratify high-risk individuals for primary prevention, based on multiple risk factors that determine the risk of CHD within the next ten years. The Framingham screening for 'hard CHD' is accepted for 'global risk assessment'. The following CHD risk equivalents have been identified:

- ◆ Aged older than 50 years.
- ◆ Cigarette smoking.
- ◆ Hypertension.
- ◆ Elevated total cholesterol.
- ◆ Decreased HDL-C.
- ◆ Diabetes.

Screening for risk factors at different levels of prevention has a direct impact on the goal directed interventions of risk management. Primary prevention precedes disease or dysfunction and is applied to a generally healthy population. Cardiovascular risk factors that can be targeted at a primary level of prevention include smoking, high-fat diet and low level of physical exercise. Secondary prevention starts when pathology is involved, emphasising early diagnosis and prompt intervention to halt the pathological process. Secondary interventions include early detection of cardiovascular problems such as hypertension, adverse alterations in serum cholesterol levels and increased glucose levels. Lastly, tertiary prevention is applicable to those individuals with a fixed disability, whether stabilised or irreversible. Tertiary prevention focuses on cardiac rehabilitation in

order to restore the individual to optimum levels of functioning within the constraints of the prevailing cardiovascular disease . Tertiary prevention is aimed at risk factors that are not reversible, such as diabetes, kidney disease, angina and a history of a myocardial infarction or stroke. It is therefore of vital importance to act as a primary prevention professional in screening for these risk factors and managing these risks to prevent initial disease pathogenesis, halt secondary pathological cascades developing and ultimately prevent the manifestations of end-stage organ disease.

In a study done by Praeger and Martin (1994, as cited in Wimbush & Peters, 2000:149-153), a cardiovascular genogram was used to identify cardiovascular risk, illustrating the effect of family health and relationship patterns that exist over a period of at least three generations. The researchers felt that this tool could easily be incorporated into the nursing health practice in order to identify individuals and groups at risk for cardiovascular disease and implement the appropriate prevention measures. Nurses should continue to take a proactive approach to the prevention and management of cardiovascular disease.

Comprehensive primary strategies to prevent smoking, reduce cholesterol, make dietary adaptations, increase exercise and reduce stress are important interventions that must be developed by the nurse in collaboration with members of the multidisciplinary team, as well as the patient. Risk screening on a secondary level has certain risk management implications such as the implementation of screening programmes to identify individuals with hypertension, dyslipidaemia and increased glucose levels. Once people are aware of their risks, then culturally sensitive, family-focused preventative interventions can be implemented. Implementing proactive assessment and screening, as well as providing health education, are essential components of health risk management in nursing (Wimbush & Peters, 2000:153).

3.4 RISK MANAGEMENT RELATING TO CARDIOVASCULAR DISEASE

Cardiovascular disease is the leading cause of mortality and morbidity in the United Kingdom and the single most common cause of premature death. The high incidence of cardiovascular disease is not unique to this country. A similar pattern has been observed worldwide (Yusuf *et al.*, 2002, cited in Foxtton *et al.*, 2004:47). The WHO has predicted that, by 2020, CHD will be the most common cause of death and disability throughout the world. This underlines the importance of risk management strategies.

Atherosclerotic cardiovascular disease results in more than 19 million deaths worldwide annually, with IHD accounting for the majority of this number. Despite advances in treatment of IHD, a large number of people, who are apparently healthy and experience no symptoms, die suddenly of this disease. Available screening and diagnostic methods seem to be insufficient and potential victims are not identified. The result is that no treatment is given and fatalities are not prevented (Naghavi, Libby, Falk, Casscells, Litovsky, Rumberger, Badimon, Stefanadis *et al.*, 2003:1772).

The goals of global cardiovascular risk management are to ensure that high-risk patients are identified and incorporated into a health risk management and reduction programme. Advice and motivation are given for possible lifestyle changes. Issues that need to be considered with regard to risk factor management include advice on modifiable risk factors, such as hypertension, different fractions of serum cholesterol concentrations, smoking, abdominal obesity, lack of fruit and vegetables in diet, sedentary lifestyle with lack of physical exercise, and glycaemia control in the diabetic population. (Yusuf *et al.*, 2002, in Foxton *et al.*, 2004:48.)

It is clear that the atherosclerotic process leading to cardiovascular disease begins early in life. Genetics play an important role in the development of cardiovascular disease. However, potentially modifiable risk factors are now also prevalent in the paediatric and adolescent population. These include smoking, the current epidemic of obesity, insulin resistance, Type 2 diabetes mellitus, hypertension, dyslipidaemia and physical inactivity. Unfortunately, the presence of these risk factors gives the youth a head start in the development of atherosclerosis and cardiovascular disease. The important role of school health programmes in promoting behavioural change should therefore be recognised.

In order to address this problem, the American Heart Association and related professional organisations developed guidelines for the primary and secondary prevention of cardiovascular disease and strokes. The PCNA has further developed and revised the *National Guidelines and Tools for Cardiovascular Risk Reduction: A Pocket Guide* in 2005. This resource provides information on the multiple national guidelines and recommendations for primary and secondary cardiovascular disease prevention and risk management goals. This allows the healthcare provider to initiate risk factor assessment and optimal risk management. (PCNA, 2005:8A-9A.)

3.4.1 CARDIOVASCULAR RISK FACTORS

Risk management in the cardiovascular context implies identifying and managing different cardiovascular risk factors. Although the different risk factors are discussed separately below, it should be noted that there is often an interrelationship between them. For example, it has been established that there is a relationship between obesity, hypertension, diabetes mellitus and the metabolic syndrome.

For the purpose of this study, the major risk factors are discussed as schematically categorised by Aouizerat (2005:140).

TABLE 3.1: MODIFIABLE, NON-MODIFIABLE AND EMERGING CARDIOVASCULAR RISK FACTORS

Non-modifiable Cardiovascular Risk Factors (3.4.1.1)	Modifiable Cardiovascular Risk Factors (3.4.1.2)	Emerging Cardiovascular Risk Factors (3.4.1.3)
Age Gender Family history of CHD or other atherosclerotic vascular diseases at an early age (in men <55 yrs and women <65 yrs) Personal history of CHD or other atherosclerotic vascular diseases	Dyslipidaemia Smoking Hypertension Hyperglycaemia/ diabetes Overweight and obesity Physical inactivity/lack of exercise Psychological risk factors Excess alcohol consumption Left ventricular hypertrophy	Microalbuminuria C-reactive protein Fibrinogen Hyperhomocystinuria Hyper-Lp(a) Hypertriglyceridaemia Renin Uricaemia Oxidative stress

In clinical practice, it is useful to consider the risk of positive family history of CHD or other atherosclerotic vascular diseases, as well as personal existing history of CHD, as part of the non-modifiable section of risk factors due to the already existing predisposition of atherosclerosis. Psychological risk factors, namely stress and a Type A personality, are regarded as part of the modifiable section (Lindsay & Gaw, 2004:33).

Often the more generally known risk factors in literature are referred to as traditional cardiovascular risk factors. These include age, gender (male and postmenopausal females), diabetes, hypertension, positive family history, elevated LDL levels, low HDL levels, a history of smoking and a sedentary lifestyle. Risk factors that are new, or still in experimental stage, are referred to as emerging risk factors. These include hypertriglyceridaemia, inflammatory markers such as C-reactive protein, fibrinogen, and homocysteine, variant LDL-C, such as hyper-Lp(a), microalbuminuria, renin and uricaemia.

3.4.1.1 NON-MODIFIABLE CARDIOVASCULAR RISK FACTORS

The risk factors discussed below are unavoidable and not modifiable, but do raise the risk for developing cardiovascular disease.

3.4.1.1.1 Age

The mortality of CHD increases exponentially with age for men from the age of 45 years and women from the age of 55 years (Wellmann, 2000:192). It is unclear why heart disease becomes more prevalent with age. Atherosclerosis may be the result of the aging process and could be the cumulative effects of the risk factors present exerting their effect over time (Lindsay & Gaw, 2004:33).

3.4.1.1.2 Gender

Epidemiological studies reveal that premenopausal women are relatively protected against the development of cardiovascular disease, due to the effect of ovarian hormones, especially that of oestrogen levels (Lindsay & Gaw, 2004:289).

Although the incidence of atherosclerotic vascular disease is similar in men and women following menopause, advanced atherosclerotic lesions develop 20 years earlier in men than in women. The age-specific mortality of atherosclerotic vascular disease is lower in

premenopausal women than in men of the same age (Meeto, 2004:15). Ten years after menopause, CAD rates are more or less the same for both genders.

Most women who die suddenly from CHD do not experience the typical warning signs normally experienced by men. Nausea and dizziness are more common in women, while the classic chest pain symptom is manifested more typically in men. Low-bone density in women, especially post-menopausal women, is also a risk factor, as there is a higher incidence of heart disease in women with low-bone density than in women with high-bone density (Lee & Simmon, 2002:2).

The American Heart Association and the American College of Cardiology recommend that women at risk of heart disease and who have high cholesterol should use pharmacotherapy, such as statins, as first-line lipid-lowering therapy, rather than hormonal replacement therapy. Research has shown that statins prevent osteoporosis in women by increasing bone density (Lee & Simmon, 2002:2).

Another risk factor, which females are more subject to, is obesity. The Women's Lifestyle Project evaluated the effect of reducing calories, saturated fats and cholesterol, and increasing physical activity, for a randomised trial of women with an average risk for heart disease, on entering menopause. The result was that they lost weight and decreased their level of cholesterol by more than 50 per cent. This shows that lifestyle changes can reduce the risk of heart disease in women during and after menopause.

According to research (Lee & Simmon, 2002:3), male hormones contribute to heart disease in five ways, namely:

- ◆ Increasing LDL-C and lowering HDL-C;
- ◆ Increasing central obesity/accumulation of abdominal fat, triglyceride levels and insulin resistance – the so-called “metabolic syndrome”;
- ◆ Increasing coagulation due to increased viscosity as a result of increased red blood cells;
- ◆ Increasing vasospasm of the coronary arteries; and
- ◆ Enlarging and possibly damaging the heart's muscles.

Male cigarette smokers, aged older than 60 years, have two times the risk of CHD compared to those aged 30 to 39 years, and three times the risk compared to non-smokers (Dawber, 1980, in Newton & Froelicher, 2005:812). This is a perfect example of the interrelationship of three risk factors, cumulating in the risk for cardiovascular disease.

3.4.1.1.3 Family history

Researchers conducting the Framingham Heart Study (Lee & Simmon, 2002:3) estimated that having a positive family history increases an individual's risk by about 25 per cent. A positive family history of a myocardial infarction entails three relationships. Firstly, one first-degree relative (a parent, son or daughter, brother or sister) with a myocardial infarction doubles the risk, and a myocardial infarction in two or more first-degree relatives triples the risk. Secondly, the risk is also greater if a relatively large percentage of family members have CAD. Thirdly, myocardial infarction risk is greatest when a myocardial infarction occurs in a male first-degree relative before the age of 55 years or in female first-degree relatives before the age of 65 years (Wood, 2001:S 54). Both genders are probably at an increased risk due to a combination of genetic and environmental factors predisposing the development of CAD (Burke, 1991, and Roncaglioni, 1992, as cited in Newton & Froelicher, 2005:811).

The risk associated with a positive family history of a myocardial infarction is independent of other known CHD risk factors. However, the clustering of risk factors, such as hypertension, diabetes and obesity, is common as a result of an interaction between genetic factors and environmental influences, making it difficult to isolate the genetic influence, except in those individuals with familial hypercholesterolaemia (Lindsay & Gaw, 2004:34).

3.4.1.1.4 Personal history of atherosclerotic vascular disease

Grundy (2001:8E) classifies the population who carries CHD risk equivalents into three categories, namely:

- ◆ Individuals with other clinical forms or a history of atherosclerotic vascular disease, such as peripheral arterial disease, abdominal aortic aneurysm and/or symptomatic carotid artery disease;
- ◆ Individuals with diabetes mellitus, particularly Type 2 diabetes; and
- ◆ Individuals who have multiple risk factors or a ten-year risk of CHD of more than 20 per cent.

According to Woods (2000:1), all patients with existing CHD or other major atherosclerotic vascular diseases are at high risk. Every effort should be made by these individuals to achieve the following therapeutic targets:

- ◆ Lifestyle changes, such as ceasing smoking, following a healthier diet, increasing aerobic exercise, consuming alcohol moderately and having a body mass index (BMI) of less than 25 kg/m² with no central obesity;
- ◆ Blood pressure of less than 140 mmHg systolic and 85 mmHg diastolic;
- ◆ Total cholesterol of less than 5.0 mmol/L and a LDL-C of less than 3.0 mmol/L; and
- ◆ Patients with diabetes mellitus should maintain an optimal glycaemic control of HbA_{1c} (glycosylated haemoglobin A fraction/percentage) of less than seven per cent.

3.4.1.2 MODIFIABLE CARDIOVASCULAR RISK FACTORS

The major modifiable risk factors for cardiovascular disease are the most important factors for assessment of risk and are used as targets for risk prevention and management, and intervention programmes. The PCNA schematically represents these modifiable risk factors. See Figure 3.1 below.

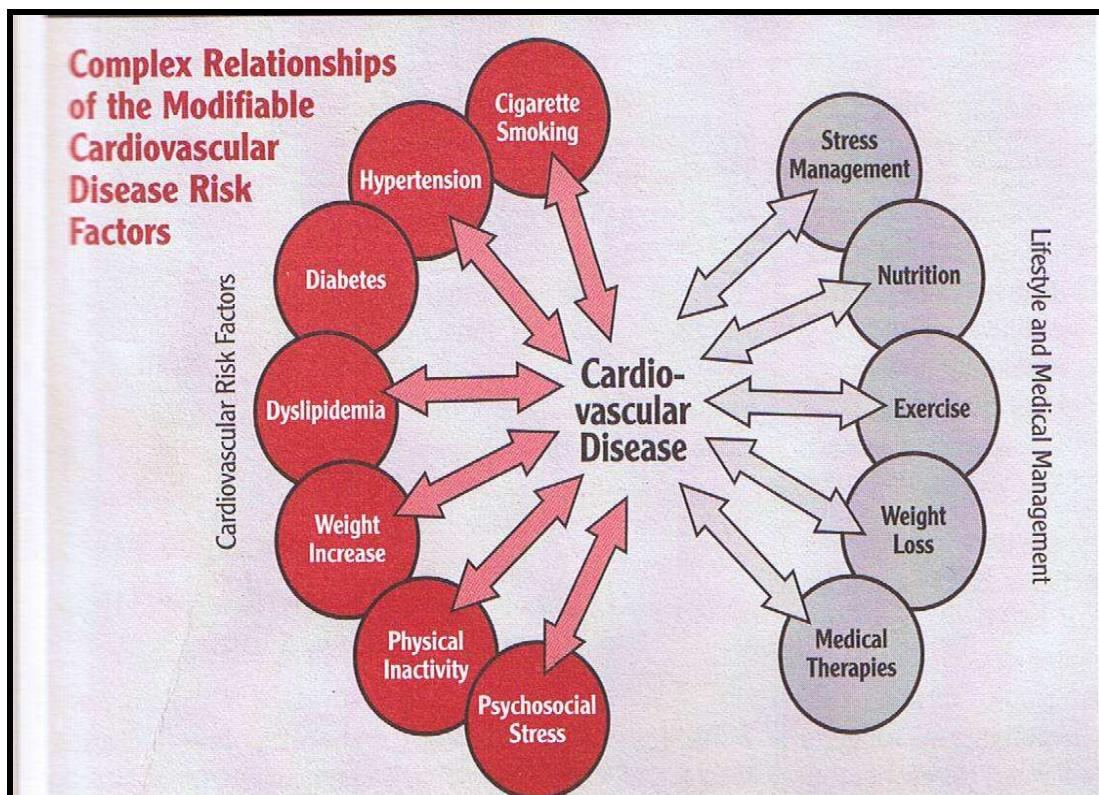


FIGURE 3.1: MODIFIABLE CARDIOVASCULAR RISK FACTORS

(Champagne *et al.*, 2002:9.)

The discussion of the risk factors below is structured as follows: first the *ethiology* and/or *epidemiology* and its impact on the individual's health status will be briefly examined, followed by the existing *global management programme* or *guidelines* to reduce specific risk (these under the overarching heading 'general overview') and lastly by the unique *role of the nurse* in this risk management and/or reduction programme (under the heading 'role of the nurse in risk reduction management').

3.4.1.2.1 Dyslipidaemia

⇒ *General overview*

Dyslipidaemia is abnormal lipid levels including elevated levels of total cholesterol and LDL-C, as well as low levels of HDL-C. The intestine and the liver are responsible for synthesising the precursors for HDL. HDL and other major apoproteins facilitate the transport of excess cholesterol from the tissues to the liver hepatocyte receptors. Cholesterol is then excreted in the bile or bile salts. This phenomenon, namely reverse cholesterol transport, is responsible for the inversely low HDL levels and the elevated LDL, total cholesterol and trygliseride levels (Fair, 2005:899). Dyslipidaemia can be classified into three categories:

Primary dyslipidaemia

This is caused by a single gene abnormality.

Secondary dyslipidaemia

The causes of secondary dyslipidaemia can be divided into the following five categories (Maritz, 2003:365-6):

Diet (excessive saturated fats and calorie intake; weight gain; excessive alcohol consumption; anorexia nervosa). The atherogenic diet consists of foods high in saturated fatty acids, calories and cholesterol. This causes an increase in serum LDL-C levels, which is detrimental in the development of CAD. According to the Third Adult Treatment Panel (ATP111) report, lifestyle risk factors can be managed through therapeutic lifestyle targets (Linton & Fazio, 2003:2).

Diabetes mellitus.

Disorders of metabolism, for example obesity and insulin resistance/metabolic syndrome (which plays a dominant role in causing secondary dyslipidaemia and in the genesis of CAD).

Drugs (thiazide diuretic; beta-adrenergic blocking agents; glucocorticosteroids; estrogens).

Diseases (non-metabolic): These include biliary obstruction, systemic lupus erythematosus (SLE) and chronic renal failure.

Dyslipidaemia in which multiple genes (polygenic) and/or environmental influences (diet) combine to cause abnormal serum lipids.

Hypercholesterolaemia is the most common form of dyslipidaemia, with decreased LDL clearance the cause of the extensively elevated serum cholesterol. Familial hypercholesterolaemia is caused by a genetic disorder, either heterozygous or homozygous. In heterozygous familial hypercholesterolaemia, there is one normal and one abnormal gene for the LDL receptor. This causes plasma LDL-C to be removed from the blood at two-thirds the normal rate, a two- to three-fold increase in blood LDL levels and an increased risk for a myocardial infarction. In homozygous familial hypercholesterolaemia, two abnormal genes are inherited. In this case, the LDL clearance is even slower, resulting in a six-fold increase in blood LDL-C levels. This may lead to a myocardial infarction as early as the age of five to 15 years (Goldstein & Brown, 1987, in Fair & Berra, 2005:901).

The interaction between lipoproteins and the endothelium of the artery involves specific protein receptor interactions and the activation of cellular signalling pathways. This interaction results in the regulation of genes, modification of proteins, platelet activation, thrombosis and thrombolysis, cell proliferation and cellular homeostasis.

Physiologically, the elevated plasma levels of HDL protect against CAD, by improving endothelial function. HDL's potential anti-atherothrombotic effects are based on its antioxidant, profibrinolytic, anti-inflammatory and enhanced reverse cholesterol transport properties (Okreglicki, 2002:504).

Given the protective role of HDL, lipid disorders of combined elevated serum LDL, total cholesterol and triglycerides, and decreased levels of protective HDL present the major risk factors for CHD (Kannel, 1983, as cited in Fair & Berra, 2005:899).

An elevation of total cholesterol and LDL-C (hyperlipidaemia) can be caused by:

- ◆ A high intake of dietary cholesterol and saturated fatty acids, which down-regulates the LDL receptor activity and synthesis, resulting in decreased LDL clearance of cholesterol; and
- ◆ Genetic mutation of apoproteins, lipid activating enzyme systems, which promote the removal of lipoproteins from the circulation, thus resulting in a decreased clearance of total cholesterol (Fair & Berra, 2005:899-901).

The pathophysiological effect is that LDL-C, the carrier of cholesterol, enters the arterial wall and is oxidised by macrophages, causing the process of atherosclerotic plaque formation (Wood *et al.*, 1998, in Meetoo, 2004:15). The cause of atherosclerosis is the fatty streaks on the arterial wall, formed when monocytes congregate in response to lipoprotein oxidation. These cells leave the circulation and migrate to the intima of the arterial wall, increasing the lipid component of the fatty streak and secreting multiple growth factors that trigger further proliferation of connective tissue cells, such as fibroblasts and smooth muscle cells. Collagen production eventually leads to a change from compliant fatty streaks to hard fibrous plaque. Arterial remodelling takes place due to the increased plaque volume, resulting in an outward expansion of coronary arteries to accommodate the effects of the blockage and to allow blood flow through the stenosed vessel. Increasing amounts of fibrous tissue accumulate as the plaque ages, leading to the formation of a fibrous cap. Progressive arterial stenosis eventually leads to decreased blood flow through the stenosed artery causing ischaemia. Rupture of the plaque causes thrombus formation, resulting in cardiovascular events of angina pectoris, myocardial infarction and strokes.

Hypercholesterolaemia can also result in a reduced vasodilatation, causing a vasospasm response and decreasing the diameter of the artery. This leads to diminished blood flow and results in ischaemia. Elevated cholesterol also increases platelet aggregation and adhesion, leading to thrombus formation, inflammatory response and plaque rupture. These processes contribute to the development of atherosclerosis (Fair & Berra, 2005:901).

In South Africa, 46 per cent of white males have a total cholesterol greater than 5,6 mmol/L (Okreglicki, 2002:504). The prevalence rate for the Afrikaner population is the greatest at one in 172, followed by the Ashkenazi Jewish population and the Gujerat Indian community (Crowther & Paiker, 2003:43).

Severe hypercholesterolaemia could present with the following clinical manifestations:

- ◆ Tendon and tuberous xanthomas, as well as xanthomas on the eyelids and corneal arches, due to tissue cholesterol deposition;
- ◆ CAD in early decades of life due to the increased atherosclerotic plaque formation;
- ◆ Aortic valve stenosis; and
- ◆ Articular symptoms, such as tendonitis and arthralgia.

Low levels of HDL-C is also a cardiovascular atherogenic risk factor, as it has a protective effect, removing the accumulation of cholesterol in the arterial wall and transporting it into the liver for excretion into the bile. HDL-C plasma is reduced by smoking, obesity and physical inactivity, which in turn increases the risk of atherogenesis (Wood *et al.*, 1998, in Meeto, 2004:15). A person can thus have normal total cholesterol and LDL-C (less than 4.0 mmol/L), but still develop CHD. The cause and acceleration of atherosclerosis are considered to be multifaceted insulin resistance and low HDL-C levels (less than 1.0 mmol/L). According to Kannel (1983, in Fair & Berra, 2005:899), the protective effect of HDL is greater than the atherogenic effect of LDL-C. Similarly, the Framingham Heart Study found that there was a 50 per cent reduction in coronary risk with every 10 mg/dL increment in HDL-C.

Raal (2003:378) states that dyslipidaemia, particularly in the case of increased LDL-C, correlates with increased CAD mortality. Lipid-lowering interventions like lifestyle modifications or pharmacotherapy can reduce the rate of cardiovascular catastrophes. But, he says, the South African community remains a “hypercholesterolaemic, atherogenic society” which is becoming more and more sedentary and obese.

⇒ ***The role of the nurse in the risk reduction management of dyslipidaemia***

Large primary prevention studies have shown that lowering total cholesterol and LDL-C levels reduces non-fatal myocardial infarctions and CHD death by 30 per cent. The recommendation is to maintain a total cholesterol of less than 5 mmol/L and a LDL-C of less than 3.4 mmol/L (Okreglicki, 2002:504). To ensure the accuracy of lipid measurements, blood should be collected after a 12-hour fast (except for water), the patient should sit quietly for five minutes before the venipuncture and the sample should be obtained one minute after tourniquet application. Cholesterol measurements should be taken no sooner than eight weeks after a myocardial infarction, surgical procedures, trauma, or an acute bacterial or viral infection. Measurements taken earlier may result in a false high value.

It is imperative for the nurse to assess the patient with elevated cholesterol levels for other non-lipid risk factors, which are often interrelated and place him/her in a high risk category. These risk factors include cigarette smoking, hypertension, diabetes mellitus, a family history of premature heart disease, age, the prevalence of other CHD risk equivalents (abdominal aortic aneurysm, peripheral vascular disease) and a Framingham score of more than 20 per cent in ten years.

Lifestyle modifications are the most cost-effective preventative or management strategy and the nurse can play a leading role in the coordination of a multidisciplinary approach to the risk reduction of dyslipidaemia.

Risk factor reduction of hypercholesterolaemia

A strategy for the risk reduction management of hypercholesterolaemia would include the following steps:

Assessment of the individual's current dietary pattern and eating habits

This is necessary to intervene successfully, and motivate the individual to make a healthy lifestyle change.

Dietary recommendations

These recommendations are aimed at reducing the intake of fat (triglycerides) and cholesterol, while also changing the type of the fatty acids consumed from saturated fats to mono-unsaturated or polyunsaturated fats. Replacing food items high in saturated fats with mono-unsaturated or polyunsaturated fatty acids and increasing the quantities of fruit, vegetables and fibre can reduce the saturated fat in a patient's diet.

- ◆ Saturated fats, such as butter, can lead to unfavourable increases in LDL-C and procoagulant platelet aggregation.
- ◆ Mono-unsaturated fats are neutral regarding lipid profile and lower LDL-C. They are a good source of essential fatty acids. Examples of foods high in mono-unsaturated fats are poultry, canola or olive oil, avocado and peanuts.
- ◆ Polyunsaturated fatty acids and omega-3 fatty acids favourably reduce procoagulant tendencies. Examples of foods high in polyunsaturated fats are marine products.

Individuals with hypercholesterolaemia should also restrict their intake of cholesterol to less than 200 mg per day (Fair & Berra, 2005:907). This can be achieved by decreasing

the portion size or avoiding products containing cholesterol. Plants do not synthesise cholesterol and therefore never contribute to cholesterol intake. Soya protein is a useful meat substitute that will reduce the meat protein content consumed.

The National Cholesterol Education Programme (NCEP) advocates a “therapeutic lifestyle change” (TLC), which includes the reduction of total fat intake to 25 to 35 per cent of total calorie intake and incorporates behaviour-change models and compliance strategies (Fair & Berra, 2005:906-7). Table 3.2 on page 59 represents the nutrient composition of the TLC (NCEP, 2001, as cited in Fair & Berra, 2005:902; Lindsay & Gaw, 2004:161-3).

In a comparison between a Mediterranean-type diet and a prudent Western-type diet by the Lyon Diet Heart Study, it was observed that the Mediterranean diet had impressive cardio-protective effects. It showed a 70 per cent reduction in all mortality, attributable to the reduction in CHD mortality, with comparable reductions in non-fatal sequelae (Wellman, 2000:196). The diet included a low intake of total and saturated fats, increased intake of plant omega-3 fatty acids, fresh fruit and vegetables, legumes, cereals containing large amounts of fibres, antioxidants, minerals including calcium and potassium, vegetable proteins, Vitamin B, such as B₆, B₁₂ and niacin, and folates, such as folic acid.

The evidence that antioxidants decrease CHD risk is supported by the epidemiological findings that oxidised LDL is present in atherosclerotic lesions. The hallmark of early atherosclerotic formation is the accumulation of lipid in the arterial intima. Oxidation of LDL enhances its accumulation on the arterial wall (Newton & Froelicher, 2005:820). Lutein-containing foods and carotenoids decrease carotid intimal disease by decreasing macrophage intimal damage in response to oxidised LDL. Lutein is found in dark leafy green vegetables and egg yolks. Observational studies have shown that at least one portion of fish per week is associated with a decrease in CHD, such as myocardial infarction (Okreglicki, 2002:507).

Haskell (2003:247) supports the above diet composition and adds that a more plant-based diet versus an animal product-based diet has significant lower rates of cardiovascular disease mortality. Ready-made, low-cost foods high in saturated fats and trans-fat are popular and unfortunately easy to obtain. Furthermore, components of the food industry vigorously promote the sales of large portions of high-calorie, low-nutrient fast foods for profit reasons.

Substantial knowledge and behaviour skills

Substantial knowledge and skills must be conveyed by the healthcare worker/nurse to the individual concerning dietary changes. The healthcare worker/nurse must ensure that the patient is taught these skills and internalises this knowledge in order to effect dietary changes. In a study conducted by Crouch *et al.* (1986, as cited in Fair & Berra, 2005:908), a more positive outcome was achieved when behavioural interventions were combined with educational strategies.

Weight reduction

Weight reduction is effected by means of dietary recommendations, increased physical activity and behavioural changes.

- ◆ *Dietary recommendations*

(Previously discussed.)

- ◆ *Increased physical activity*

At least 30 to 60 minutes of exercise, three to four times a week, aimed at elevating the heart rate to 75 per cent of the age-related maximum, is recommended (Blom, 2002:285). Weight loss decreases serum triglycerides resulting in increased levels of HDL-C. Increased physical activity aids in weight loss by increasing caloric output. Exercise also improves glycaemic control (diabetes is often an accompanying risk factor) by lessening insulin resistance and improving insulin sensitivity. Regular physical activity improves endothelial function by improving the vasodilatory response and reducing platelet aggregation (Fair & Berra, 2005:909).

- ◆ *Behavioural changes*

Behavioural changes needed by the patient will be discussed under the management of obesity.

Pharmacological management

The healthcare worker/nurse must have a good understanding of the pharmacodynamics and pharmacokinetics of these drugs in order to be able to educate the patient and detect side effects timeously. The classes of hypolipidaemic drugs are as follows:

- ◆ *Bile acid-binding resins*

These increase the synthesis of bile acids from hepatic cholesterol stores. The reduced hepatic cholesterol stimulates LDL-receptors and increases 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) reductase activity, thus resulting in

increased extraction of LDL from the circulation, reducing the serum LDL level. Unfortunately, these agents are unpalatable, leading to poor compliance. Common side effects include constipation (>30%), gastrointestinal tract discomfort (20%), nausea (8%) and bloating (9%). More rarely diarrhoea, steatorrhoea, intestinal obstruction and hyperchloraemic acidosis can occur (Raal, 2003:380).

◆ *Nicotinic acid (Niacin)*

This is a Vitamin B₃ derivative which prevents the re-absorption of bile salts and blocks the release of free fatty acids from adipose tissue, resulting in decreased hepatic conversion of free fatty acids to triglycerides, very-low-density lipoprotein (VLDL) and LDL-C particles, whilst increasing HDL levels with 26 per cent (Chapman, 2004, as cited in Foxton *et al.*, 2004:53). The nurse should inform the patient about the side effects of this drug, which include flushing (95%). This drug can often not be tolerated, causing pruritus, rash, acanthosis nigricans, toxic amblyopia, dizziness, hyperuricaemia with acute gout, impaired glucose tolerance and increased liver enzymes. The incidence of these side effects can be reduced by taking the tablets with meals and by starting with small doses, increasing the dose gradually over a three- to four-week period. Patients must be encouraged not to take the tablets intermittently as this aggravates the side effects. Aspirin taken approximately an hour before can also ameliorate the side effects. It is important to monitor the glucose, liver functions and uric acid levels of the patient during niacin therapy (Raal, 2003:381).

◆ *HMG-CoA reductase inhibitors*

These are generally known as statins. Statins are the most powerful of the lipid-lowering drugs, as well as the most cost-effective. Serum cholesterol is reduced by 20 to 45 per cent, LDL-C is decreased by 25 to 55 per cent, triglycerides are reduced by ten to 30 per cent and HDL-C is elevated by five to 15 per cent. Side effects that should be monitored include hepatotoxicity, myopathy and rhabdomyolysis (Raal, 2003:380). Statin's mechanism of action in dyslipidaemia is the inhibition of the enzyme HMG-CoA reductase, which is the rate-limiting enzyme in cholesterol synthesis. Reduced cholesterol synthesis in the liver stimulates increased LDL receptor response activity, enhancing the clearance of VLDL and LDL from the circulation by up to 60 per cent (McTaggart, 2003, as cited in Foxton *et al.*, 2004:51). Statins also lower triglycerides (fatty acids attached to the glycerol) in proportion to their LDL lowering effect.

- ◆ *Fibric acid derivatives or fibrates*
These primarily increase the lipoprotein lipase activity, which results in increased catabolism of VLDL and reduces triglycerides. Due to their limited LDL lowering effect, these drugs are effective in managing hypertriglyceridaemia and low HDL-cholesterol states. Fibrates are generally well tolerated and side effects are uncommon. Rare side effects include nausea, abdominal pain, myopathy, impotence, raised liver function tests and alopecia. Due to their renal excretion, renal function should be monitored for impairment and used in conjunction with statins, which may cause rhabdomyolysis (Raal, 2003:381).

- ◆ *Intestinal absorption blockers (Ezetimibe)*
These block the absorption of cholesterol in the brush border of the intestine and enhance the uptake of LDL by the liver to be synthesised. Gastrointestinal tract side effects are uncommon (Raal, 2003:382).

- ◆ *Omega-3 fish oils*
The benefit of these fish oils in the reduction of the risk of CAD is well documented (Stone, 1996, in Foxton *et al.*, 2004:53).

According to Fair and Berra (2005:910), “nursing can play a cardinal role in the management of individuals by helping the person to minimise the side effects, while promoting adherence to the therapeutic regimen to achieve the desired lipid, if the dietician is not readily available”. It is of vital importance to involve and consult with the dietician in order to deal with specific and complicated case scenarios.

3.4.1.2.2 Cigarette smoking

⇒ General overview

Cigarette smoking, hypercholesterolaemia, hypertension and physical inactivity are regarded as the four major risk factors in the development of CHD. Smoking is a unique risk factor, in that it interacts synergistically with hypercholesterolaemia and hypertension in escalating the development of CHD (United States Department of Health and Human Services - USDHHS, 1989, cited in Martin & Froelicher, 2005:839). Cigarette smoking can increase the incidence of stroke by 50 per cent (Fraser, 1999:18). It is perhaps the most preventable known cause of CHD, which has a higher mortality than both lung carcinoma and chronic obstructive airway disease (Glantz, 1991, in Newton & Froelicher, 2005:812).

Exposure of non-smokers to environmental tobacco smoke increases the risk of CHD and mortality by 30 per cent in both genders. Similar arterial endothelial damage is caused, initiating or accelerating the development of atherosclerosis and increasing platelet aggregation, putting the non-smoker at risk for coronary thrombosis (Glantz, 1991, as cited in Newton & Froelicher, 2005:812).

Smoking low-tar (<17.6 mg), low-nicotine (<1.2 mg) or filter cigarettes does not put the individual at a lower risk of IHD when compared to high-tar, high-nicotine or non-filtered cigarettes (Kannell, 1984, and Kaufman, 1983, as cited in Newton & Froelicher, 2005:812).

Generally smoking accelerates the development of atherosclerosis by means of several mechanisms, including:

- ◆ Adverse effects on lipid profiles;
- ◆ Endothelial damage;
- ◆ Haemodynamic stress;
- ◆ Oxidant injury;
- ◆ Neutrophil activation; and
- ◆ Increased blood viscosity and therefore increased thrombosis.

(Benowitz & Gourlay, 1997, in Martin & Froelicher, 2005:839.)

According to McBride (1992) in Meeto (2004:14), cigarette smoking is directly responsible for atherosclerosis, which causes endothelial damage with subsequent changes in serum lipids and lipoproteins. This pathogenesis is followed by platelet aggregation and elevated plasma concentration of fibrinogen, leading to thrombus formation. In the Nurses Health Study, cigarette smoking was associated with a five-fold increase in risk for fatal CHD and a myocardial infarction, and triple the risk of angina pectoris (Willett, 1995, as cited in Newton & Froelicher, 2005:812).

According to Benowitz and Gourlay (1997), as cited in Martin and Froelicher (2005:839), although the major contributor to cardiovascular morbidity (angina pectoris and intermittent claudication) is the acceleration of atherosclerosis, a major focus in the smoking population with cardiovascular disease is how smoking mediates acute cardiovascular events such as myocardial infarction, sudden death and stroke.

The mechanism contributing to these pathologies is an interaction of various pathogeneses illustrated in Figure 3.2 on page 64.

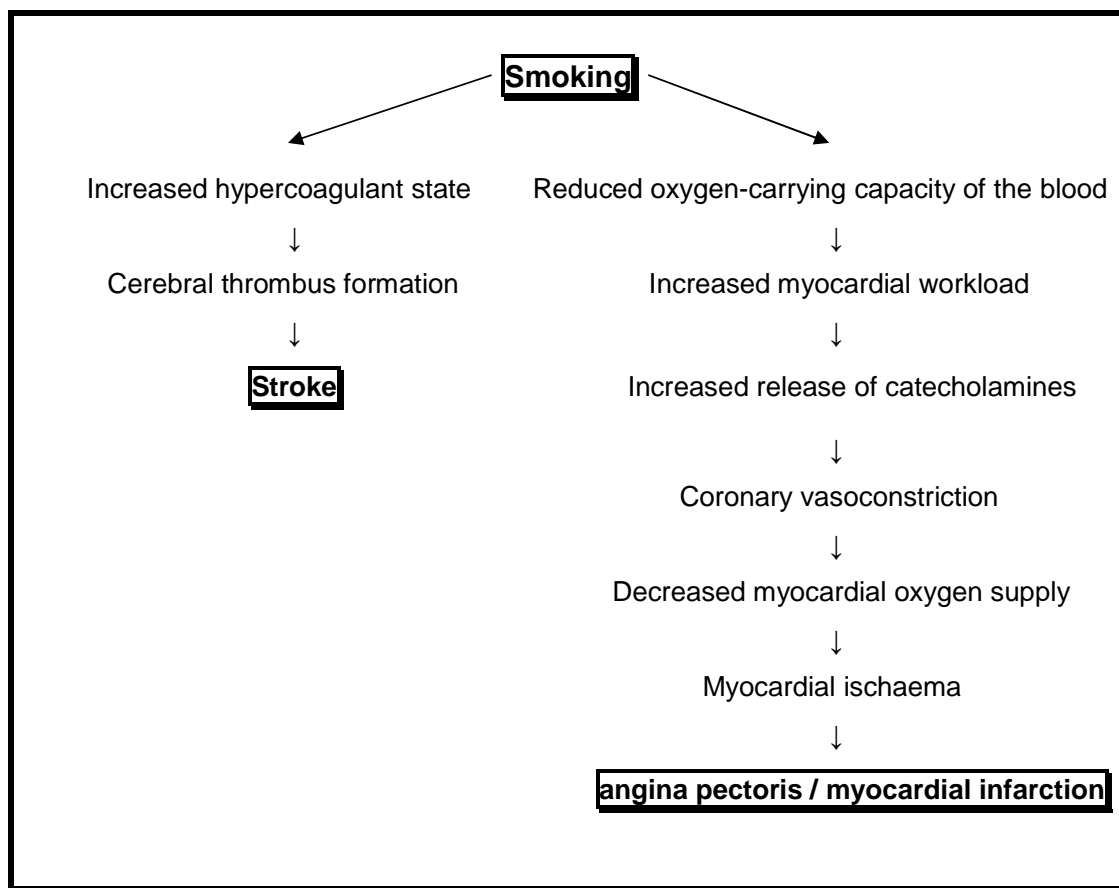


FIGURE 3.2: PATHOGENESES OF CIGARETTE SMOKING

Furthermore, cigarette smoking acts synergistically with the thrombogenic risk of oral contraceptive use, placing women who smoke and are older than 35 years at a greater risk of CHD (Croft, 1989, in Newton & Froelicher, 2005:818).

Stillmann (1995) as cited in Martin and Froelicher (2005:839) states that *nicotine* and *carbon monoxide* are considered the major contributors to the formation of atherosclerosis. Cigarette smokers have a two- to four-fold higher incidence of CHD and a 70 per cent higher death rate as a result of CHD than non-smokers. Smoking also contributes to the higher incidence of peripheral vascular disease, severe arteriosclerosis of the aorta and cerebrovascular disease such as strokes. (Martin & Froelicher, 2005:839-840.)

Nicotine has the following effects:

- ◆ Disruption of the lipid metabolism, resulting in increased LDL-C and a decrease in HDL-C.

- ◆ Hypercoagulability and increased platelet aggregation causing thrombosis.
- ◆ Increased production of catecholamines, which leads to increased blood pressure, heart rate, contractility and systemic vascular resistance, all contributing to increased myocardial oxygen consumption.
- ◆ Myocardial blood supply is limited by the obstructive development of atherosclerosis.
- ◆ Vasoconstriction of the coronary arteries, decreasing the coronary blood.
(Martin & Froelicher, 2005:839.)

Carbon monoxide has the following effects:

- ◆ Interference with the oxygen-carrying capacity of red blood cells by binding to the haemoglobin, thereby reducing the amount of haemoglobin available for binding with oxygen and impeding oxygen release from the haemoglobin molecule to the tissues (Benowitz & Gourlay, 1997, in Martin & Froelicher, 2005:839).
- ◆ Increase in the permeability of the endothelial membranes, resulting in an increased uptake of cholesterol, leading to atherosclerosis (USDHHS, 1983, in Martin & Froelicher, 2005:839).

⇒ ***The role of the nurse in the risk reduction management of smoking***

One of the major responsibilities of the nurse in cardiovascular health promotion is to initiate smoking cessation by means of behavioural modification. Although this may not usually be included in the nursing curricula, research has shown the effectiveness of nurse-led smoking cessation interventions.

Within eight hours of smoking cessation, the nicotine levels of the patient will be reduced by 50 per cent and within 24 to 48 hours carbon monoxide levels will be comparable to those of a non-smoker (Meetoo, 2004:14), which in turn reduces the risk of CHD. The Framingham study showed that smoking cessation lead to an immediate reduction in stroke risk in all ages, regardless of the amount of smoking. Major risk was reduced within two to four years (Fraser, 1999:18).

The core component of successful smoking cessation interventions is usually behaviour modification, which includes:

- ◆ Identifying areas of concern for the patient;
- ◆ Teaching patient strategies to cope with difficult situations; and

- ◆ Role-play strategies to allow patients to enhance their new coping strategies (Martin & Froelicher, 2005:838).

According to the USDHHS (Martin & Froelicher, 2005:839), permanent smoking cessation is the ultimate goal for cessation interventions and smokers. However, owing to the addictive properties of nicotine in tobacco products, this goal is difficult to achieve. The extent of the addictive properties of nicotine can be seen in the withdrawal symptoms experienced. Nicotine withdrawal is diagnosed when four of the following symptoms commence within 24 hours of abrupt cessation:

- ◆ Dysphoric or depressed mood.
- ◆ Insomnia.
- ◆ Irritability.
- ◆ Frustration or anger.
- ◆ Anxiety.
- ◆ Decreased concentration.
- ◆ Restlessness.
- ◆ Decreased heart rate.
- ◆ Increased appetite or weight gain.

Identification of the signs and symptoms mentioned above and prompt intervention is important for the nurse taking part in a health promotion programme of this kind.

A brief questionnaire regarding nicotine tolerance was designed by Fagerstrom (Refer to Table 3.3 on page 67). The total score can range from zero to ten. A score of greater than seven indicates nicotine dependence (Martin & Froelicher, 2005:846).

According to Martin and Froelicher (2005:840), there are several similar theories regarding smoking cessation. These are the Transtheoretical Model of DiClemente (1991), Prochaska's Theory (1994) and Velicer's Theory (1995). Smokers are classified into the four following stages according to their desire to quit smoking:

- ◆ Pre-contemplation.
- ◆ Contemplation.
- ◆ Action.
- ◆ Maintenance of smoking cessation.

TABLE 3.3: FAGERSTROM'S NICOTINE DEPENDENCE QUESTIONNAIRE

Question	Answer	Points
How soon after you wake up do you smoke your first cigarette?	Within: 5 min	3
	6-30 min	2
	31-60 min	1
	After 60 min	0
Do you find it difficult to refrain from smoking in places where it is not allowed, e.g. church, cinemas?	Yes	1
	No	0
Which cigarette would you hate most to give up?	First one in the morning	1
	All others	0
How many cigarettes do you smoke per day?	<10	0
	11-20	1
	21-30	2
	>31	3
Do you smoke more frequently during the first hours after waking than during the rest of the day?	Yes	1
	No	0
Do you smoke if you are so ill that you are in bed most of the day?	Yes	1
	No	0

Another theory regarding smoking cessation is the Self-efficacy Model, which is based on Bandura's social cognitive learning theory (1997, in Martin & Froelicher, 2005:840). In smoking cessation, self-efficacy is the smoker's level of confidence in refraining from smoking in challenging situations, such as social, emotional and habitual situations. Challenging situations must be identified and strategies devised by the individual in collaboration with the healthcare worker to assist the individual to avoid or cope with tempting situations. An individual with a low self-efficacy is more prone to relapse to smoking, according to Dornelas *et al.* (2000, in Martin & Froelicher, 2005:840). It is the healthcare worker/nurse's responsibility to identify individuals with low self-efficacy and provide him/her with coping skills or strategies to support and navigate successfully through risky situations.

Other supportive intervention techniques include individual and group counselling, hypnotherapy, nicotine replacement therapy and aversion therapy (Murray, 2001, as cited

in Meeto, 2004:14). A variety of incentive group smoking cessation programmes are offered, but most smokers prefer to quit on their own or with individual support. According to the literature, 90 per cent of smokers eventually quit on their own, even though there may be several relapses (Pechacek, 1984, as cited in Martin & Froelicher, 2005:841). It is imperative that nurses familiarise themselves with methods that can be adapted to the patients' individual needs, combining a clinical approach with multi-component strategies exclusive of a formal treatment regimen.

It is critical that healthcare workers/nurses assess their level of competency in offering smoking cessation interventions. If necessary, they should be trained in counselling. An evidence-based clinical guide document *Treating Tobacco Use and Dependence: Clinical Practice Guideline* proposes the following five intervention steps (the "five A's") for smoking cessation (Martin & Froelicher, 2005:842-9):

Step 1: Ask about tobacco use.

Systematically identify tobacco users/cigarette smokers.

Step 2: Advise.

Strongly urge all smokers to quit smoking by giving them a distinct and powerful, but personalised message about smoking cessation and the health hazards of continuing to smoke. It is imperative that the message is personal and relevant to the smoker's health, disease status, family or social situation, age, sex, and past smoking behaviours. Highlight the personal health hazards for the smoker and his/her family, and the high risk of cardiovascular disease related to smoking. Simultaneously stress the benefits of smoking cessation, especially benefits such as significantly improving survival rates for people of all ages, lowering the risk of stroke to that of a non-smoker within five to 15 years of abstinence (Stillman, 1995, in Martin & Froelicher, 2005:840) and decreasing the risk of death from CHD by at least 50 per cent in the first year of smoking cessation (Sparrow *et al.*, 1978, in Martin & Froelicher, 2005:840).

Step 3: Assess.

Determine which smokers are willing to quit smoking at that time. A response scale can be used to identify smokers who intend quitting smoking.

This is a Lickert scale with seven points:

Definitely No	- 1
Probably No	- 2
Possibly No	- 3
Maybe	- 4
Possibly Yes	- 5
Probably Yes	- 6
Definitely Yes	- 7

If patients are unwilling to quit, it is important to determine what the barriers to smoking cessation are. Providing help, support and solutions to anticipated problems may move the patient from the precontemplation phase to the contemplation phase. If the patient is still hesitant to quit smoking, motivational interventions should be provided, as recommended in the USDHHS Guidelines (2000b, in Martin & Froelicher, 2005:840). Once this has been achieved, the patient must identify, in collaboration with the nurse, the following aspects (the “five R’s”):

R elevance

Discuss the relevance of the smoking interventions with the patient so that it becomes meaningful to him/her. Discuss smoking cessation with regard to the patient’s own health status, family and/or social environment, age, sex and any other significant situation unique to him/her.

R isks

The three categories that should be mentioned to the patient are:

Acute risks of smoking include shortness of breath and exacerbation of asthma.

Long-term risks include the risk of developing a heart attack, stroke, cancer and chronic obstructive airway disease.

Environmental risks are the adverse effects smoking can have on the patient’s family members’ health and include the risk of lung cancer, sudden infant death syndrome and asthma (Martin & Froelicher, 2005:843).

R ewards

The rewards of smoking cessation should be emphasised in the discussion with the patient. These include improved health, energy levels, sense of smell and taste, self-esteem, reduced wrinkling and ageing of the skin, economic savings, role-modelling of non-smoking for children and the absence of the adverse effects of smoking on his/her children, family members and friends.

Roadblocks

Roadblocks or barriers to quitting smoking should be pointed out to the patient. These include withdrawal symptoms, fear of failure, weight gain, lack of social support, depression, and the social need to smoke.

Repetition

Repetition and review of the four “R’s” mentioned above should be conducted regularly with the patient until he/she is receptive to smoking cessation.

Step 4: Assist.

Assist the patient who is ready to quit smoking by establishing a plan to quit. This plan could include setting a date to quit. Setting a specific quit date within two weeks of meeting with the healthcare worker/nurse is very important, as a patient could decide to quit on the spot, “cold turkey”. At this stage, the patient’s commitment to quitting can be formalised by signing a contract. This is an effective behavioural technique in smoking cessation and can be used as a means of support for the patient during the process. The plan should also include the patient informing family, friends, co-workers or significant others about quitting and asking for their support. Challenges to remaining smoke-free should be anticipated and tobacco products removed from the home and work environment.

Four components should be included in this stage of the intervention process (Martin & Froelicher, 2005:844). These components are provision of *practical counselling*, *intra-treatment support*, *extra-treatment social support* and *effective pharmacotherapy*.

Provision of practical counselling

Practical counselling should include problem-solving skills training, relapse prevention and stress management. During practical counselling, the nurse helps the patient to identify and anticipate risky situations, such as social events, activities and internal states that increase the risk of smoking relapse. Coping strategies that the patient could use include anticipatory planning, avoidance and stress reduction. It is important to warn the patient that even one puff of a cigarette increases the chances of a complete relapse to smoking. The patient should also be counselled about the addictive nature of smoking and the potential withdrawal symptoms, which reach maximal intensity 24 to 48 hours after first quitting and will gradually subside over one to two weeks.

Provision of intra-treatment support

Intra-treatment support is essential and shows the patient that the nurse cares for him/her and their health by providing the opportunity to talk about fears, concerns or successes.

Provision of extra-treatment social support

Extra-treatment social support is just as imperative. The nurse should urge the patient's family members and significant others to encourage and support the patient in his/her attempt to quit. A simultaneous smoking cessation intervention can be provided to family members and significant others who smoke, if needed. This is important, especially when the patient is living with other smokers, which is a strong predictor of relapse (Martin & Froelicher, 2005:844). Other extra-treatment supportive techniques include role playing with the patient on how to ask for support and identifying and referring the patient to community resources, such as hotlines or help-lines, websites, group meetings or even helping patients to finding "cessation buddies" with whom they can collaborate.

Provision of effective pharmacotherapies

Pharmacotherapies are recommended, unless the patient is pregnant, breast-feeding, an adolescent, was smoking less than ten cigarettes a day or has medical contraindications, such as a recent myocardial infarction or unstable angina. In a study, five first-line pharmacotherapies were analysed and determined safe and efficacious. Their use led to double the cessation rates in a group of smokers when compared to the group given placebos (Martin & Froelicher, 2005:846). When taking pharmacotherapies, the patient should be advised to read supplemental information that is appropriate to the patient's culture, race, education and age regarding the different pharmacotherapies.

Step 5: Arrange.

The nurse should schedule follow-up contact sessions with the patient. Kottke *et al.* (1988, as cited in Martin & Froelicher, 2005:849) came to the conclusion that reinforcement contact sessions conducted by the healthcare worker resulted in a greater likelihood of smoking cessation. According to the USDHHS (2000b) in Martin and Froelicher (2005:844), it is of cardinal importance that the nurse follows up on the patient by means of personal contact sessions. After the date to quit has been set by the patient, a follow-up contact session should be held within the first week and

thereafter within the first month to reinforce the decision and offer support to the patient. Follow-up sessions can be done personally or by means of long-distance communication. In order to reinforce the strategies discussed in the previous steps, the nurse should congratulate the patient on success, offer support, reinforce decisions and teach problem solving. If the patient has relapses, follow-up sessions provide the opportunity to review the circumstances leading to the relapse, to create a new plan of action to deal with similar situations in the future and to establish a new date to quit. The nurse also has the opportunity to review and troubleshoot any problems associated with the pharmacotherapies used during these follow-up contact sessions (Martin & Froelicher, 2005:849).

⇒ ***The role of the nurse in the risk management of relapse***

Relapse prevention

The key to successful and maintained smoking cessation is to prevent any relapse to smoking. Most relapses occur within three months after the initiation of cessation, although the risk for relapse continues long after the initial date on which the patient quit. The *Clinical Practice Guideline* (USDHHS, 2000b, as cited in Martin & Froelicher, 2005:841) divides relapse prevention into two main categories namely, *minimal practice interventions* and *prescriptive interventions*.

- ◆ *Minimal practice interventions* should be provided at every contact session to the patient who recently quit smoking. The nurse should congratulate the patient on his/her cessation success, assist in problem solving or difficulties experienced or anticipated and encourage the patient to maintain his/her status as a non-smoker.
- ◆ *Prescriptive interventions* are more in-depth evaluations of “risky situations” that occurred or are anticipated. The nurse evaluates whether support systems are in place, depression or withdrawal symptoms are evident and if the patient is still motivated to remain a non-smoker.

A variety of predictors for relapse within 60 days after cessation have been identified, namely stress, high nicotine dependence, low self-efficacy and limited social support (Ockene *et al.*, 2000, in Martin & Froelicher, 2005:844).

Relapse prevention strategies

Strategies for relapse prevention include:

- ◆ *Identifying “high risk” situations* by means of self-monitoring and self-efficacy scales. The patient monitors each cigarette smoked, when or what time of day, the situation

at the time that the cigarette was smoked and a rating of his/her mood. This helps to identify smoking patterns, behaviours and habits. The patient's self-efficacy is measured by the patient's confidence to resist the urge to smoke. This rating is predictive of whether the patient will resume smoking, as well as of situations or contexts that are predictive of a relapse (Martin & Froelicher, 2005:845). A 14-item, 11-point Likert scale represented in Figure 3.3 can be used to measure self-efficacy in different situations:

Not at All Confident			Slightly Confident			Fairly Confident			Very Confident		
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
When you feel bored or depressed											
When you see others smoking											
When you want to relax or rest											
When you just want to sit back and enjoy a cigarette											
When you are watching TV											
When you are driving or riding in a car											
When you have finished a meal or snack											
When you feel frustrated, worried, upset, tense, nervous, angry, anxious or annoyed											
When you want to snack, but don't want to gain weight											
When you need more energy or can't concentrate											
When someone offers you a cigarette											
When you are drinking coffee or tea											
When you are in a situation where alcohol is involved											
When you feel smoking is part of your self-image											

FIGURE 3.3: LIKERT SCALE OF SELF-EFFICACY PREDICTIVE OF SMOKING RELAPSE

A rating of less than 70 per cent for a given question denotes a high-risk situation for the patient and the need for support (Martin & Froelicher, 2005:845).

- ◆ *Providing the patient with skills* that will assist him/her to cope in these high-risk situations through the mobilisation of his/her resources and the implementation of cognitive and behavioural strategies. According to Tsoh *et al.* (1997) as cited in

Martin and Froelicher (2005:845), a person can be trained to cope with the urge to smoke through the ACE (Avoid, Cope, Escape) strategy.

Avoid: If the patient is not confident that he/she can resist smoking in a risky situation, the patient should be encouraged to avoid the situation, until his/her confidence improves and he/she feels more confident in dealing with the specific situation. For example, the patient could be advised to sit in the non-smoking section in a restaurant.

Cope: If avoiding the high-risk situation is not possible, the patient should be taught to cope with it. There are several coping strategies that can be used, such as distraction, incompatible behaviours and positive self-talk.

Escape: If the patient cannot avoid or cope with a high-risk situation, escape may be an option. The patient should get out of the risky situation as fast as possible without smoking.

The nurse should stress that the patient can use any combination of these strategies.

- ◆ *Rehearsing the coping mechanisms with the patient.* The nurse and patient rehearse the identification of risky situations and exercise coping strategies. It is the nurse's responsibility to strengthen coping mechanisms by means of role-playing with the patient and help him/her find a suitable solution or coping strategy to deal with the high-risk situation in order to prevent relapsing to smoking.

Relapse training

Relapse training focuses on lifestyle modifications that enhance the patient's self-control over his/her smoking. In a study of patients after a myocardial infarction, it was shown that the two techniques that have successfully been used to gain a greater sense of self-control are exercise and relaxation strategies (Taylor *et al.*, 1988, as cited in Martin & Froelicher, 2005:846). According to Shiffman (1986), cited in Martin and Froelicher (2005:846), another lifestyle modification that could be helpful in relapse prevention is the avoidance of alcohol. Alcohol is an independent indicator of relapse.

Areas that may need special attention and specific supportive interventions in the process of smoking cessation interventions are:

- ◆ Stressful situations.
- ◆ Depression and loss.
- ◆ Weight gain.
- ◆ Alcohol usage.

According to Martin and Froelicher (2005:851-2), special attention should be given to:

- ◆ Those who do not have adequate social support from their spouse or family members.
- ◆ The economically disadvantaged.
- ◆ Migrant workers.
- ◆ Immigrants.
- ◆ The homeless.
- ◆ Lesbian, gay or bisexual individuals.
- ◆ Ethnic minorities.
- ◆ Women with special needs.
- ◆ Infants and young children.

3.4.1.2.3 Hypertension

⇒ General overview

According to Flack, Alexander, Sahebzamani, Spates and Wynne (2004:3-10), hypertension imposes a burden on healthcare systems worldwide. Hypertension often occurs in individuals with other risk factors, such as diabetes, hyperlipidaemia, obesity, and smoking, thus *culminating in a multifactorial augmentation of risk for cardiovascular disease*. There is a definite correlation between the degree of blood pressure elevation and cardiovascular disease risk. The average increase in systolic blood pressure of 20 mmHg that accompanies age implies that the risk of significant atherosclerosis is increased two- to three-fold for individuals between the age of 30 and 65 years.

Furthermore, hypertension is a highly significant problem in the black population of America, with an estimated 30 per cent of all deaths in this population attributed to hypertension. Hypertension also results in approximately eight times more hospitalisations in the black American population than in the white population. There is a high incidence

and prevalence of hypertension in black people, especially in black females. In the black population, hypertension occurs earlier in life, is more severe and is more often associated with target organ injury, than in the white population.

Hypertension is defined as a systolic reading of greater than 140 mmHg and/or a diastolic reading of greater than 90 mmHg (Newton & Froelicher, 2005:812). This measurement was also agreed upon by the Joint National Committee of the National High Blood Pressure Education Programme and the Guidelines subcommittee of the WHO, as well as the International Society of Hypertension (Cunningham, 2005:856).

Hypertension is the single most important risk factor globally for ischaemic and haemorrhagic strokes and results in a three- to four-fold increase in risk of CHD, stroke and myocardial infarction (Newton & Froelicher, 2005:812). In the Framingham study, this was confirmed by data indicating that people experiencing hypertension have at least double the risk of developing CHD and heart failure when compared to normotensive people. Hypertension is also the major modifiable risk factor for atherosclerosis. According to Cunningham (2005:856), high blood pressure is the most common risk factor for cardiovascular disease in developed and developing countries.

According to Okreglicki (2002:503), epidemiological data has shown that an increase in diastolic blood pressure from 76 mmHg to 105 mmHg is associated with a ten-fold increase in cerebral stroke and a five-fold increase in heart disease. An even better marker for CHD is the elevation of the pulse pressure at any level of systolic blood pressure, which indicates a reduction of vascular compliance.

Lee (2002:198) emphasises that the detection and control of hypertension is cardinal in maintaining the health of the South African society. Proactive measurement, early detection of blood pressure abnormalities and appropriate referring are imperative. Often it is the professional nurse who first detects this major cardiovascular risk factor.

The Demographic and Health Survey of 1998 showed that about 25 per cent of the South African population is hypertensive. Only 26 per cent of males with hypertension are aware of it, whilst a low ten per cent of hypertensive patients are adequately controlled, with a blood pressure of less than 140/90 mmHg (Okreglicki, 2002:504). Chobanian made similar discoveries in a study in the USA (Bakris *et al.*, 2003, as cited in Cunningham, 2005:867), where 30 per cent of the hypertensive population was unaware of their condition. This calls for increased efforts in the more successful detection, management

and treatment of hypertension. The *Hypertension Clinical Guideline 2000* (Milne, 2001:163) states that cardiovascular disease cost South Africa an estimated R4 billion to R5 billion in 1991, 7.5 per cent of the national direct healthcare spending (Lee, 2002:198).

In the development of hypertension, there is a multifactoral interrelationship with other cardiovascular risk factors, including age (older than 60 years), dyslipidaemia, diabetes mellitus, overweight, gender (men or postmenopausal women), and individuals with a family history of early onset of cardiovascular disease. Evidence suggests that hypertension begins in childhood and that both height and weight directly influence a child's blood pressure. In adults, blood pressure tends to increase with age, probably as a result of the progression of arteriosclerosis. In terms of gender, women generally have a higher prevalence of hypertension than men. Data from the Framingham and other epidemiological studies indicate that in both adults and children, the systolic and diastolic blood pressure increases as body weight increases. (Cunningham, 2005:858-9.)

The frequent occurrence of hypertension and diabetes simultaneously may indicate that insulin resistance is a contributing factor to hypertension. Multifaceted insulin resistance seems to be the link between these two cardiovascular risk factors. The syndrome is caused by decreased expression of glucose transporters (Glut 4) on cell membranes of mainly muscle cells, in response to insulin. Tumor necrosis factor- α (TNF- α), which is produced by visceral fat cells, causes the decreased expression of Glut 4. An increase in TNF- α production therefore induces central obesity and is the key component of the metabolic syndrome as reflected by increase in visceral fat cell accumulation. In the metabolic syndrome or syndrome X, as it is sometimes also referred to, the "deadly quartet" of the four cardiovascular risk factors – abdominal obesity, hypertension, dyslipidaemia and insulin resistance – are clustered together (Chobaian *et al.*, 2003, as cited in Cunningham, 2005:861).

There are numerous causes of hypertension ranging from renal, endocrine, cardiovascular and neurologic disorders, as well as pregnancy, exogenous compounds and genetic disorders, which will not be discussed owing to the cumbersomeness of such an ethiology. Hypertension also has many predisposing factors that interrelate and overlap with CAD, including older age, high dietary intake of sodium, obesity, sedentary lifestyle, excessive intake of alcohol, cocaine abuse, the use of oral contraceptives, and being of African descent (Urden *et al.*, 2002:397).

Several studies indicate the direct relationship between hypertension and obesity (Garrison *et al.*, 1987, as cited in Cunningham, 2005:870). There is also a relationship between the presence of excess abdominal adipose tissue (defined as central obesity with an increased waist-to-hip ratio of >0.85 in women and >0.95 in males) and the development of hypertension, diabetes, dyslipidaemia and an increased CHD mortality (Blair *et al.*, 1984, in Cunningham, 2005:870). In several studies in the USA, Kannel *et al.* (1984), cited in Cunningham (2005:870), found that overweight individuals have a two- to three-fold risk of hypertension compared to individuals who are not overweight.

For the purpose of this study, the author will focus on the cardiac and vascular pathological changes associated with hypertension and other cardio-endocrine influences on hypertension.

According to Meeto (2004:15), there are several vascular changes associated with hypertension, which include changes in the vascular endothelium, causing impaired endothelial vasodilatation and thus hypertension. Factors that cause endothelial dysfunction are hypercholesterolaemia, diabetes, smoking, physical inactivity, and homocystinaemia.

Endothelial injury caused by hypertension is shear-induced injury, eliciting a proliferative response. Furthermore, platelet aggregation is enhanced and an influx of proteins and LDL-C through augmented monocyte adherence to vasoconstriction leads to lipid pooling and atherogenesis in the arterial walls. These functional changes in the endothelium of the arteries lead to a decreased production of vasorelaxing substances and increased production of vasoconstrictor substances, thus increasing the systemic vascular resistance and blood pressure (Lindsay & Gaw, 2004:78).

Hypertension also affects the heart, causing left ventricular hypertrophy, heart failure, CAD and myocardial infarction. A positive correlation exists between cardiovascular morbidity and mortality and left ventricular hypertrophy. The putative role of the renin-angiotensin-aldosterone system in the development of left ventricular hypertrophy is well supported by the finding that treating hypertension with angiotensin converting enzyme (ACE) inhibitors causes regression of hypertrophy. Regression of left ventricular hypertrophy has also been associated with interventions, such as weight loss, physical activity, and treatment with angiotensin 11 receptor blocking agents, calcium-channel blockers, β -blockers and diuretics (Gottdiener *et al.*, 1997, as cited in Cunningham, 2005:865).

⇒ ***The role of the nurse in the risk management of hypertension***

This would involve **risk management, assessment** (*blood pressure measurement, history taking, physical examination, urine analysis, biochemistry sample, 12-lead electrocardiogram – ECG*), **patient education** (*lifestyle modification, physical exercise, smoking cessation, avoidance of alcohol consumption, dietary modifications, adherence to risk management regimens*) and **drug treatment**.

Risk management

Risk prevention and management of hypertension can be facilitated by the nurse in collaboration with a multidisciplinary team. In 14 trials, when hypertension was reduced by 5.8 mmHg, there was a significant reduction of 42 per cent in the incidence of strokes (Fraser, 1999:18). Aspects that should receive attention are adequate exercise, weight loss, alcohol reduction and the reduction of sodium intake (Meetoo, 2004:15).

Assessment

◆ ***Blood pressure measurement***

The first aspect of assessment that is important is the correct measurement of blood pressure. Lee (2002:198) and Lindsay and Gaw (2004:79) emphasise the possible pitfalls in the measurement of blood pressure and how imperative it is to measure blood pressure correctly and accurately. The professional nurse should have acquired the skills and knowledge related to the correct procedure, and the occurrence of these pitfalls should be minimised. The *Hypertension Clinical Guideline 2000* (Milne, 2001:164) gives the following points to ensure meticulous and correct measurement:

- The blood pressure cuff should be the right size (bladder within the cuff should encircle 80% of the arm). Undersized cuffs overestimate blood pressure by 10 to 25 mmHg.
- The bladder of the cuff should be placed centrally over the artery and at the correct level.
- Blood pressure should be measured with the patient in the same position every time (sitting position preferred, as a standing blood pressure could be influenced by postural hypotension).
- The arm on which the blood pressure measurement is taken should be bare and supported at the level of the heart, so that isometric exercise of the limb is excluded.

- The patient should preferably not smoke, drink caffeine-containing beverages or eat food for 30 minutes before the blood pressure is measured.
- The blood pressure should be allowed to stabilise for about five minutes after walking, climbing stairs or arriving at the wellness centre.
- A trend of the blood pressure measurements should be taken. In other words, two to three readings, two minutes apart, should be taken. The measurements should be repeated three times over two months if the systolic blood pressure is between 140 and 160 mmHg or the diastolic reading is between 90 and 100 mmHg.
- Anxiety-induced hypertension or “white coat hypertension” should be evaluated by means of a 24-hour monitoring device, as this form of hypertension could be the cause of left ventricular strain resulting in left ventricular hypertrophy.
- Regular calibration of the blood pressure device for accuracy is important.
- The correct method and stethoscope should be used during the auscultatory method of blood pressure measurement to detect the various Korotkoff sounds and their clinical significance.

Ambulatory blood pressure monitoring provides blood pressure information while the patient goes about daily activities and sleeps at night. Blood pressure is usually higher during the day while the patient is awake and lower while he/she is resting or asleep. Blood pressure normally drops ten to 20 per cent at night. If it does not drop, there is an increased risk of a cardiovascular event. Patients whose 24-hour blood pressure is greater than 135/85 mmHG are at approximately double the risk of having a cardiovascular event compared to those whose 24-hour blood pressure is less than 135/85 mmHG, regardless of the office or clinic blood pressure readings. Normal ambulatory blood pressure readings are slightly lower than clinic reading benchmarks (125 mmHg to 135 mmHG systolic and less than 80 mmHg diastolic readings). Ambulatory blood pressure readings correlate better with target organ injury than clinic measurements, and therefore are an investigative tool that should be considered more often, especially in labile blood pressure or “white coat” hypertension. (Flack *et al.*, 2004:8.)

◆ **History taking**

After measuring blood pressure, the professional nurse’s assessment of the patient should include obtaining information regarding his/her history. According to Cunningham (2005:868), the following aspects of a patient’s history are important in the case of an individual who may be hypertensive:

- The duration of the hypertension (if known).
- Previous treatments for the hypertension.
- The uses of agents or substances that may cause hypertension. These include excessive amounts of sodium, adrenal steroids, sympathomimetics and oral contraceptives.
- Family history of hypertension including pheochromocytoma and renal disease.
- Symptoms of secondary causes, for example tachycardia, diaphoresis and flank pain.
- Symptoms of target organ damage, for example headaches, transient blindness, chest pain and claudication.
- Presence of other cardiovascular risk factors, such as smoking, diabetes, dyslipidaemia and physical inactivity.
- Dietary history, for example the consumption of sodium, alcohol and saturated fats.
- Psychosocial factors, such as work status, stress and education level.
- Sexual function.
- Features of sleep apnoea, such as early morning headaches, loud snoring and erratic sleep.

(Cunningham, 2005:868.)

◆ ***Physical examination***

The following are important aspects of a physical examination:

- Accurate measurement of serial blood pressure readings.
- Assessment of the patient's general appearance including the distribution of body fat (central obesity), skin lesions indicating peripheral arterial disease and bruising indicating abnormal clotting profile or use of anticoagulant therapy.
- Funduscopy to detect retinal hypertension and papilloedema.
- Palpation and auscultation of the neck for thyroid enlargement and carotid bruits.
- Heart examination including heart sounds, rhythm and size (point of maximum impulse - PMI).
- Lungs examination including rhonchi and rales indicating left heart failure associated with hypertension.
- Abdomen examination including renal masses, bruits over the abdominal aorta, renal or femoral arteries.

- Extremities examination including peripheral pulses, colour, temperature and capillary filling, which would indicate signs of peripheral vascular insufficiency or venous congestion, seen as oedema formation.
- Neurological assessment to determine evidence of target organ damage due to blood-pressure-induced damage, for example cerebrovascular accidents and transient ischaemic attacks.

◆ **Urine analysis**

The patient's urine should be tested for:

- Proteinuria, haematuria and delayed creatinine clearance, which may suggest underlying renal disease and the contributing cause of hypertension.
- Glucosuria, which may indicate the presence of diabetes mellitus.

◆ **Biochemistry sample**

A biochemistry sample should be taken to test for:

- Urea and creatinine indicating underlying renal disease.
- Electrolytes.
- Total cholesterol, triglycerides, LDL-C and HDL-C indicating possible dyslipidaemia.

◆ **12-Lead electrocardiogram (ECG)**

An abnormal ECG in a patient with hypertension is a guide to the presence of left ventricular hypertrophy, strain, myocardial infarction or myocardial ischaemia.

Patient education

The statement “drug therapy if needed and as resources permit” contained in the South African *Hypertension Clinical Guideline 2000* (as cited in Lee, 2002:201) reflects the limited availability of pharmacological resources. Cunningham (2005:874) raises two important issues of concern in the execution of anti-hypertensive pharmacotherapy, namely: how much should the individual's blood pressure be lowered through medication and what are the relative risks and benefits of the different classes of anti-hypertensive pharmacotherapy? These issues remain controversial. Thus, in conjunction with expensive pharmacotherapy, the nurse should educate a patient regarding non-pharmacological lifestyle modifications, which could prevent or delay the onset of high blood pressure, or control hypertension (Cunningham, 2005:869-70).

Patient education should cover the following:

- ◆ **Modifying lifestyle** through behavioural counselling and coping strategies for effective *stress management*. Possible complementary and alternative interventions, including stress management, reduced caffeine intake, increased garlic or onion intake, and increased intake of potassium, magnesium and calcium, have been linked to the reduction of blood pressure.

- ◆ **Increasing physical exercise** to three hours per week (Appel *et al.*, 2003, as cited in Cunningham, 2005:872) or to 30 minutes of regular moderate aerobic exercise, such as brisk walking, at least three to five times per week (Milne, 2001:166). The seventh report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure recommends that individuals with hypertension exercise moderately for a minimum of 30 minutes every day of the week (Chobanian *et al.*, 2003, in Cunningham, 2005:872). Cunningham suggests that a physical examination should be done prior to the aerobic activity. The healthcare worker/nurse should give the patient appropriate health education concerning the signs and symptoms of a heart attack and stroke, as hypertension is a major cardiovascular risk factor, which may be predisposed by other underlying cardiovascular risk factors. The results of the meta-analyses done by Fagard *et al.* (1993), as cited in Cunningham (2005:872), indicate that aerobic training is effective in reducing hypertension.

- ◆ **Smoking cessation** through behavioural counselling.

- ◆ **Avoiding or limiting alcohol consumption** to less than one ounce per day (Appel *et al.*, 2003, in Cunningham, 2005:872) or two standard South African drinks per day (Milne, 2001:166). Reducing alcohol intake significantly reduces systolic and diastolic blood pressure (Cushman, 1999, as cited in Cunningham, 2005:873).

- ◆ **Implementing dietary modifications**, which include low fat, high fibre and unrefined carbohydrates with adequate amounts of fruit and vegetables. The Dietary Approach to Stop Hypertension (DASH) found that diets high in fruit, vegetables, low-fat dairy products and low saturated and total fat resulted in a significant reduction in systolic and diastolic blood pressure (Appel *et al.*, 1997, cited by Cunningham, 2005:871). The DASH diet also includes meats, poultry and fish as protein sources and nuts, seeds and legumes as rich sources of energy,

magnesium, potassium, protein and fibre (Cunningham, 2005:872). The dietary modification should include:

- *Encouraging weight loss.* This includes maintaining an ideal body weight (BMI <25 kg/m²). The loss of weight has been demonstrated as the most effective hypertension reduction lifestyle measure (He *et al.*, 2000, as cited in Cunningham, 2005:870).
 - *Sodium restriction and potassium supplementation* through the intake of fruit and vegetables. Clinical trials have consistently shown that decreasing sodium intake is an effective non-pharmacological measure in reducing blood pressure (Appel *et al.*, 2001, cited by Cunningham, 2005:871). Sodium restriction is also a beneficial adjunct to anti-hypertensive therapy. Subjects who decreased their sodium intake were able to decrease their doses of diuretics and potassium-sparing agents significantly (Weinberger *et al.*, 1988, as cited in Cunningham, 2005:871).
- ◆ ***Preventing, monitoring and addressing problems of adherence*** by means of the following:
- *Educating the individual about hypertension and the management regimens* – pharmacological and non-pharmacological.
 - Elicit concerns and questions.
 - Provide opportunities for patient to “ventilate”.
 - Assess the patient’s understanding of the diagnosis and discuss his/her concerns, misunderstandings and expectations.
 - *Individualising the regimen* – include the patient in decision making and planning.
 - *Providing reinforcement* – give positive feedback regarding improvement of blood pressure level.
 - *Promoting social support* – educate family members and suggest group activities.

Drug treatment for hypertension

The Joint National Committee’s seventh report algorithm for hypertension drug treatment is as follows:

Stage 1 (Systolic blood pressure = 140-159 mmHg or diastolic blood pressure 90-99 mmHg): 1st line – Thiazide diuretic; 2nd line – ACE inhibitor, aldosterone receptor blocker, beta blocker and calcium channel blocker.

Stage 2 (Systolic blood pressure ≥ 160 mmHg or diastolic blood pressure ≥ 100 mmHg): Two drug combination: Thiazide diuretic and ACE inhibitor; aldosterone receptor blocker and beta blocker; or beta blocker and calcium channel blocker.

Drugs for compelling indications: Other anti-hypertensive drugs, such as adrenergic inhibitors and direct vasodilators, as well as the following in combination: Thiazide diuretic, ACE inhibitor, aldosterone receptor blocker, beta blocker and calcium channel blocker.

The management of hypertension is thus directed toward the lifestyle modifications mentioned above. These modifications can be facilitated by the professional nurse, with the involvement of a multidisciplinary team in terms of advice about diet, weight loss and stress management. If these modifications are not successful, supplementary medication can be prescribed by a medical practitioner.

The goal of therapy for individuals with hypertension is to prevent morbidity and mortality related to hypertension, such as IHD, end-organ damage, and atherosclerotic cardiovascular and renal disease (Chobanian *et al.*, 2003, as cited in Cunningham, 2005:869). An important tool in the risk management of hypertension is the concept of setting an individual “goal blood pressure” of less than 140/90 mmHg (Hypertension Detection and Follow-up Programme Co-operative Group, 1979, as cited in Cunningham 2005:869).

3.4.1.2.4 Hyperglycaemia/diabetes mellitus

⇒ General overview

Diabetes is a global concern affecting 150 million people worldwide, two per cent of the world's population. The prominent phenotype of diabetics, accounting for 90 to 95 per cent of diabetics, is Type 2 diabetics. This is as a result of the ageing population and an increase in the incidence of risk factors for diabetes, such as obesity (in adults and children), decreased activity, urbanisation and an increase in ethnic mixture (Lindsay & Gaw, 2004:310-11). In the United Kingdom, diabetes is a major health problem, assuming epidemic proportions. Type 2 diabetes is responsible for increased risk of stroke, peripheral vascular disease and vascular disease which accounts for the majority of Type 2 diabetes-related morbidity and mortality. Diabetes prevention, treatment, care, rehabilitation and the long-term complications of multi-organ effects all contribute to the health cost burden on the country.

According to the American Diabetes Association and the Centre for Disease Control and Prevention (Wallhagen, 2005:948), diabetes mellitus is actually a syndrome of metabolic disorders characterised by an elevated blood glucose, disturbances in the carbohydrate, protein and fat metabolism, and relative or absolute deficiencies of insulin secretion or action. Diabetes mellitus is defined as a random fasting blood glucose level of 3.9-6.2 mmol/L (South African values) (Newton & Froelicher, 2005:815).

Two major categories of diabetes predominate, namely Type 1 (absolute insulin deficiency and insulin dependence) and Type 2 (relative lack of insulin or insulin resistance and no insulin dependence). Both types of diabetic individuals have a two- to four-fold higher risk of cardiovascular disease than those without diabetes (Wallhagen, 2005: 952).

Type 2 diabetes encompasses conditions characterised by various degrees of insulin resistance, beta cell failure and an increase in hepatic glucose release. Obesity (especially central/visceral adiposity), lack of physical activity, hyperglycaemia, hyperinsulinaemia and ageing are associated with changes in cellular responsivity and insulin resistance. Continuous exposure of tissue to hyperglycaemia may cause damage to the beta cells and decrease tissue responsiveness to insulin's actions. In addition to this, loss of insulin's inhibitory effect on lipolysis and fatty acid oxidation result in increased levels of free fatty acids, which in their turn contribute to tissue insulin resistance, stimulate hepatic gluconeogenesis and further decrease beta-cell function (Wallhagen, 2005:951).

Insulin resistance or impaired insulin effectiveness underlies abnormalities preceding the development of Type 2 diabetes, which is regarded as a condition of premature vascular disease and of cardiovascular risk factors, such as hypertension, dyslipidaemia, hyperinsulinaemia, atherosclerosis and a procoagulant state. The role of insulin resistance is so cardinal in the pathogenesis of atherosclerosis in the diabetic patient, that there is no significant reduction of the macrovascular complications of Type 2 diabetes mellitus, despite the use of sulphonylurea and insulin, suggesting that factors such as insulin resistance (apart from glycaemic control) may have an augmented pathogenic role in the development of cardiovascular complications (Lindsay & Gaw, 2004:311).

In the *NCEP Adult Treatment Guidelines* (Haskell, 2003:249), diabetes is considered as such a significant risk factor that the risk of a patient with diabetes having an initial heart attack is equated to the risk of a patient who has cardiovascular disease (but not diabetes) having a second heart attack. Diabetic patients have double the risk of developing CHD

Metabolic syndrome is made up several physiological abnormalities, such as hypertension, hyperinsulinaemia, dyslipidaemia, obesity and macrovascular atheromatic disease. These are risk factors for the development of Type 2 diabetes, as well as factors that influence its management, and can all be modified through lifestyle interventions and risk management (Wallhagen, 2005:951). The criterion for the diagnosis of metabolic syndrome is the presence of three or more risk determinants (Wellmann, 2000:192-4).

Guidelines for the management of individual modifiable risk factors are provided by the National High Blood Pressure Education Programme, the American Diabetes Association and by the third ATP report of the NCEP. The ATP111 defines the three life habit risk factors, namely obesity, physical inactivity and a high fat diet (high intake of saturated fatty acids and cholesterol), as major and modifiable. The relevance of the ATP111 guidelines to the diagnosis of metabolic syndrome is the suggestion that patients with certain risk factors, namely triglycerides, abdominal obesity and an elevated glucose level, are in or near the high-risk category. When evaluated according to the Framingham formula, patients with these features of metabolic syndrome are unlikely to be identified as high risk, because the features are not included in the Framingham study and the patients have no other apparent cardiovascular risk factors. The ATP111 recognises metabolic syndrome as a secondary target of risk reduction therapy after the primary target of low LDL-C (Linton & Fazio, 2003:2-6).

Obesity, a sedentary lifestyle, and moderately elevated fasting blood glucose are key triggers for the development of Type 2 diabetes. Adults with a BMI of more than 30 kg/m² have a five-fold higher risk of developing diabetes than individuals with a normal BMI. There is significant and increasing evidence that glucose intolerance is associated with a significant increase in cardiovascular mortality and morbidity. Potential causative factors contributing to this are the increased insulin concentrations (pre-diabetes), insulin resistance, advanced glycation end-products (AGE) and an increased thrombogenicity (hypercoagulability) directly involved in the thrombotic event precipitating acute coronary syndrome and a myocardial infarction.

The macrovascular pathophysiological effects of diabetes give rise to cardiovascular disease. Although there is no qualitative difference in the atheromatous lesions in individuals with diabetes compared to those without diabetes, these lesions may be more extensive, diffuse and localised in the distal peripheral and coronary vessels. Interestingly, individuals with Type 1 diabetes who are not obese and have a well controlled glycaemia, also have near to normal lipid levels but have evidence of an accelerated atheromatous

process (Nathan *et al.*, 2003, as cited in Wallhagen, 2005:953). This may be a consequence of early occurrence of macrovascular damage with even mild blood glucose elevations.

The increased thrombogenicity is due to platelets with an increased number of receptors and elevated plasminogen activator inhibitor (PAI) levels. The risk of cardiovascular events increases with more than ten per cent for every one per cent increase in glycated haemoglobin. Diabetes is not only responsible for the accelerated atherosclerosis in the macrovascular system, but also for left ventricular hypertrophy through hyperinsulinism. The metabolic syndrome, which is characterised by insulin resistance, insulin-mediated salt retention and hyperinsulinaemia, places the diabetic patient at a higher risk for developing hypertension. Insulin growth factor and angiotension 11 are signals for the development of left ventricle hypertrophy (Okreglicki, 2002:505). In combination, these factors cause thickening and leakage of the vasculature and decrease the elasticity of the blood vessels.

Murray (2001), as cited by Meeto (2004:15), states that diabetes increases endothelial permeability to calcium and LDL-C, which are deposited in the elastic, tunica media layer of the arterial wall. The increase in Type 2 diabetes mellitus has important implications, because it has been shown that patients with Type 2 diabetes and no history of prior myocardial ischaemia were at similar risk of future coronary artery events as patients without diabetes but with prior myocardial ischaemia (Ker, 2004:9). This is substantiated by the ATP111 report (Linton & Fazio, 2003:8). According to this report, individuals with diabetes mellitus who do not have evidence of CAD should be raised to the level of a CAD high-risk category. The presence of other atherosclerotic diseases, such as peripheral arterial disease, abdominal aortic aneurysm and symptomatic carotid artery disease, are all at this level of CAD risk. Premenopausal women with diabetes are at a higher risk of developing CAD than non-diabetic women of the same age, as a result of the lack of the protective effect of oestrogen. Cardiovascular risks factors, such as the presence of dyslipidaemia, hypertension, cigarette smoking and obesity, aggravate and accelerate the development of CAD risk three- to four-fold in the diabetic patient (Urden *et al.*, 2002:397).

Due to significant macrovascular complications in both Type 1 and Type 2 diabetes, lipid screening and effective risk management are highly recommended. Elevated triglycerides and decreased HDL-C levels are common in individuals with Type 2 diabetes, owing to the decreased inhibitory effect of insulin on lipolysis and the resultant increased fatty acids. This is the most predictive indicator for the development of CAD in individuals with

Type 2 diabetes. As previously discussed, lipid control can be achieved by pharmacotherapy (statins), nutrition, exercise and other lifestyle modifications, such as smoking cessation.

⇒ ***The role of the nurse in the risk management of diabetes***

Diabetes is a major risk factor for cardiovascular disease. However, data increasingly suggest that through intensive risk management, the incidence of cardiovascular disease may be reduced and the risks minimised (Wallhagen, 2005:948). In three recent randomised clinical trials of diabetic high-risk patients, it was demonstrated that certain moderate changes can reduce the development of diabetes by 50 to 60 per cent over a three-year period (Haskell, 2003:249). The following life habits should be considered:

- ◆ Diet: low-calorie and low saturated fat.
- ◆ Exercise: moderate-intensity physical activity for 150 minutes per week, primarily consisting of brisk walking.
- ◆ Weight loss: seven per cent of the body weight.

The risk management of diabetes involves a comprehensive multidisciplinary approach to assisting the patient and his/her family in the necessary lifestyle modifications. The role of the healthcare worker/nurse is to facilitate a diabetic individual's ability to blend self-management into his/her own life in a favourable way. This is an area in which the professional nurse can play a pivotal role in coordinating a risk prevention programme.

Risk management

The risk management of diabetes would include *glycaemic control and diet, weight control through diet and exercise, lipid control and exercise, blood pressure control, and foot care and neurological assessment.*

◆ **Glycaemic control and diet**

According to Wallhagen (2005:954), the recommendations of the American Diabetic Association (ADA) are currently a s-glucose of 5.0 to 7.2 mmol/L (ideally a fasting glucose of less than 6.5 mmol/L) before meals and less than 10 mmol/L after meals, and a haemoglobin A of less than seven per cent (this percentage level has been shown to reduce the development of microvascular complications by 50 to 75% in patients with Type 1 diabetes). The assessment of glycosylated haemoglobin at three- to six-months intervals would evaluate the effectiveness of a continuous

treatment regimen and provide data on the metabolic control over the past two to three months.

An important strategy to facilitate achievement and maintenance of glycaemic control is the self-monitoring of s-glucose. This will assist the patient in assessing the impact of various foods and life activities on their s-glucose trend. Diet and exercise remain the cornerstones of the management of diabetes. Exercise not only improves glycaemic control but also decreases cardiovascular risk factors, such as dyslipidaemia, hypertension and weight gain, and prevents the onset of Type 2 diabetes. It is essential that exercise is included in the treatment regimen in order to prevent bouts of hyperglycaemia or hypoglycaemia from developing. The involvement of a dietician with expertise in diabetes is recommended to assist effective glycaemic control.

◆ **Weight control through diet and regular exercise**

This is essential in diabetic patients, as more than 90 per cent of Type 2 diabetic patients are overweight (BMI > 25 kg/m²) and centrally obese (waist measurement of > 102 cm for men and > 88 cm for women).

Weight can be managed through the adoption of lifestyle habits, such as following a nutritional diet (low fat and low calorie), decreasing or cutting out alcohol intake, increasing physical activity and undergoing behavioural therapy, which can show improvements in HbA_{1c} concentrations of up to three per cent. Weight loss targets in obese Type 2 diabetic patients should be a moderate five to ten per cent of their body weight (about 10 kg), which will show a significant improvement in glycaemic control. Individuals with impaired glucose tolerance are at a high risk of developing Type 2 diabetes, but can reduce this risk by 58 per cent over four years through lifestyle modifications and weight loss of only three to four kilograms on average (Lindsay & Gaw, 2004:315-6).

The involvement of the multidisciplinary team, including the doctor and dietician, is especially important here, but the role of the nurse as coordinator is imperative. According to the Finnish Diabetes Prevention Study (Lindstorm *et al.*, 2003, as cited in Lindsay & Gaw, 2004:329), the involvement of these experts in a multi-risk factor approach is cardinal. This approach should be comprised of a comprehensive lifestyle management programme, targeted toward the prevention and reduction of

the progression of pre-diabetes and impaired glucose tolerance to Type 2 diabetes in the hyperglycaemic person, and aimed at ameliorating CHD risk.

Insulin replacement is designed to provide a near physiological pattern of glucose control. Insulin replacement therapy is necessary for Type 1, and 30 to 40 per cent of Type 2, diabetic patients. Different insulin formulations and analogs are available and can be prescribed by a medical professional.

◆ **Lipid control and exercise**

Although diet and exercise have already been discussed, lipid control in combination with exercise is also discussed here. This is because diabetic dyslipidaemia is hallmarked by hypertriglyceridaemia and reduced HDL levels in up to 30 per cent of Type 2 diabetic patients, despite good glycaemic control. Total cholesterol and LDL levels are increased as with individuals without diabetes. This typical dyslipidaemia is more evident and severe in women than in men and poses a CHD risk for women (Lindsay & Gaw, 2004:324-5).

Diabetic dyslipidaemia increases the fatty acid release from the adipose tissue, leading to an overproduction of triglycerides and VLDL particles by the liver. This is further augmented by the defective inhibitory control of insulin on hepatic synthesis, which also causes an elevation of s-triglycerides. The defective function of enzyme lipoprotein lipase in Type 2 diabetic patients results in impaired catabolism of triglyceride-rich lipoproteins. Hypertriglyceridaemia is associated with the rapid development of atherosclerosis and hypercoagulation in Type 2 diabetics. Compounding factors such as insulin resistance, hyperinsulinaemia and hyperglycaemia require the management programme to be multifaceted in its approach.

The increased levels of oxidised LDL-C present in diabetic patients could be a rationale for the use of antioxidant therapy. Researchers, focusing on the role of lipid oxidation in the pathogenesis of atherosclerosis, have found high plasma levels of Vitamin E in individuals with lower rates of cardiovascular disease (Flack *et al.*, 2004:20). An inverse relationship between beta-carotene and death from cardiovascular disease was also demonstrated in epidemiological and observational studies.

◆ **Blood pressure control**

Hypertension in the diabetic individual must be treated aggressively to minimise the cardiovascular and renal complications. The goal for blood pressure limits in adult patients with diabetes is less than 130/80 mmHg. The goals in the risk management of hypertension should be facilitated by the nurse and can include lifestyle modifications and pharmacological therapy.

Okreglicki (2002:505-6) and Lindsay and Gaw (2004:328) give guidelines stipulated by the European and Joint British recommendations for the healthcare worker in the risk management of the hyperglycaemic, pre-diabetic and diabetic patient. These are tabulated as the do's and don'ts for diabetics. Refer to Table 3.4.

TABLE 3.4: The Do's and Don'ts for Diabetics

Do's	Don'ts
<p>Do diet (fat intake less than 30 per cent of calories)</p> <p>Do exercise (30 minutes aerobics, four to five times per week)</p> <p>Do take the following medication (in secondary prevention)</p> <ul style="list-style-type: none"> ▪ Aspirin 150 mg per day (if high risk) ▪ ACE inhibitor (if evidence of cardiovascular disease) ▪ Beta blocker (in the case of hypertension) ▪ Statins (irrespective of LDL levels if IHD is confirmed) ▪ Insulin therapy (as prescribed) <p>Do have acceptable glycaemic control (HbA_{1c} =7%)</p>	<p>Don't smoke</p> <p>Don't be obese (BMI >30 kg/m²)</p> <p>Don't have a waist measurement greater than 94 cm (men) and 80 cm (women)</p> <p>Don't have a blood pressure higher than 130/80 mmHg</p> <p>Don't have a</p> <ul style="list-style-type: none"> s-total cholesterol > 5 mmol/L s-triglyceride > 2.3 mmol/L LDL-C > 3 mmol/L HDL-C < 0.9 mmol/L <p>Don't have a fasting blood glucose greater than 6.5 mmol/L</p>

◆ **Foot care and neurological assessment**

Foot ulcers and neurological dysfunction are some of the major causes of mortality, morbidity and disability in diabetic patients. It is vital to perform vascular, neurological, musculoskeletal, skin and soft tissue foot screenings annually. Diabetic patients cannot exercise with foot ulcers and will therefore be prevented from working through their programme effectively. The nurse needs to detect or treat these cases or refer the patient to a podiatrist or specialist. Neuropathy, as well as several other neurological abnormalities, can also negatively influence the wellbeing of the diabetic patient and should be continuously assessed. Examples of these conditions are orthostatic hypotension, sexual dysfunction and gastroparesis.

The pathological pathway to cardiovascular disease of the first four cardiovascular risk factors (hypertension, smoking, diabetes mellitus and dyslipidaemia) is schematically represented in Figure 3.5 below. A discussion of the fifth and sixth factors, namely obesity and being overweight and physical inactivity and lack of exercise, follows.

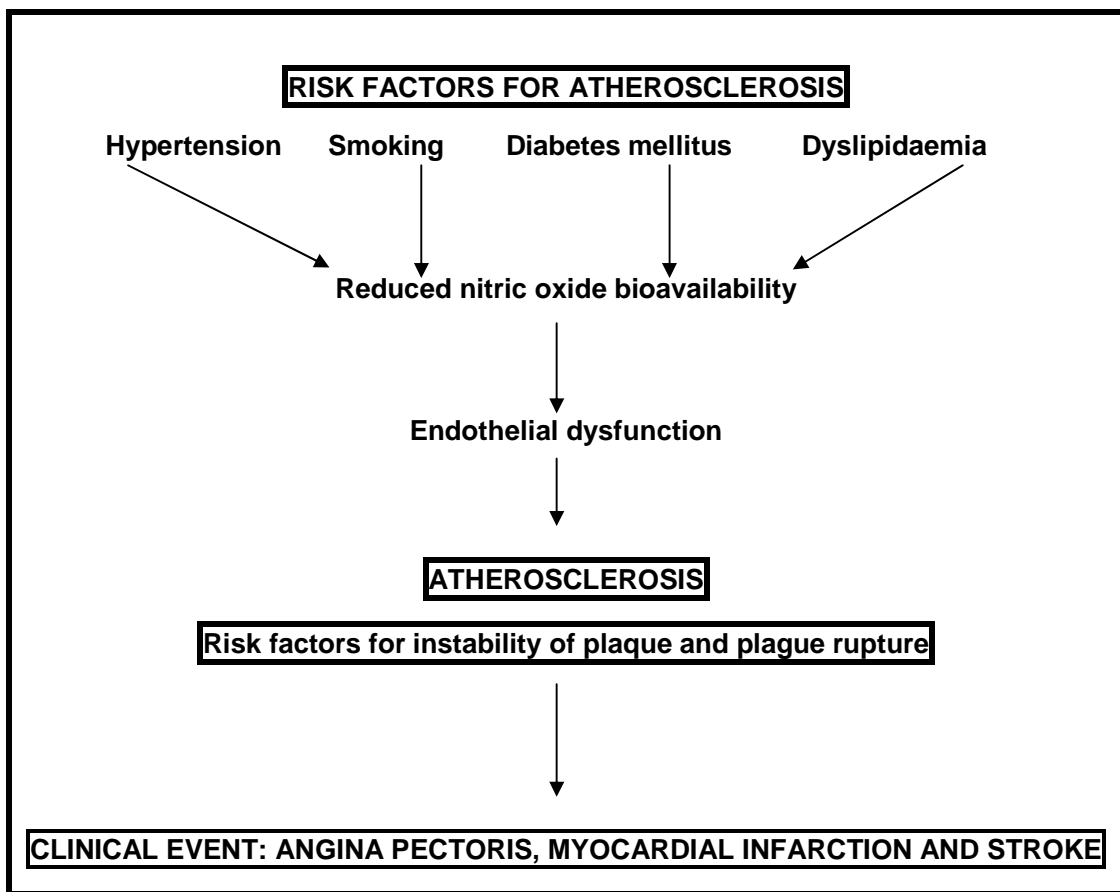


FIGURE 3.5: PATHOLOGICAL PATHWAY OF RISK FACTORS FOR ATHEROSCLEROSIS

3.4.1.2.5 Obesity and being overweight

⇒ *General overview*

According to the WHO, obesity is defined as a BMI of greater than 30 kg/m², while being overweight is defined as a BMI of between 25 and 29.9 kg/m² and the ideal weight as a BMI of less than 25 kg/m². Waist circumference or visceral or abdominal obesity is the central distribution of excess adipose tissue. This is a more sensitive and specific indicator than BMI as predictor of obesity-related morbidity and mortality (Burke & Cartwright, 2005:938). The reduction of waist circumference is associated with decrease in cardiovascular risk.

Obesity is a multifactorial disease, the result of complex interactions between genetic, metabolic, environmental, cultural and psychological factors. Obesity is a growing health problem in developed and developing countries worldwide. Even in undernourished populations, improved diet and living standards are accompanied by increasingly sedentary lifestyles and an increased intake of excess fats, which may be just another form of malnutrition (Okreglicki, 2002:505). Obesity is becoming a global concern, which the WHO is addressing through the International Obesity Task Force. Its purpose is to provide empirically-based guidelines for the identification, evaluation and treatment of overweight and obese adults.

In the USA, obesity has become a pandemic. It contributes significantly to increased health costs, lessens life expectancy and reduces the quality of life (Fontaine *et al.*, 2003, in Burke & Cartwright, 2005:937). Of further concern in the USA is the increasing prevalence of children and adolescents who are overweight, based on gender and age-specific BMI >95th percentile. The long-term effects of being overweight or obese on diabetes and cardiovascular disease risks are staggering, especially for this age portion of the population.

According to a report by Vermeulen (2006) in a Pretorian weekly, obesity is no longer a disease only associated with Americans who consume vast amounts of fast foods and lead sedentary lifestyles. In South Africa, there has been an increase in obesity, causing health problems in affluent communities. According to a Dr C. Olivier, commenting in the same news report, the metabolic syndrome (a syndrome linked to obesity and other cardiovascular risk factors, and further complicated by hypertension and dyslipidaemia) is often found in obese or overweight people. Obesity has led to an increase in Type 2

diabetes amongst South Africans, probably due to the Western influence on lifestyle in the country. Long working hours and little time for exercise or to prepare a healthy meal has led to “eating on the run and relying on unhealthy fast food options causing blood sugar spikes and craving fast food even more” (Olivier, as cited in Vermeulen, 2006). The development of fast food outlets is prominent in South Africa, augmenting the modern unhealthy eating culture that entails buying fast food items and spending less time on physical recreation or exercise, all cumulating in obesity and a sedentary lifestyle.

Android/central obesity is strongly associated with the development of insulin resistance, which leads to Type 2 diabetes mellitus and results in a greater risk for CHD (Wood *et al.*, 1998, as cited in Meetoo, 2004:15). Weight reduction is recommended when waist circumference is greater than 102 cm in men and 88 cm in women (Lean *et al.*, 1995, in Foxtan *et al.*, 2004:49). Individuals with waistline circumferences greater than these recommendations are at greater risk of developing obesity-related morbidities, such as Type 2 diabetes, dyslipidaemia and cardiovascular disease (Burke & Cartwright, 2005:938). According to Urden, Stacy and Lough (2006:429), obesity is often associated with a sedentary lifestyle and increases an individual's susceptibility of developing other cardiovascular disease risk factors, such as hypertension, hyperglycaemia, hyperlipidaemia and hypercholesterolaemia. The Framingham study showed that obesity is strongly predictive of CAD and that there is an increased relative risk when abdominal obesity is present (Linton & Fazio, 2003:2).

According to the British Nutrition Foundation (1999), cited in Foxtan *et al.* (2004:49), CHD is the main cause of excess mortality in obese/overweight individuals and there is a two-fold increase in the risk of developing CHD for obese or overweight individuals. CHD is the main cause of mortality for those who are obese, because obese individuals have a greater probability of developing other risk factors, such as hypertension, diabetes or glucose intolerance, high triglyceride levels and elevated LDL-C, as well as a higher tendency of developing clotting abnormalities, increasing the risk of thrombus formation and a myocardial infarction (Meade *et al.*, 1993, in Foxtan *et al.*, 2004:49).

In addition to mounting evidence-based research demonstrating the harmful effects of obesity on the cardiovascular system and on health in general, research has also shown the benefits of weight reduction, even as little as a ten per cent reduction in the initial weight of an overweight person (Burke & Cartwright, 2005:937).

Trends in the food industry, as well as a fast-paced environment, are factors in the increased calorie intake per day and decreased energy expenditure, which result in obesity. These trends include the emergence of fast food restaurants with low cost, high fat and high calorie meals, the increase in portion sizes and the 25 per cent increase in the last decade in the diameter of the typical restaurant plate. The misconception of low fat but not low calorie contributed immensely to the increase in obesity. Labour saving technologies in the workplace and at home have contributed to the decrease in activity-induced calorie expenditure. Socially, computer and video-based technologies as forms of recreation have contributed to the sedentary lifestyle of the modern cardiovascular disease high-risk individual.

Obesity precipitates and increases the susceptibility of an individual to the development of hypertension (Burke & Cartwright, 2005:937). Several physiological parameters, such as lipoprotein oxidisability, blood pressure, fibrinolytic abnormalities and C-reactive protein, which effect the development of cardiovascular disease and are associated with obesity, are also factors that should be considered.

⇒ ***The role of the nurse in the risk management of obesity and being overweight***

Healthcare professionals can help slow the trend of an increasingly obese society. This can be implemented through education and counselling regarding the maintenance of a healthy weight and implementation of healthy lifestyle measures to reduce weight and maintain weight loss (Burke & Cartwright, 2005:938).

In general, the lifestyle management of obesity and weight loss can be achieved through increased physical activity, eating less fat and sugar, and minimising alcohol consumption. The nurse can assist the overweight and obese individual as follows:

Baseline assessment

A baseline assessment of an overweight/obese patient includes measuring his/her BMI, waist circumference and cardiovascular risk profile, as well as assessing non-cardiovascular conditions.

Determining the overweight/obese patient's absolute risk

Absolute risk is the expected CHD risk that is the result of obesity for any given combination of age, gender and other risk factors.

Individuals who are overweight/obese are considered to be at very high risk if they have other co-morbidities for cardiovascular disease. These include established CHD, the presence of other atherosclerotic diseases (peripheral arterial disease, abdominal aortic aneurysm and symptomatic carotid disease), Type 2 diabetes, sleep apnoea and any target organ damage due to hypertension. Additional factors which increase absolute risk are physical inactivity, a sedentary lifestyle, elevated triglycerides or dyslipidaemia (Burke & Cartwright, 2005:939).

An obese patient could be considered at high absolute risk for obesity-related co-morbidities if three or more of the following cardiovascular risk factors are present:

- ◆ Cigarette smoking.
- ◆ Hypertension.
- ◆ High LDL-C (>160 mg/dL).
- ◆ Low HDL-C (<35 mg/dL).
- ◆ Impaired fasting glucose.
- ◆ Positive family history of premature CHD.
- ◆ Male gender (>45 years) or female (>55 years).
- ◆ Females (post-menopausal).

Determining the patient's relative risk based on overweight/obesity criteria

This involves overweight/obesity and abdominal obesity criteria. The relative risk is the ratio between the absolute risk of the individual and the absolute risk in someone of the same age and gender with no other risk factors. An evidenced-based report made by the National Heart, Lung and Blood Institute (NHLBI, 2000) recommended that waist circumference be included with BMI in the clinical evaluation of cardiovascular risk. Waist circumference is also a valuable marker for monitoring progress and giving feedback to the patient (Burke & Cartwright, 2005:938).

Gradual reduction of weight to achieve a healthy body weight

Weight should be reduced by 0.5 to 1 kg per week (or 10% of baseline weight; weight loss that can be maintained at least a year) to a BMI of less than 25 kg/m² (Foxton *et al.*, 2004:49). Weight reduction can be achieved by ***initiating behavioural strategies, giving dietary advice*** and ***implementing a daily exercise programme***.

Initiating behavioural strategies

Behavioural strategies and changes are initiated by motivating the patient and require his/her commitment to lifelong lifestyle changes. If the patient is not motivated, the nurse should review the risks of being overweight with the patient, highlighting the benefits of and manner in which the patient will be assisted in the weight reduction programme. The nurse also needs to address the coexisting risk factors and initiate a risk management programme for these, including further weight gain prevention.

Behavioural therapy is usually facilitated through the coordination of the multidisciplinary team, which can include a psychologist, dietician, exercise physiologist/physical fitness trainer, nurse and physician. The attitude of the healthcare worker/nurse is of cardinal importance when addressing the sensitive issue of obesity and weight management, as this may determine the patient's receptivity. The nurse should also assist the patient in being realistic about weight loss outcomes and emphasise the health benefits of a ten per cent weight loss (Burke & Cartwright, 2005:941).

Important factors that should be included are the patient's attitude toward weight loss, previous failures and successes of weight loss, the available support system, the patient's understanding of the risk posed by his/her weight status, the patient's willingness to initiate an exercise programme, the level of self-efficacy in achieving a reduction in weight, time commitments, possible barriers to behavioural change and the financial implications of a dietary programme (NHLBI, 1998, as cited in Burke & Cartwright, 2005:941).

Strategies used to facilitate behavioural changes are the following:

- ◆ Self-monitoring is often seen as the *sine qua non* of behavioural therapy (Wing, 1998, as cited in Burke & Cartwright, 2005:943). This entails instructing patients to record their food intake, calories, fat grams and exercise expenditure. Through this, the patient becomes aware of his/her behaviour and the calorie and fat content of foods eaten.

- ◆ Goals set for total calorie and fat intake and energy expenditure through exercise should be realistic, attainable, proximal and specific.
- ◆ Stimulus control is considered the hallmark of behavioural therapy (Stuart, 1996, in Burke & Cartwright, 2005:943). Environmental antecedents control behaviours. Thus, by changing non-beneficial environmental stimuli to positive cues, such as replacing high-fat foods with attractive fruits or vegetables, storing tempting foods out of sight and enthusiastically embarking on a new exercise programme, the desired behavioural change can be achieved.
- ◆ In problem-solving, patients are taught specific problem-solving steps, for example: identify the problem situation leading to the undesired eating or exercise behaviour, find solutions and select the most suitable solution to test (D’Zurilla & Goldfried, 1971, in Burke & Cartwright, 2005:943). Lastly, the individual needs to evaluate the use of the solution in resolving the specific problem.
- ◆ Patients are taught that relapse should be anticipated and strategies devised to cope with the non-beneficial situation and prevent relapse.
- ◆ In cognitive restructuring, patients are taught to counter negative thoughts, rationalisations and all-or-none thinking, with positive thoughts and self-esteem enhancing statements.
- ◆ Other strategies that could be used are contingency management, patient counselling, motivational interviewing, positive reinforcement, coping with high-risk situations, stress management and mustering social support.
- ◆ Obese/overweight individuals experiencing major socio-emotional events, such as moving, a change in marital status, significant anxiety, depression or eating disorders (bingeing, bulimia), family illness or any significant stressor may need to be referred to another expert in the multidisciplinary team, such as a psychologist.
- ◆ The probability of a positive outcome will be enhanced if the healthcare worker and patient can mutually agree on a weight management programme, both in the short and long term.

Giving dietary advice

Dietary advice given should include *reducing fat intake, modifying carbohydrates intake, increasing the consumption of fresh fruit and vegetables, and increasing dietary fibre* (Burke & Cartwright, 2005:942; Foxton *et al.*, 2004:49).

◆ **Reducing fat intake**

Most fat comes from meat and meat products, spreading fats and oils, dairy products, cakes and biscuits. Obese individuals should reduce their fat intake and the nurse assist them by giving them the following *fat-lowering hints* (Lindsay & Gaw, 2004:179):

For protein and dairy products:

- Use lean cuts of meat and chicken (trim the fat and skin off).
- Use fresh fish and seafood.
- Use low-fat dairy products (skimmed/fat free).
- Limit cheese servings.

For fats and oils used in food preparation:

- Use cooking methods that require little oil/fat, for example grilling.
- Avoid fried foods unless using vegetable oil high in polyunsaturates.
- Use as little as possible or no butter/margarine.
- Use low fat or fat free salad dressings/sauces. Avoid butter- or cream-based sauces (replace with low fat yogurt, herbs or vinegar).

For snack foods and takeaways:

- Avoid chips/crisps and deep-fried, battered or pastry bakes.
- Select lower fat options (chicken/grilled burger) and follow with fresh fruit.

For processed foods:

- Select only low fat items.
- Limit processed meats and avoid high-fat sausage or luncheon meat products.

The use of low fat spreads and yogurts containing plant stanols or sterol esters is suggested as an adjunct to diet and exercise. If consumed two to three times a day, these foods inhibit the absorption of cholesterol in the intestines.

◆ **Modifying carbohydrates intake**

Increasing unrefined complex carbohydrates (starches) intake:

These bulky carbohydrates promote early satiety, while simple carbohydrates have little satiety value. According to Lindsay and Gaw (2004:180), the nurse can assist an obese patient with the above eating strategy by:

- Planning meals around complex carbohydrates such as potatoes (add a tasty topping) or brown rice (eat with vegetables);
- Eating cereals low in sugar and high in fibre for breakfast;
- Eating whole grain breads and rolls; and

- Replacing rich cakes and puddings with whole wheat scones, muffins or crumpets.

Decreasing refined carbohydrate (sugars) intake:

Decrease refined sugars, especially in the form of sugar-coated fats like chocolate, cake and ice-cream. This can be achieved by:

- Gradually reducing sugar added to drinks and foods. Replace sugar with an artificial (low calorie) sweetener.
- Select “unsweetened” or “no sugar added” brands.
- Read the label content of food stuffs to determine the sugar content.

◆ **Increasing the consumption of fresh fruit and vegetables**

Fresh fruit and vegetables are low fat, high fibre foods.

- Root vegetables, such as carrots, pumpkin and squash, promote satiety and are ideal for an individual trying to lose weight.
- Aim to eat five or more portions of fresh fruit and vegetables each day.
- Choose fruit- and vegetable-based starters at home or when dining out.
- Serve a side salad with all meals and eat a smaller portion of the main meal when it is high in fats.
- Experiment with vegetarian dishes (e.g. stuffed vegetables or vegetable stir fries).
- Eat fresh whole fruits or baked fruit with low fat yogurts for dessert.

◆ **Increasing dietary fibre**

This can be done by means of:

- Whole grain flour, breads, breakfast cereals, brown rice.
- Fresh fruit and vegetables – eating skins/seeds where appropriate.
- Legumes and beans are a good source of fibre and low fat protein.

While the involvement of a dietician is essential, it is the role of the nurse to coordinate, implement, motivate and evaluate the dietary advice (Grace *et al.*, 1994, in Meetoo, 2004:15). It is the healthcare worker’s responsibility to orientate the patient to the self-monitoring of food, and calorie intake and expenditure.

Implementing a daily exercise programme

Physical exercise and activity improve weight loss (Pavlou *et al.*, 1989, in Burke & Cartwright, 2005:942). The single best predictor of weight loss maintenance is exercise

(Klem *et al.*, 1997, cited in Burke & Cartwright, 2005:943). The patient should set weekly exercise goals, gradually increasing these goals to shape behaviour into an exercise routine. The ultimate goal should be a calorie expenditure of 1000 kcal per week. This can be achieved by moderate exercise (30 minutes of exercise three to five times per week). In this area, the patient can be supported by members of the multidisciplinary team, such as a biokineticist or physical fitness trainer.

Daily activities, such as climbing stairs, also improve weight loss efforts. An obese/overweight individual should be encouraged to decrease sedentary activities, such as watching television and playing computer or video games, and replace these with activities such as gardening or recreational sports (Dunn *et al.*, 1999, as cited in Burke & Cartwright, 2005:943).

The best results for weight loss and maintenance are attained through a combination of dietary therapy, an exercise programme and behavioural therapy. Behavioural therapy should be continued for at least six months from the implementation of the maintenance strategies (NHLBI, 2002; Wing, 1998, as cited in Burke & Cartwright, 2005:944).

Pharmacotherapy

Pharmacotherapy could be used as an adjunct to lifestyle modifications, but should be limited to those with a BMI of more than 30 kg/m² in the absence of co-morbid conditions and those who have failed to lose ten per cent of their body weight through dietary management over a period of at least three months (Lindsay & Gaw, 2004:170). Several anti-obesity agents were withdrawn in 1997 owing to the cardiac valvular abnormalities they caused, which has resulted in the slowing of approval for such drugs.

There are three categories of medications used in the medical treatment of obesity, namely drugs that reduce nutrient absorption, suppress appetite and increase energy expenditure (currently not yet approved) (Yanovski & Yanovski, 2002, in Burke & Cartwright, 2005:944).

It is likely that a patient will need pharmacotherapy for weight loss on a long-term basis, as numerous studies have shown that weight gain occurs with discontinuation of therapy. This emphasises the importance of non-pharmacological strategies, such as modified eating habits and exercise, with anti-obesity agents playing only an adjunctive role in achieving and maintaining weight loss.

3.4.1.2.6 Physical inactivity and lack of exercise

⇒ *General overview*

Studies have shown that a lack of exercise and/or a sedentary lifestyle are risk factors for CAD. However, physical activity can reduce this risk (Linton & Fazio, 2003:2). A sedentary lifestyle is defined by Lindsay and Gaw (2004:194) as including less than one 30-minute session of continuous moderate-intensity physical activity per week. A large percentage of people live sedentary lifestyles and, therefore, the potential for health gain through physical activity is great. However, it is important to clearly link inactivity and a sedentary lifestyle with the risk of heart disease in patients' minds, because otherwise their exercise habits can be difficult to change. The nurse's role lies not only in educating patients about the health-related benefits of regular exercise and assisting them to work out an exercise programme, but also to motivate and be a role model to them (Lindsay & Gaw, 2004:212).

According to Haskell (2003:248), maintaining a physically active lifestyle, along with not smoking and following a nutritious diet, is a core component of an effective cardiovascular disease prevention programme. Physical inactivity is associated with lower HDL levels, higher LDL levels, hypertension, obesity and the development of Type 2 diabetes (Urden *et al.*, 2002:397). Exercise programmes can also motivate patients to stop smoking and facilitates weight loss in obese individuals (Meetoo, 2004:15).

Ongoing studies have provided consistent evidence regarding the effect of physical activity in the prevention of chronic disease, including CHD and other cardiovascular risk factors such as hypertension, Type 2 diabetes and obesity. In contrast, low levels of physical fitness or activity are often associated with higher cardiovascular and all-cause mortality rates (Fletcher *et al.*, 2002, cited by Myers, 2005:916).

Regular moderate walking or sport activities are associated with 30 to 40 per cent reduction in mortality. Irregular bouts of physical activity are associated with a transient increase in myocardial infarction and sudden cardiac death among middle-aged individuals who are de-conditioned (Okreglicki, 2002:505).

The exercise component of cardiac rehabilitation contributes to the secondary prevention of clinical catastrophes of CHD, as well as to the improvement in coronary artery vasodilatation and blood flow (Haskell, 2003:248). Secondary prevention of cardiovascular disease, or cardiac rehabilitation, has tremendous mortality benefits as a result of its

foundation of exercise. It was found that a six-week rehabilitation programme, which included comprehensive risk factor reduction and exercise, resulted in a 50 per cent lower rate of CHD morbidity and mortality in the rehabilitation period compared to the control group of patients over a five-year follow-up period (Myers, 2005:919).

The physical activity index, expressed as *kilocalories per week* (the sum of walking, climbing stairs and sport activities or an energy expenditure of 5 to 7 kcal/min), suggests that a reduction in mortality of up to 40 per cent can be achieved through modest levels of activity (1000 to 2000 kcal/week or three to five one-hour sessions of activity). Only minimal benefits are achieved by the addition of greater-intensity activities. The level of intensity of activity should not be confused with the level of fitness. In several studies, it was demonstrated that higher levels of fitness were associated with a reduction in CHD or all-cause mortality. Importantly, these associations appear to be independent of other CHD risk factors (Myers, 2005:917). Blair *et al.* (1989) in Myers (2005:917) support the latter statement and imply in their studies that the benefits of physical activity on health and survival/mortality are mediated mainly through the increase in the individual's fitness level.

Lindsay and Gaw (2005:201) describe various methods to control exercise intensity. These include setting heart rate and oxygen consumption targets, developing the angina pectoris or significant ST segment changes, and monitoring perceived exertion, breathlessness and metabolic equivalents (METs; one MET equals the oxygen cost of resting metabolism). The greatest mortality reducing benefit appears to be in the engagement of *moderate* activity levels, moderate being defined as an activity performed at an intensity of three to six METs. This is roughly equivalent to brisk walking for most adults (Ainsworth *et al.*, 1993, in Myers, 2005:916).

In further studies, Myers found that the largest gains of physical activity in terms of mortality were achieved by the individuals with the lowest fitness level, who have more than four times the risk of all-cause mortality, when compared to those with the highest levels. An individual's fitness level is a stronger indicator and predictor of mortality than established risk factors, such as smoking, hypertension, hyperlipidaemia and diabetes.

The outcomes of physical activity and exercise are generally, haemodynamically and metabolically beneficial to the patient (Haskell 2003:248; Lindsay & Gaw, 2004:194; Myers, 2005:920).

◆ **General effects**

- A decrease in the risk of cardiovascular disease and CHD mortality, in contrast to physically inactive individuals, who have about double the risk of developing CHD.
- A decrease in the risk of stroke, in contrast to inactive individuals who have three times the risk of having a stroke, possibly due to the increase in fibrinolysis.
- The reduction of depression and anxiety, benefiting mental health by enhancing mood and self-esteem.

◆ **Haemodynamic effects**

The haemodynamic effects of training increase exercise capacity by:

- Increasing the cardiac output, blood volume and the oxygen extraction ability.
- Increasing stroke volume and decreasing heart rate with sustained endurance exercise. Fitter individuals have a slower resting pulse and are thus able to perform day-to-day activities at a lower percentage of their maximum heart rate, which results in a larger stroke volume with every beat. As the heart rate decreases, diastole lengthens and the time for coronary perfusion is increased. Exercise training could be the difference between experiencing disabling angina and having no angina during daily activities. Anti-angina medications can also be reduced in patients with myocardial ischaemia, who exercise, due to their improved myocardial perfusion.
- Reducing heart rate at rest and for any submaximal workload, thus reducing myocardial oxygen demand during daily activities.
- Reducing blood pressure in hypertensive individuals by about 10 mmHg and preventing or delaying the development of an increased blood pressure.

◆ **Metabolic effects**

- Enhances the metabolic capacity of skeletal muscle by increasing the mitochondria number and volume, capillary density and oxidative enzyme content.
- Increases aerobic capacity.
- Expresses the Glut 4 on the cell membranes, which facilitates glucose uptake and alleviates insulin resistance independent of insulin action (Wellmann, 2000:196). This reduces an individual's chance of developing non-insulin dependent diabetes.

- Improves the blood lipid profile by reducing triglycerides, total cholesterol and LDL-C, and increases HDL-C.
- Enhances weight reduction and weight loss maintenance.
- Improves bone health and maintains bone strength, thereby decreasing the risk of osteoporosis. Coordination, cognitive functioning and balance are also improved.
- Improves the immune system, thus reducing the risk of colon cancer.

The most physiologically important benefit of training in cardiovascular risk management is the enhancement of the perfusion and efficiency of oxygen extraction (American College of Sports Medicine, 2000, as cited in Myers, 2005:921).

⇒ ***The role of the nurse in the risk management of physical inactivity and lack of exercise***

Exercise benchmarks for the physically inactive person

Not all cardiac patients have access to specialist advice on physical exercise. It is therefore essential that the nurse should offer accurate advice and support, and promote their physical wellbeing. According to Lindsay and Gaw (2004:193), a physical fitness programme should follow the “**FITT**” principle.

Frequency

Frequency refers to the number of times the activity should be undertaken per week. The need for exercise on a daily basis is essential because of its many short-lived beneficial effects, such as increasing insulin sensitivity and glucose uptake, reducing blood pressure and decreasing blood triglyceride levels. Aerobic fitness increases with frequent training, but tends to reach a plateau when frequency of training is increased to more than three days per week (Lindsay & Gaw, 2004:201).

Intensity

Intensity refers to the amount of exertion required. The intensity of exercise could be “light” (easily within the person’s exercise capacity), increasing to “moderate” (causing increase in respiratory and pulse rates) and then “vigorous” (a significant challenge to the cardiopulmonary system). When the intensity of exercise is increased to aerobic exercise, the “training threshold” is reached. If patients are on beta-blockers, which inhibit the

intensity and the rate of cardiac contraction, the heart will not respond normally to exercise. This is as a result of the inhibitory action on the heart rate during submaximal and maximal exercise intensity and invalidates the usual method of monitoring the heart rate. Modifications in the methods of determining exercise intensity are necessary. These may include the use of a perceived rate of exercise scale (the Borg scale), in which the patient's exertion is determined by a validated scale of how they feel.

Table 3.5 is a scale of the Rating of Newer Perceived Exertion (RPE) developed by Borg (Harris, 2005:255). *Moderate intensity* has been benchmarked as brisk walking (4,8-6,4 km/h), but could also be jogging, recreational activities, such as cycling or swimming, and physical exercise. *Most days* is defined as five or more days (Haskell, 2003:248).

TABLE 3.5: BORG'S RPE SCALE

RPE	Rating	Newer RPE	Rating
06		0	Nothing at all
07	Very, very light	0,5	Very, very weak
08		1	Very weak
09	Very light	2	Weak
10		3	Moderate
11	Fairly light	4	Somewhat strong
12		5	Strong
13	Somewhat hard	6	
14		7	Very strong
15	Hard	8	
16		9	
17	Very hard	10	Very, very strong
18			Maximal
19	Very, very hard		
20			

Type

Type refers to the mode of physical exercise recommended. In an epidemiological data analysis conducted by Leon (1997, in Lindsay & Gaw, 2004:196), the type of physical activity, whether occupational, leisure-time or everyday, did not appear to influence the

health benefits attained. The specific type of activity should be adapted to the individual's lifestyle (in- or outdoors), exercise capacity and physical capabilities. The inclusion of a professional physical trainer or biokineticist can be of great benefit within the multidisciplinary team.

Time

Time refers to the actual time spent performing the exercise or the conditioning period, which excludes the warm-up and cool-down times. Cardiac patients should be advised to gradually warm up prior to exercise and cool down after stopping.

The *Surgeon General's Report on Physical Activity and Health*, published in the USA (1996), as cited in Myers (2005:919), recommends focusing on a moderate amount of *regular exercise* rather than the intensity of the activity. The duration of the physical activity can be adapted to the individual's needs, for example: a 60-minute session three times per week or shorter bouts of moderate to higher intensity of at least eight to ten minutes' duration. Okreglicki (2002:505) recommends aerobic exercise, such as brisk walking, active gardening, dancing or walking up stairs, enough to increase the heart rate to 75 per cent of the predicted maximum for the individual's age for 30 minutes, four to five times a day.

The nurse or physical trainer should be aware of certain clinical indicators of poor clinical status during a pre-programme exercise test (Lindsay & Gaw, 2004:208). These could lead to serious adverse effects, especially in the cardiovascular risk compromised patient, and include:

- Decrease in systolic blood pressure during exercise or the lack of a rise in systolic blood pressure, despite increased workload.
- Evidence of myocardial ischaemia on the ECG at a low level physical activity workload.
- Chest pains, angina or failure of quick-acting nitrates to relieve angina once it has developed.
- Appearance of ventricular dysrhythmias.
- Feeling of exhaustion and breathlessness.

Patients should be advised to report any of the above signs or symptoms immediately. Physical exercise should not be done within two hours of eating a meal, as the blood flow is diverted away from the gut to the skeletal muscles, hindering digestion.

An exercise tolerance test, for example on a treadmill using the Bruce Protocol, should be conducted to measure the individual's aerobic capacity and to be able to give appropriate and safe advice in order to prevent myocardial ischaemia.

Cardiac patients should also be advised on how to gradually warm up prior to exercise (for at least 15 minutes) in order to reduce cardiovascular complications. These complications develop when exercising is started immediately. The heart rate rises rapidly in response to the sudden increase in demand, causing a sudden increase in myocardial oxygen demand and predisposing the individual to dysrhythmias and/or angina. Warm-up time allows the body to selectively redistribute blood through cardiac output. Without this, the muscles are forced to function anaerobically and build up lactic acid, which causes fatigue and has a negatively inotropic effect on the myocardium.

The cool-down period is just as important for the cardiac patient. During exercise, the skeletal muscles wrapped around the veins enhance venous return to the heart. If exercise is stopped abruptly, the muscle pump will suddenly stop assisting the veins and blood will begin to pool in the extremities rather than return readily to the heart. This could cause post-exercise hypotension and light-headedness. If the venous return to the heart is suddenly decreased, reducing the stroke volume, the patient's heart rate will rise in order to maintain cardiac output. This causes the patient's myocardial oxygen consumption to rise, even though he/she has stopped exercising. After exercise, the skeletal muscle also needs an adequate blood supply in order to remove waste products, such as lactic acid produced during exercise. Therefore, a slow, less intense exercise pattern at the end of a session is vital.

The nurse should be aware of the barriers to exercising regularly in order to be able to motivate the patient to maintain the recommended change in exercise habits. Lindsay and Gaw (2004:210) provide the following suggestions to managing these barriers:

- Individuals who previously exercised regularly, but now lead a sedentary lifestyle and have little idea of their true level of fitness, have no incentive to improve it. A fitness assessment is a way of motivating an individual to take part in regular aerobic exercise, especially if re-testing is to be done.
- Another barrier to regular exercise is inadequate self-discipline and exercising without supervision. Regular contact should be maintained with a health worker, whether personally, telephonically, through email or an internet website connection. Positive feedback and encouragement are essential in motivating individuals to maintain their healthier lifestyle.

- The reasons for dropping out are not always known and should be investigated. Reasons could include financial, time and geographic constraints to regularly exercising at health clubs and sport facilities. The existence of discount schemes could be investigated.
- Individuals who expect a sudden, major change in their health status become discouraged and demotivated when they have unrealistic goals and expectations for the exercise programme and thus do not see an immediate improvement. Goals should be individualised and be realistic in order to maintain the exercise programme and make it part of their lifestyle.
- Accurate baseline measurements of an individual's physical capacity are essential in order to set the intensity at the right level. Otherwise, the exercise programme will only serve to physically and psychologically demotivate the individual.

Exercise adherence is the highest in an individualised programme. An exercise programme should take the accessibility of the facilities to the patient and his/her likes and dislikes in exercising into account. Equally important is enlisting the active support of his/her significant other, as this will provide motivation and support for long-term maintenance.

3.4.1.2.7 Psychological risk factors

⇒ General overview

Various psychological factors have been identified as risk factors precipitating the development of CHD. These include depression, anxiety, social isolation, lack of social support, socio-economic status, Type A personality, hostility, possible job-related stress, low levels of control and acute life events with great emotional impact (Madan & Froelicher, 2005:825). According to Lindsay and Gaw (2004:36), and Foxton *et al.* (2004:51), individual or combined psychological factors, which precede stress, result in a lack of coping and high levels of perceived stress. Adverse health-related behaviours, such as excess smoking, an unhealthy diet, excessive alcohol consumption, physical inactivity and non-adherence to treatment regimens, could also be a response to psychological factors.

A group of experts from the National Heart Foundation of Australia, reviewing the major psychological risk factors for the development of CHD, caused disagreement when they

questioned whether certain psychological factors were indeed risk factors (Bunker, Colquhoun, Esler, Hickie, Jelinek, Oldenburg, Peach, Ruth, Tennant & Tonkin, 2003:272-5). Factors commonly regarded as components of stress are:

- Depression and anxiety, hysteric or panic disorder;
- Acute and chronic life events;
- Social isolation and lack of quality social support;
- Hostility;
- Type A behaviour; and
- Psychological work characteristics.

Compared to people with minimal levels of stress, people with high levels of stress more frequently report experiencing clinical cardiac events. People with higher spirituality scores and who partake in religious events have lower mortality due to CHD or following cardiac surgery. This is attributed to the perception that more spiritually aware individuals become less distressed, anxious and depressed at times of emotional trouble, which could have direct or indirect effects on cardiovascular disease (Haskell, 2003:251).

The effect of several biological mechanisms related to stress, such as hypertension, tachycardia, ectopic ventricular dysrhythmias and increased platelet aggregation, has been explored in relation to increased clinical cardiovascular disease events. A reduction in clinical cardiovascular disease events can be observed in people who receive stress management therapy (Haskell, 2003:250).

Several of these identified stressors correspond to Madan and Froelicher's (2005:825) psychological risk factors that contribute to stress or psychological distress and, according to these authors, may have an influence on the progression of CHD.

The two theories that link psychological risk factors to the development of CHD and which are sometimes combined are:

- Neuro-endocrine response theory; and
- Behavioural mechanisms theory.

A physical response to a real or imaginative stimulus/trigger is experienced as a stressor which leads to the fight-or-flight neuro-endocrine response of the sympathetic nervous system. There is a release of cortisol and catecholamines (adrenaline and noradrenaline) with certain physiological effects, represented schematically (Figure 3.6) on page 113 (Madan & Froelicher, 2005:828).

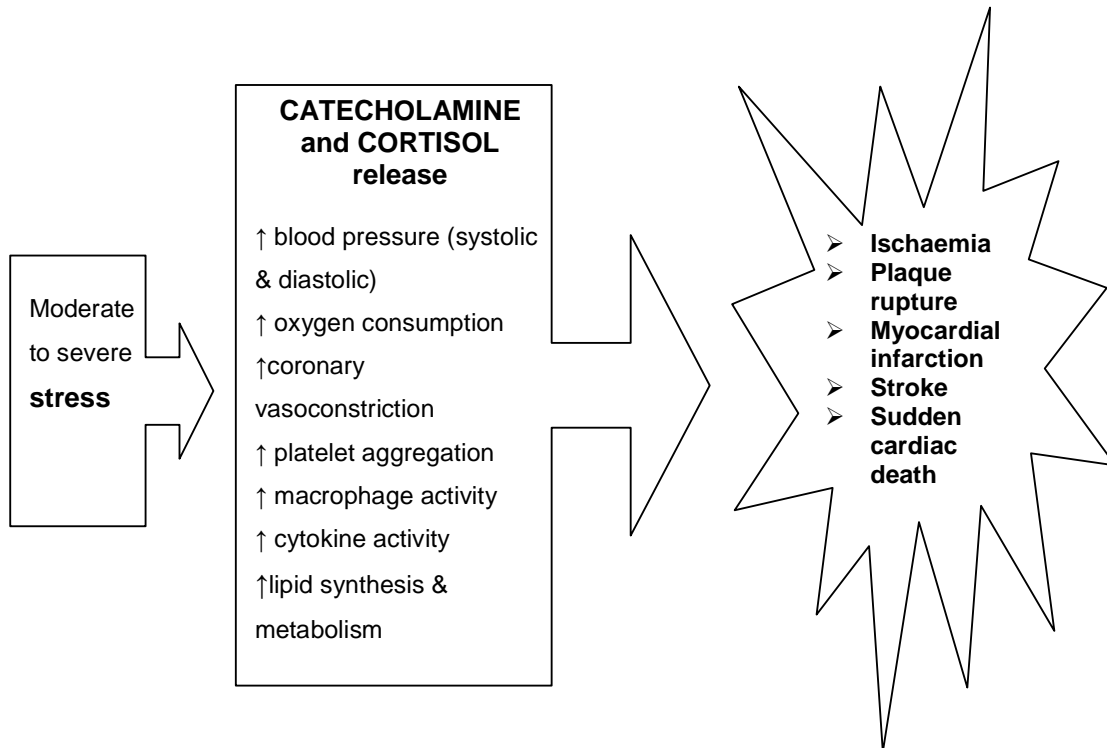


FIGURE 3.6: SCHEMATIC PRESENTATION OF THE PHYSIOLOGICAL AND PATHOPHYSIOLOGICAL EFFECTS OF STRESS, INCLUDING END-ORGAN EFFECTS (ADAPTED FROM MADAN & FROELICHER, 2005:828)

Activated platelets and macrophages release chemotactic and cytotoxic substances, which leads to increased heart rate, hypertension, increased myocardial contractility and thus increased oxygen demand and myocardial oxygen consumption, resulting in accelerated blood flow. This cascades to the endothelial vascular response enhancing thrombus formation and activating macrophages. These activated macrophages promote phagocytosis, which leads to the development of atherosclerotic foam cells. Erosion and damage to the epithelium allow lipoproteins to enter the vessel wall, stimulating the recruitment of monocytes, which in turn, absorb the lipids from the foam cells. A fibrous connective tissue cap is formed over the lipid centre resulting in an atherosclerotic plaque that causes narrowing of the arterial lumen. Pathogenic destabilisation and rupture of the fibrous cap surrounding the atherosclerotic plaque follows, causing a coronary or cerebral thrombosis (Madan & Froelicher, 2005:828).

This neuro-endocrine response theory explains the connection between physiological responses to negative behavioural affective states. Hostile behaviour leads to an increase in sympathetic response with an increase in heart rate and blood pressure. Paradoxically,

a decreased parasympathetic nervous system activity and lower heart rate seen in depressed patients have been associated with ventricular fibrillation.

The psychological risk factors discussed below are grouped according to their *definition* and/or *cardiovascular risk implication, assessment* and *specific management interventions*. At the end of this discussion, a summary is given of the *generic interventions* applicable to all these risk factors. The discussion concludes with the *nurse's role in the management and early detection of these emerging cardiovascular risk factors*.

Depression and anxiety, hysteric or panic disorder

◆ Depression

Strong and consistent evidence was found in the reviews that depression is an independent risk factor for clinical CHD. The CHD risk was directly related to the degree or severity of depression. There is a three- to five-fold increase in CHD in patients suffering from major depression (Bunker *et al.*, 2003:273). Patients who were depressed had a 20 per cent clinical cardiac event rate within six months of having a myocardial infarction, compared to three per cent in non-depressed patients. Regardless of the severity of CHD, patients with depression are three to four times more likely to die in the first year after a myocardial infarction in comparison with those patients with no depression (Madan & Froelicher, 2005:825).

The strength of the association between depression and CHD is similar to risk factors such as smoking or hypercholesterolaemia (Bunker *et al.*, 2003:273). Thus, depression is also a prognostic factor for patients with CHD. In the general population, the incidence of depression is about six per cent, in comparison to the incidence of CHD in the population, which is 16 to 25 per cent. Women are at higher risk of developing CHD because they are twice more prone to becoming depressed than men. Less educated individuals and individuals with a lower income are also at significantly higher risk for developing depression (Kessler, 2003, as cited in Madan & Froelicher, 2005:825).

Compared to a non-depressed group of CHD patients, patients with CHD who are depressed have higher smoking rates. In patients who attended a cardiac rehabilitation programme as secondary prevention, the following positive aspects were noted: anxiety, depression and coping abilities predicted a one-year leisure-time activity and there was higher smoking cessation amongst these patients. Depression causes functional impairments: only 38 per cent of patients with depression (versus 63 per cent of non-

depressed patients) returned to their job environment within three months of a cardiac event (Wells, 1989, as cited in Madan & Froelicher, 2005:826).

In addition to its individual health consequences, depression also places a burden on society's economic resources. As a result of recurring cardiac events associated with higher emotional distress and depression, hospitalisation is increased and therefore so are its costs. The average cost for a depressed patient with cardiac events in the USA is four times higher than for a non-depressed patient (Madan & Froelicher, 2005:826).

Patients who experience depression or social withdrawal may participate less in risk management programmes and be less compliant with risk reduction programmes. Depressed patients do not seek medical treatment early, have lower medication compliance and find it difficult to adopt and maintain healthier lifestyle behaviours. These non-compliant behaviours are mechanisms in the development of CHD. If risk factors, such as smoking, lack of exercise and a high-calorie diet, are not modified by a multifaceted risk reduction programme, the development of CHD could be aggravated by inadequate self-care, insufficient sleep and other longstanding negative behaviours.

◆ ***Anxiety, hysteric or panic disorder***

Negative affective states perpetuate behaviours of social withdrawal and disconnection from support systems, lack of involvement in activities and chronic anger outbursts, which have non-beneficial effects on cardiac physiology. According to a study by Framer-Smith *et al.* (as cited in Madan & Froelicher, 2005:829), conducted on a group of patients with myocardial infarction, depression and anxiety were significant independent predictors of cardiac events. Anxiety and a history of depression were associated with thrombogenic events, while anxiety and anger were linked more to dysrhythmias.

High levels of anxiety are associated with an increase in the incidence of CHD. Compared to men without anxiety symptoms, men reporting two or more symptoms of anxiety have triple the risk of experiencing a fatal CHD event. During hospitalisation, the presence of symptoms of anxiety increases the risk of recurrence of cardiac events, independently of depression. In hospitalised patients with an acute myocardial infarction, complications such as acute ischaemia, dysrhythmias, re-infarction and sudden cardiac death were associated with high levels of anxiety. Anxious patients without adequate social support are more prone to smoking, higher cholesterol levels, hypertension, diabetes mellitus and physical inactivity (Madan & Froelicher, 2005:827).

➤ **Life events that make an acute impact**

There is sound evidence that acute stress or life events can trigger cardiac events. Acute life events that have a significant association with CHD include the death of a significant other, bereavement, retirement, a change in financial circumstances or even environmental catastrophes, such as earthquakes or terrorist attacks. This was investigated through observational studies of exposure to natural and non-natural disasters such as Gulf War missile attacks, the Northridge earthquake in Los Angeles County and earthquakes in Japan. A significant increase in fatal and non-fatal myocardial infarctions was observed, with greater rates of mortality among women than men. Evidence suggests that the risk for ischaemic events doubles in the hour after high stress levels have been experienced (Madan & Froelicher, 2005:827).

Stress experienced as a result of life events has a negative emotional impact on an individual and can lead to dysrhythmias and sudden cardiac death in patients with CHD. This was discovered in patients who underwent coronary angioplasty: stenosed coronary arteries responded to stress by constricting, whereas normal segments responded by dilating.

In comparison to physical stress (physical activity), mental stress produces a higher diastolic blood pressure and a lower heart rate, suggesting that ischaemia occurring in response to emotional stress may account for the inappropriate vasoconstrictor response and its detrimental effects. Unfortunately, as a result of the ethical dilemma of exposing subjects to stress and the effects of this exposure, conclusive statements regarding this cannot be made.

➤ **Lack of social support and forthcoming isolation**

The degree of social support can be determined by the quality of the structural or functional support of social relationships. Structural support focuses on the number and frequency of social interactions, social ties or networks, whereas functional support reflects the type of function, such as emotional comfort and care or the importance placed on the support by the individual, provided by that support. The lack of social support was established as a risk factor for CHD by Case *et al.* (as cited in Madan & Froelicher, 2005:826) when they investigated the effects of social networks by comparing recurring cardiac events in post myocardial infarction patients who were single and living alone. These patients had a 50 per cent higher risk for subsequent cardiac events. Patients with no sources of emotional support had double the risk of developing a cardiac event. Marital distress was associated with a three-fold increase in recurrent coronary events in women.

Lack of sustained social support includes the absence of being able to express positive affects, agreement, acknowledgement and feeling, and provide aid, advice and emotional support. There is consistent and good evidence that social isolation and the lack of quality social support are independent risk factors for the development of CHD. Risk can be two to three times higher in the case of social isolation and three to five times higher when there is a lack of quality social support (Bunker *et al.*, 2003:273).

An important form of social support associated with decreased mortality is that derived from a satisfactory, happy marital relationship. According to Pratt *et al.* (as cited in Madan & Froelicher, 2005:829), a divorced or separated marital status is an independent risk factor for a myocardial infarction. Marital problems are associated with poor health outcomes as a result of the stress caused by the perception that needs or expectations are not being met. Women who perceived higher marital distress were associated with a three-fold increase in recurrent coronary events. In the case of a single marital status, which is associated with low perceived support or lack of support, there is a higher probability of mortality in cardiac patients.

In addition to being a stressor, the lack of social support influences an individual's interest in necessary behavioural modifications. Higher rates of smoking are observed in patients who are unmarried or separated, compared to married patients, as well as a lower likelihood of ceasing smoking. Male cardiac patients receive more support from their spouses for their participation in risk management programmes than female cardiac patients do from theirs.

Overprotective spouses can also be stressful to the cardiac patient. A cardiac event can also exacerbate existing distress in a high-conflict relationship when there is lack of emotional/functional support and the need for nurturing is high (Madan & Froelicher, 2005:826).

Hostility, anger and Type A behaviour, and psychosocial work features

◆ Hostility, anger and Type A behaviour

After several years of research regarding the relationship between Type A behaviour and CHD, hostility and anger have emerged as risk factors in the development of CHD. Type A behaviour includes hostility, perfectionism, impatience, intolerance, and hasty, ambitious and aggressive competitive behaviour. However, in one review, researchers came to the conclusion that the Type A behaviour pattern does not increase the risk for CHD (Bunker *et al.*, 2003:274), making the subject controversial.

Research done at the Ohio State University demonstrated a link between high levels of homocystine (an amino-acid containing sulphar) and a hostile and angry attitude (Van der Merwe, 2004:175).

Hostility can include behavioural, affective and cognitive components. The cognitive components of hostility include perceiving others as distrustful and becoming frustrated and feeling mistreated by others.

Studies have shown that, after nine years of managing risk factors such as smoking, alcohol intake and BMI, men of high hostility still have up to double the risk for CHD (Madan & Froelicher, 2005:827). The link between hostility and cardiac reactivity suggests important physiological sequelae for triggering clinical cardiac events. Expression of acute anger has been reported to cause a coronary event within two hours. This is the result of an increase in platelet aggregation and thrombogenesis, plaque rupture and occlusion of the arteries, either coronary or cerebral, which causes a stroke or a myocardial infarction. High levels of hostility are also predictive of restenosis after angioplasty.

◆ ***Psychosocial work features***

According to the Expert Group of the National Heart Foundation of Australia (Bunker *et al.*, 2003:273), the environmental characteristics of an individual's work did not have a distinct positive or negative influence on CHD. In a prospective cohort study, the humanistic (not environmental) effects of job strain, job control and effort-reward on cardiovascular mortality were measured by Kivimaki, Leino-Arjas, Luukkonen, Riihimaki, Vahtera and Kirjornen (2002:857). The association between work-related stress, determined by the job strain model and the effort-reward imbalance model, and the risk of death from cardiovascular disease was evaluated. The purpose of the work stress model is to identify characteristics of the work environment that could cause frequent and long-lasting stress and therefore predict disease end points. The job strain model proposes that the combination of high work demands and low job control causes job strain. A mismatch between high efforts at work and low reward received in return poses a psychological health risk. The aspects of the work environment that employees perceived as contributing to effort-reward imbalances include low financial remuneration, lack of social approval, lack of job security and limited career opportunities. The risk of cardiovascular disease and mortality is increased by high job strain, low job control, high effort-reward imbalance and low reward, but not by high efforts or high job demands (Kivimaki *et al.*, 2002:859).

According to a study of CHD risk factors in middle-aged women conducted in California in 1992 (Madan & Froelicher, 2005:828), women who were employed showed significant lower s-lipid and s-glucose levels, smoked fewer cigarettes and exercised more than unemployed women. Other studies suggest that employees who experience job stress (high job demands and low control) are more prone to developing CHD. Accumulative factors in the workplace, such as support from co-workers, job security, and juggling family and job demands, probably also influence whether and the degree to which an individual's job is experienced as a stressor. Evidence supporting job stress as an independent risk factor for CHD has not yet been validated.

⇒ ***Assessment and specific management of psychological risk factors***

All the psychological risk factors that have adverse effects or create “negative stress” on an individual's physical or emotional well-being need to be assessed. The difficulty of assessing stress lies in its definition, because while one individual experiences a certain activity or experience as stressful (negative stress), another may regard it as a positive challenge (positive stress). Thus, assessment and interventions to reduce psychological risks should be individualised, even though they are assessed using universal methods. Several tools have been developed to assess the different psychological risk factors and evaluate them as stressors, causing psychological distress, and predictor or independent risk factors for CHD. Assessment can be done by means of an interview and/or standardised measurement tools.

⇒ ***The role of the nurse in the assessment of psychological risk factors***

Clinically the professional nurse should be aware of and assess the patient for stress-related symptoms. These can be categorised as follows:

◆ **Physical symptoms**

- Fatigue, dizziness or light-headedness;
- Hot flushes or chills and goose flesh;
- Insomnia;
- Restlessness, although possibly easily exhausted;
- Diaphoresis;
- Fever blisters;
- Chest pain and heart palpitations;
- Shortness of breath;

- Frequent urination;
 - Anorexia, weight loss or overeating and weight gain;
 - Aching muscles (especially neck and back) or hand tremors;
 - Hypertension;
 - Headaches;
 - Nausea, feeling of a knot on the stomach or bloatedness; and
 - Diarrhoea or constipation.
- ◆ **Psycho-emotional symptoms**
- Depression or a feeling of helplessness or hopelessness;
 - Anxiety and fearfulness;
 - Anger, hostility or resentment;
 - Feeling of frustration or powerlessness;
 - Irritability, being short-tempered or on edge;
 - Feeling of boredom;
 - Bitterness or guilt feelings;
 - Pessimism or negativity; and
 - Easily frightened.
- ◆ **Cognitive symptoms**
- Poor memory, forgetfulness or poor concentration;
 - Mind flight or going “blank”;
 - Confusion;
 - Taking everything seriously or personally or a lack of sense of humour; and
 - Dwelling on problems or an inability to shut off.
- ◆ **Behavioural manifestations**
- Emotionally labile;
 - Excessive alcohol consumption;
 - Use of tranquillisers or sedatives;
 - Fidgeting, nail-biting, chewing hair or chewing continuously;
 - Hostility/anger outbursts, tantrum throwing or throwing things/banging doors, or violence;
 - Verbal outbursts or swearing; and
 - Telling lies to cope.

◆ **Depression and anxiety**

The Primary Care Evaluation of Mental Disorders (PRIME-MD) is a diagnostic assessment tool which takes the form of a patient questionnaire measuring depression and anxiety (Madan & Froelicher, 2005:830). A clinical interview based on the *Diagnostic and Statistical Manual of Mental Disorders (Third Edition)* (DSM-111) can be conducted by a mental health professional.

Depression and anxiety are associated with other negative lifestyle behaviours or risk factors. It is therefore imperative that these psychological risk factors be addressed to limit the accumulative snowball effect of risk factors in the development of cardiovascular disease.

A lack of pleasant activities and exercise, inadequate sleep and an imbalanced diet increase the vulnerability of the depressed/anxious individual to readily perceive events as stressful, and can create a vicious cycle. Treating anxiety and depression can improve compliance with medication, participation in lifestyle changes and positive behaviours such as exercising and dieting.

A medical practitioner or psychologist usually implements the specific management of depression. However, through the contact they have with cardiac patients in hospitals or in a risk management programme, and, amongst other things, by recognising and screening patients for depression, nurses play a pivotal role in addressing this psychological risk factor in the multidisciplinary team. Patients presenting with general psychosocial manifestations of these risks should be referred for a complete professional evaluation and a suitable management programme. Moderate to severe depression requires professional consultation by a psychologist or psychiatrist. Patients with less severe depression respond to good motivation and engagement in positive activities, such as:

- Increased socialisation or connection with family and friends; and
- Increased involvement in activities, such as exercising with a friend, gardening, or any other enjoyable activity that nurtures a sense of accomplishment.

According to Beck *et al.* (in Madan & Froelicher, 2005:833), activity scheduling is a hallmark of cognitive behavioural therapy (CBT) for depression because it fosters connections with significant others and enhances a sense of inner achievement, thus improving negative emotional states.

◆ **Social isolation**

Assessment of social isolation and/or lack of social support can be conducted by the nurse practitioner. The Enriched Social Support Instrument (ESSI), a five-point, seven-item Likert scale assessment tool, was developed from several social support scales that are predictive of mortality (Madan & Froelicher, 2005:829). This simple tool in tabulated format (see Table 3.6 on page 123) can be used by a professional nurse to determine the social isolation and/or lack of social support experienced by the patient. After completing the assessment, the patient can be referred to the appropriate multidisciplinary team member.

TABLE 3.6: SOCIAL ISOLATION TOOL

Items	1 None of the time	2 Little of the time	3 Some= times	4 Most of the time	5 Always
<i>Is there someone available to you:</i>					
Whom you can rely on to listen to you when you need to talk to someone?					
To advise you if you should encounter a problem?					
Who shows you affection, caring and love?					
To help you with day-to-day tasks?					
Is there anyone you can rely on to provide you with emotional support, e.g. helping with problems or helping to make difficult decisions?					
Do you have enough contact with someone you feel close to, someone you can trust and confide in?					
Are you currently married or living with a partner?				YES	NO

Scoring is added and the criteria for low perceived social support are based on five out of the seven items (items 1,2,3,5 and 6). Low social support is reflected by a score of less

than or equal to two on at least two of the five items listed above or a total score of less than 18. Timing of this assessment influences the outcome, as family/significant others may respond at the time of crisis, like a myocardial infarction, and demonstrate an augmented support, which may be artificial. A more realistic assessment of support can be obtained over a period of time after a crisis. Individuals with little structured social support have significantly poorer prognoses compared to those with a strong social support system (Madan & Froelicher, 2005:829).

Interventions to aid social support can take the form of anticipatory guidance by the professional nurse. This can be accomplished through patient and family member education. Acquired knowledge and skills regarding cardiovascular disease can alleviate family members and patients' fears and stress levels, and eliminate inaccurate assumptions. Assessment of the patient and family members' needs and desire for knowledge is important when managing a patient experiencing a lack of social support (Madan & Froelicher, 2005:833).

Secondary prevention of social isolation entails encouraging an individual to join a cardiac rehabilitation or risk prevention programme or club, as joining may increase community contacts, especially for those who have few social ties or existing ties that are perceived as unsupportive. Individuals with existing support networks are likely to benefit from the inclusion of their family or significant others, which may foster a stronger support structure. They are also more likely to have realistic perceptions about the lifestyle/behavioural changes and wellness restructuring, and not distort or make false assumptions due to lack of control or knowledge, or fear of changing roles.

◆ **Hostility and anger**

Assessing the patient for his/her readiness to receive information or counselling is vital in determining the success of patient education. It is crucial to guide the patient in gaining insight into the physiological effects of hostility and anger (Madan & Froelicher, 2005:834). Increasing the patient's awareness of his/her hypercritical view of daily problems and others, as incompetent, frustrating or irritating, is important in addressing the negative behaviour and perceptions.

Intervention strategies for hostility and anger are aimed at maintaining social connectedness in individuals who may lack the skill to socially network appropriately within the family, friend or workplace setting. Many of these patients tend to have unsatisfactory relationships or have difficulty in maintaining relationships. Therefore,

patients need to recognise their own internal reactions in an interpersonal context, and need to practise acceptable, appropriate expressions of feelings and assertive behaviour.

A gentle and tactful approach is essential as patients with these traits may be less compliant with risk factor modification and medical intervention programmes. In order for the patient to achieve some introspection and understanding of his/her own psychological risk factor, the professional nurse can ask the patient questions such as “*Do you think you get more angry than others in situations such as being delayed in traffic or long queues?*” and “*How do you think your anger and emotional arousal affect your heart or blood pressure?*” (Madan & Froelicher, 2005:834).

When managing hostility and anger, it is important to decrease the physiological arousal brought about by anger, hostility, Type A behaviour or psychological work stressors.

The benefit of exercise and relaxation training in decreasing physiological stimulation, decreasing emotional arousal and increasing parasympathetic response should be emphasised when attempting to learn to control hostile behavioural outbursts. According to Madan and Froelicher (2005:832), this can be accomplished by:

- ◆ Educating the patient about the physiological and psychological benefits of relaxation training compared to the negative impact of stress on the sympathetic and parasympathetic nervous system activity as seen in Figure 3.6 on page 113.
- ◆ Increasing self-awareness of responses to daily stressors through relaxation training and decreasing psychophysical stimulation by providing a neutral perspective for re-evaluating stress-related perceptions.

Relaxation has been found to be an integral part in cardiac rehabilitation programmes, particularly for dealing with high arousal states such as anxiety, anger and depression (Madan & Froelicher, 2005:832). Exercise also decreases physiological arousal and thus prevents the detrimental effects of psychological exacerbation (Madan & Froelicher, 2005:832).

⇒ ***Summary of generic interventions and the role of the nurse in the management and reduction of psychological risk factors***

The professional nurse can educate and motivate the patient, and facilitate and provide psychosocial interventions, in primary and secondary risk prevention and management. The timing of psychological interventions can influence adherence to intervention

programmes and the patient's motivation to modify risk factors. In primary risk prevention, identifying the risks for cardiovascular disease and making the patient aware of the cardinal benefit of risk prevention are essential.

In secondary prevention, intervention can be initiated just when an acute medical crisis has been resolved, which is often the time when the patient is the most willing and motivated to participate in lifestyle changes. In the ESSI study, it was found that patients' interest in intervention programmes waned after some time and that they wanted to forget the unpleasant experience (Madan & Froelicher, 2005:831). Thus, early intense interventions while the patient is still concerned about his/her health status and motivated to make lifestyle changes are imperative, as this will give them a sense of control, decrease anxiety and improve self-efficacy.

The effect of managing psychological risk factors on cardiac mortality and morbidity has been the subject of some research. The "Enhanced Recovery in Coronary Heart Disease", the largest, multi-centred, randomised, controlled trial study in this field, was conducted in 2003 (Madan & Froelicher, 2005:830). This study researched whether interventions aimed at reducing depression and improving social support could reduce mortality and CHD morbidity. Although a beneficial effect on mortality could not be demonstrated by the interventions, a significant reduction in depression and improvement in social support (and thus a better quality of life in patients who received psychological intervention) were achieved in this study. As was indicated previously, depression and lack of social support play an important role in the development of CHD.

Psychological risk factor reduction interventions

Motivation plays a definite role in the reduction of psychological risk factors and implementation of behavioural changes. Identification of the stage of change that the patient is in with respect to the risk behaviour is important. If the patient is in the pre-contemplation stage, the most important intervention is to increase the patient's motivation for making that change and assist him/her to enter the next stage, in which patients are motivated to change risk behaviours (contemplation stage).

The facilitator should focus counselling on developing strategies for change and action. Motivating change can also be achieved by Brief Motivational Interviewing, whereby the patient is encouraged to explore his/her beliefs and attitudes toward a specific behaviour and consider the benefit or disadvantage of changing that behaviour. This model of

motivation has been discussed previously (see section 3.2.3). It could be implemented to motivate change with respect to all modifiable risk factors for cardiovascular disease.

During psychological risk factor reduction interventions, information is exchanged between the health facilitator and the patient, family members and/or significant others. Patient education or advice on behavioural change should be given at the end of the screening interview. The information that is disclosed should have a maximal impact. In the course of patient education, the following is imperative (Lindsay & Gaw, 2004:222):

- ◆ Check the patient's present level of knowledge and understanding of the effect of the behaviour and the necessity for change.
- ◆ Present information in a manner that is understandable, concise, simple and easy to remember.
- ◆ Do an accuracy check to ensure that all information is remembered and understood.
- ◆ Pause the counselling process to ascertain whether there are any factual concerns which can be allayed by the provision of information.

Strategies used in counselling to achieve behavioural change and decision-making include the *Health Belief Model*, *stage of change theory*, *the social cognitive theory*, *theory of planned behaviour* and the *problem-solving approach*.

- ◆ The Health Belief Model proposes that patients' motivation to take preventative action is dependent on their perceptions of the relationship between the behaviour and the illness, their perceived susceptibility to that illness, its seriousness, and in particular the costs and benefits involved in changing the specific behaviour (Lindsay & Gaw, 2004:218).
- ◆ Through the stage of change theory (developed by Prochaska and DiClemente), it is possible to determine whether the patient is willing and able to use the information given to bring about change in behaviour. This model identifies the process of change and the counselling strategies necessary to bring about behavioural change (Lindsay & Gaw, 2004:218).
- ◆ The social cognitive theory's tenet is that behaviour is guided by its expected consequences. The more positive these expected consequences are, the more likely it is that the particular change in behaviour will take place. However, often, behaviours that have negative health consequences are still followed.
- ◆ The problem-solving approach by Gerhard Egan proposes change by means of problem identification and exploration, goal setting and facilitating action (Lindsay & Gaw, 2004:226). The problem-solving approach is implemented by identifying the

problem or risk factor that needs to be modified by behavioural change. Thereafter the patient is assisted in setting goals so that action can be facilitated/developed.

- ◆ Self-monitoring of negative reactions and responses, according to Madan and Froelicher (2005:831), is important for patients to recognise or be aware of their behaviours and emotions. Denial or the lack of awareness can impede problem solving and risk factor reduction, which could lead to negative emotional states, strengthening feelings of incompetence, helplessness, hopelessness and social disconnectedness.

Stress management training is another generic risk reduction strategy that the nurse can implement in managing psychological risk factors. Long-term stress resulting from previously mentioned psychological risk factors, such as job-demand and effort-reward imbalances, lack of social support, depression, anxiety, environmental events and Type A personality behaviour, causes psychological distress. As facilitator, the nurse should know the pathogenesis of stress development in order to be able to intervene judiciously. Most stress management strategies are based on the model of stress and coping developed by Lazarus and Folkman (Lindsay & Gaw, 2004:230). The first stage of the model is to identify an environmental event causing psychological distress. The second stage involves a judgement of the environmental stimulus event.

Management of stress involves dealing with each stage of perceived stress by:

- ◆ Identifying:
 - The stressor or trigger causing the negative stress;
 - The sources of these stressors; and
 - The symptoms of stress.
- ◆ Setting realistic goals for more effective responses.
- ◆ Identifying attainable solutions to achieve the goals set.
- ◆ Motivating the patient to change his/her perception and thinking patterns.
- ◆ Changing environmental circumstances (Van der Merwe, 2004:25, 85).
- ◆ Reducing stress by modifying the patient's responses to these circumstances.
- ◆ Letting the patient reward him/herself for attaining goals set.
- ◆ Being flexible and adapting to the patient's needs.

Through specific *relaxation training*, the individual could be taught to cope with stress more effectively. Relaxation training could lead to:

- ◆ Reduction in unpleasant physical sensations and chronic tiredness.

- ◆ Control over the situation or event causing stress.
- ◆ Self-awareness of stress as evidenced by physical tension or emotional arousal.
- ◆ Implementation of relaxation techniques such as:
 - Lying down or sitting quietly for a time.
 - Breathing exercises to enhance muscle relaxation and oxygen availability.
 - Gradual relaxation of the whole body.

General stress management includes:

- ◆ Regular moderate exercise of 20 to 30 minutes per day for at least four to five days per week.
- ◆ Maintaining ideal body weight according to the BMI.
- ◆ Nutritious diet and healthy eating habits.
- ◆ Risk management of any cardiovascular risk factors.
- ◆ Avoiding excessive caffeine or alcohol consumption.
- ◆ Balancing work schedule with social breaks and enjoyment.
- ◆ Sleep restoration (six to eight hours per night).

3.4.1.2.8 Excessive intake of substances

⇒ General overview

The excessive intake of substances, such as alcohol, medication and drugs, should be assessed, as the patient could be trying to cope with his/her psychological distress in this way.

Elevated triglycerides are related to high alcohol and carbohydrate intake. The effect of hypertriglyceridaemia in the development of atherosclerosis has been discussed under the abnormal lipid profile (see sections 3.4.1.2.1 and 3.4.1.2.4 on dyslipidaemia and hyperglycaemia respectively). It can also damage cardiac muscle and cause dysrhythmias, stroke and coagulopathy. Furthermore, it may contribute to obesity, due to the high calorie content, hypertension and other risk factors for the development of CHD. However, alcohol in moderation, defined as one to two units per day, may slightly increase HDL-C and reduce thrombotic tendencies (Foxton *et al.*, 2004:51.)

⇒ ***The role of the nurse in the reduction of excess intake of substances***

In a comprehensive assessment of how substances are taken, a few questions may be put to the patient (in this case, alcohol is used as an example):

During the past month, have you found that:

- ◆ You have to take five or more drinks of beers, wine or liquor on one single day?
- ◆ You have to drink because you feel lonely or lack social support?
- ◆ You drink to “get your mind off” personal or work-related problems?
- ◆ You should cut down on your alcohol intake?
- ◆ You feel guilty or upset about your drinking?
- ◆ Anyone was complaining about your drinking?

If the answer to one or more of these questions was “Yes”, the nurse facilitator should tactfully but firmly explain the adverse effects of alcohol in the development of cardiovascular disease. The patient can be referred to a health professional or institution for appropriate management (Madan & Froelicher, 2005:830).

3.4.1.2.9 Left ventricular hypertrophy

⇒ ***General overview***

According to Mansoor and Massie (1999:S19), and Lindsay and Gaw (2004:85), left ventricular hypertrophy is a strong indicator of cardiovascular risk. The presence of left ventricular hypertrophy is a risk factor independent of hypertension. Epidemiological studies in the USA have reported that the prevalence of left ventricular hypertrophy is higher and doubles the mortality in black versus white individuals (Benjamin, Arnett & Loscalzo, 2005:e121). Black patients who have been diagnosed with hypertension experience a higher incidence of cardiac hypertrophy, heart failure and CHD compared to white patients. Manifestations of atherosclerosis occur two to three times more in the general population in individuals who develop left ventricular hypertrophy. Cardiovascular events occur in proportion to the degree of increase in left ventricle mass.

Structural changes occur in the myocardium in response to increased afterload resulting from increased systemic vascular resistance and hypertension. Hypertrophy is the response of cardiac myocytes and allows the heart to pump more effectively against an elevated afterload. Diastolic filling and stroke volume become limited as a result of left

ventricular hypertrophy. The lumen of the left ventricle is reduced and function is profoundly compromised by decreased compliance.

The greater the mass of the left ventricle is, the greater the risk of dying of heart disease becomes. In individuals experiencing hypertension, glucose intolerance or dyslipidaemia and/or in individuals smoking cigarettes, this risk is intensified (Kannel & Cobb, 1992, as cited by Cunningham, 2005:865).

According to Okreglicki (2001:505), diabetes is associated with left ventricular hypertrophy. Signals for the development of left ventricular hypertrophy are also insulin levels correlating with left ventricular mass, proteinuria and increased angiotensin II levels.

⇒ ***The role of the nurse in the management of left ventricular hypertrophy***

Assessment of left ventricular hypertrophy can be done non-invasively by means of chest X-rays, ECG, echocardiography and ambulatory blood pressure. The discovery of left ventricular hypertrophy on an ECG has more ominous implications than the discovery of an enlarged cardiac silhouette on a chest X-ray, while patients with both findings are at greater risk of developing CHD than those with either the one or the other (Damodharan, [Sa]:4).

The primary intervention for individuals with left ventricular hypertrophy is optimal control of hypertension. According to Benjamin *et al.* (2005:e121), recent trials demonstrated that treatment targeting the renin-angiotensin system is especially significant in the regression of left ventricular hypertrophy. Therapeutic changes resulting in regression of left ventricular mass cause a reduction in cardiovascular risk. Left ventricular hypertrophy is a serious negative risk factor, which nurses should be more aware of. Attention should also be given to risk factors such as diabetes and obesity, as these are important risk factors for ventricular remodelling.

3.4.1.3 EMERGING CARDIOVASCULAR RISK FACTORS

Traditional risk factors like age, genetics, gender, cigarette smoking, hypertension, diabetes, obesity, physical inactivity and dyslipidaemia assist in determining the likelihood of CHD and strokes. However, these factors explain only approximately 60 per cent of the incidences of CHD. In an early study conducted by McCully (PAMLAB, 2004:1), it was

found that in two thirds of patients with arteriosclerosis there were no traditional risks present.

Several large randomised studies have shown that smoking cessation, hypertension control and lipid-lowering drug therapies help to reduce cardiovascular mortality and morbidity by 30 per cent in primary and secondary prevention (Von Eckardstein, 2004:765). Despite these advances, there is controversy regarding the inclusion of newer or emerging risk factors in the research. Von Eckardstein further states that, as a result of high costs and the relatively small chance of finding cases, new risk factors should not be included in unselected population-wide screening programmes. These factors, however, cannot be ignored and are therefore briefly discussed below.

With a view of early detection, the nurse's role is discussed in terms of (1) making the multidisciplinary team aware of possible emerging cardiovascular risk factors, and (2) monitoring serum and urine biochemical values. Specific intervention strategies with respect to the management and/or reduction of emerging risk factors are also discussed.

3.4.1.3.1 Microalbuminuria

Microalbuminuria has risen in importance as a cardiovascular risk factor, even among the general population, as it interacts with traditional risk factors (Von Eckardstein, 2004:765).

Microalbuminuria is defined as an albuminuria (the mean of three overnight urine collections) of greater than 15 µg/min (European benchmark levels) or greater than 45 g/L (South African upper limit serum level). Microalbuminuria in patients with essential hypertension strongly interacts with other metabolic abnormalities of traditional risk factors like a high C-reactive protein, high systolic blood pressure, high s-glucose, low HDL-C, metabolic syndrome, concentric left ventricular hypertrophy and active smoking. Microalbuminuria is a strong marker of micro- and macrovascular damage in patients with hypertension and diabetes mellitus.

A phenotype pattern in a subset of patients with a very high cardiovascular risk may be indicated here. In contrast, isolated microalbuminuria may represent a distinct pathophysiological condition characterised by a more benign profile and possibly a better prognosis (Pedrinelli , Dell'Omo, Di Bello, Pellegrini, Pucci, Del Prato & Penno, 2004:2414).

However, it should be kept in mind that microalbuminuria levels have intra-individual variations as a result of the influence of fever, physical stress and menstrual bleeding on renal albumin secretion. Because of the proven benefit of ACE inhibitors or angiotensin 11 receptor antagonists in patients with microalbuminuria, it is recommended that albuminuria levels be determined in patients with hypertension or diabetes mellitus for cardiovascular disease risk.

3.4.1.3. 2 C-reactive protein

Traditional cardiovascular risk factors fail to predict the risk for cardiovascular disease in 30 to 50 per cent of patients, as these risk factors minimise the contribution of inflammation as part of the atherosclerotic process. An increase in C-reactive protein is a significant contributor to increased risk for CHD (Fitzgerald, 2003:2).

European levels above 1 mg/L are considered to indicate a moderate increase in risk and a C-reactive protein level of more than 3 mg/L is considered an indicator of high risk for CHD (Von Eckardstein, 2004:764). Measurement of high-sensitive C-reactive protein may be useful in patients at intermediate risk over a ten-year period (10 to 20 per cent risk of CAD in ten years), in other words, in metabolically stable patients without obvious inflammatory or infectious conditions. An elevated C-reactive protein in this group of patients may prompt intensification of medical preventative therapy and motivate the patient to improve his/her lifestyle as a means of risk management (Linton & Fazio, 2003:5).

The Physicians' Health Study, which investigated asymptomatic lower-risk males, demonstrated that the highest C-reactive protein levels resulted in a three-fold risk for a myocardial infarction and a two-fold risk for stroke. Elevated high sensitive C-reactive protein was associated with cardiovascular risk independently of traditional and emerging risk factors, including high total cholesterol, low HDL-C, Lp(a), a positive family history of premature CHD, diabetes mellitus, hypertension, fibrinogen, homocysteine, triglyceride level and increased BMI (Fitzgerald, 2003:3).

C-reactive protein is an inflammatory marker and clinical research suggests that it is the inflammatory process that plays a role in the pathogenesis of atherosclerosis. There is growing evidence to support the role of vessel wall inflammation and malnutrition in the initiation and progression of atherosclerosis – the so-called malnutrition-inflammation-atherosclerosis syndrome (Zaldivar & Peixoto, 2003:33). Disturbance in the integrity of the

intimal layer of the arterial wall caused by infection, inflammation and tissue injury can lead to vessel damage. This injury results in a localised inflammatory response, contributing to intimal wall thickening, plaque formation and rupture, which is the pivotal event in acute coronary syndrome leading to vessel occlusion. With inflammation, there is a biological response by the macrophages and T-cells found at the plaque rupture site, resulting in acute-phase protein response such as fibrinogen, C-reactive protein and amyloid A. C-reactive protein is the best studied acute-phase reactant that is part of the atherosclerotic process. Even a slight increase in C-reactive protein predicts an increased risk for a coronary event in patients with unstable angina pectoris, stroke and peripheral vascular disease, independently of traditional risk factors (Wood, 2001:S 51). This was confirmed by a study conducted by Pai, Pischon, Ma, Manson, Hankinson, Joshipura, Curhan, Rifai, *et al.* (2004:2599) indicating that C-reactive protein is the most significant inflammatory marker and predictor of CHD in males and females.

However, in cardiovascular assessment, it is important to remember that C-reactive protein levels are strongly influenced by acute and chronic inflammation. Therefore, blood levels should regularly be taken for analysis after recovery from an acute disease. Increased C-reactive protein concentration is also found in relation to other risk factors associated with atherosclerosis, such as cigarette smoking, obesity and hyperglycaemia. Conversely, C-reactive protein levels decrease with smoking cessation, improved glycaemic control, exercise and the use of statins – all factors that reduce cardiovascular risk.

⇒ ***The role of the nurse in C-reactive protein management***

Nurses should remind doctors to determine C-reactive protein levels in patients who present with cardiovascular risk factors but no collagen diseases or acute or chronic inflammation disorders.

3.4.1.3.3 Fibrinogen

The majority of studies concur that a fibrinogen level of more than 3.5 g/L (European measurement) seems to be of significance for cardiovascular disease (Von Eckardstein, 2004:765).

Fibrinogen is an acute-phase protein, which increases as a result of an inflammatory process. Fibrinogen correlates with interleukin-6 and factor VII coagulant activity, as well

as prothrombin fragments. It affects blood coagulation, blood rheology, platelet adhesion and vascular changes, which in turn stimulate cell proliferation and plaque formation, thus posing a thrombogenic risk factor in cardiovascular disease (Meetoo, 2004:15).

Fibrinogen concentration is normally higher in women than in men and is influenced by race and ageing. Several observational studies have shown that an increase in serum fibrinogen is an independent risk predictor of CHD and is pathophysiologically related to vascular disease. Traditional cardiovascular risk factors, such as smoking, physical inactivity and increased triglyceride levels, are associated with an elevation of plasma fibrinogen. Genetic influences, especially polymorphism in the beta-fibrinogen gene, appear to be associated with increased CHD. Other blood coagulation factors associated with increased coronary risk and predictive of a myocardial infarction in some patients are factor V11, plasminogen activator inhibitor-1 (PAI-1) and increased platelet aggregation with enhanced glycoprotein11b/11a receptor expression (Wood, 2001:S 51).

The Antiplatelet Trial Collaboration Group (Lindsay & Gaw, 2004:37) concluded that, in patients with CHD, the use of low-dose aspirin reduced CHD events by 25 per cent. This cannot be extrapolated to advocate the use of aspirin in healthy individuals to reduce the risk of CHD events as a whole. Therapeutic modalities that selectively reduce fibrinogen are not yet available but risk management of traditional cardiovascular risk factors is important.

3.4.1.3.4 Homocysteine (non-lipid)

Hyperhomocysteine is defined as elevated homocysteine levels of more than 14 $\mu\text{mol/L}$ (PAMLAB, 2004:2). It is strongly influenced by renal function and several drugs. To attain accurate sample results, care has to be taken that the serum is quickly separated from the cells, as erythrocytes produce homocysteine and prolonged full blood storage could cause abnormal elevated homocysteine levels (Von Eckardstein, 2004:765).

Elevated homocysteine as an independent risk factor has advanced from a non-traditional or emerging risk factor to a generally accepted predictor of premature vascular disease. Homocysteine is a by-product of an amino acid that is an intermediate by-product of methionine metabolism, requiring folate and Vitamin B₆ as a cofactor during catabolism of the amino acid methionine. Therefore, elevation in homocysteine is seen in individuals with a Vitamin B₆ and Vitamin B₁₂ deficiency.

According to the report by PAMLAB (2004:1), an elevated homocysteine level may predict a coronary risk or death even more significantly than other traditional factors, including dyslipidaemia, and thus has been identified as an independent risk factor for developing cardiovascular disease and atherosclerotic lesions. Numerous epidemiological studies have shown a relationship between moderate hyperhomocysteinaemia and the occurrence of vascular disease, including venous thrombosis, cerebral, coronary and peripheral vascular disease, and mortality.

In studies on increased homocysteine levels, the following was found:

- ◆ For each three-unit increase in homocysteine, there is a 35 per cent increase in coronary artery disease risk (Verhoef *et al.*, as cited by PAMLAB, 2004:1)
- ◆ With a 5 $\mu\text{mol/L}$ increase in homocysteine, there is a 50 per cent increase in the risk of cerebrovascular disease (stroke) and other thrombotic events (research done by the Johns Hopkins University, and reported in PAMLAB, 2004:1)
- ◆ An overall independent risk for coronary disease is related to high homocysteine levels, although this is notably higher in smokers and individuals with hypertension (Multicentre European trial – PAMLAB, 2004:2)
- ◆ Homocysteine levels are higher in individuals with angiographically confirmed lesions of the major coronary arteries than in normal coronary arteries (Linton & Fazio, 2003:4).
- ◆ There is no specific threshold for the association between homocysteine and CHD since even mild elevations in homocysteine are associated with an increase in cardiovascular disease risk (Newton & Froelicher, 2005:819).
- ◆ In patients with “normal” homocysteine levels, a graded risk for cardiovascular events exists, suggesting that there are individuals who may benefit from treatment that lowers the homocysteine level (Lonn & Yusuf, 1999:1338)
- ◆ An elevated total homocysteine substantially increases CHD risk when associated with smoking, hypertension and hyperlipidaemia (Wood, 2001:S 51).
- ◆ Hyperhomocysteine levels and low folate plasma concentrations are associated with increased risk of extracranial carotid artery stenosis, thus validating the pathogenic thickening of the intimal-medial arterial wall in coronary arteries and carotid arteries (Framingham Heart Study – Newton & Froelicher, 2005:820; PAMLAB, 2004:3)
- ◆ Increased homocysteine after menopause correlates with increased CHD risk in women, but folic acid supplements decrease hyperhomocysteine after methionine loading (Newton & Froelicher, 2005:820).

From these studies, it can be concluded that there is a consistent, clear relation between raised homocysteine levels and low folate plasma concentrations and cardiovascular risk. Experimental studies have shown that the vascular risk induced by homocysteine includes the pathophysiological dysfunction of the endothelium as a result of direct toxic endothelial cell damage and impaired production of nitric oxide. This results in smooth muscle cell proliferation, arterial intimal-medial thickening and wall stiffening. Furthermore, there is an increased production of reactive oxygen-free radicals, increased susceptibility of LDL-C to oxidation, procoagulant activity and increased thrombogenicity (Lonn & Yusuf, 1999:1338). Elevated homocysteine levels present a cardiovascular risk and are a predictor of coronary events because they are a precursor to the development of atherosclerosis (Linton & Fazio, 2003:4).

In summary, hyperhomocysteinaemia can be regarded as an independent risk factor for cardiovascular disease. The patient should be screened for this condition, as it can easily be treated.

⇒ ***The role of the nurse in the management of elevated homocysteine levels***

Despite the substantiation by observational studies of the association of increased risk of cardiovascular disease, there is currently no proof that lowering homocysteine will decrease mortality and morbidity. Thus, the routine measurement of homocysteine and population-wide screening for homocysteine may not be appropriate. The exceptions are in patients with a strong family history of CAD where there are no other predisposing risk factors (Newton & Froelicher, 2005:820).

There are other controversies surrounding this issue. According to Linton and Fazio (2003:4), elevated homocysteine levels can be treated with folic acid, Vitamin B₆ and Vitamin B₁₂. Okreglicki (2002:507) is of opinion that, while folic acid lowers homocysteine levels, it does not enhance endothelial function. According to Van der Merwe (2004:175), the treatment of homocysteine by converting it to beneficial antioxidants is inexpensive and effective. Treatment includes a daily dosage of Vitamin E (320 mg), Vitamin B₆ (50 mg), Vitamin B₁₂ (50 mg) and folic acid (400 mg). The risks from elevated homocysteine are reduced in women and men who regularly consume vitamin B₆ and folate (Urden *et al.*, 2002:396).

3.4.1.3.5 Hyper-Lp(a)

Genetic researchers investigating variant LDL-C particles identified Lp(a) which is similar to the LDL particle with the exception of the addition of a large protein molecule linked to apolipoprotein-B-100. Elevation of Lp(a) above 30 mg/dL (the international cut-off level) is a strong risk factor for cardiovascular disease (Von Eckardstein, 2004:764).

Studies have shown that increased serum levels of Lp(a) present an independent risk factor for CHD. Increased levels of this lipoprotein result in a six-fold increase in cardiovascular risk and can be detected in atherosclerotic plaques.

Genetic phenotype and hereditary LDL-C disorders are associated with hyper-Lp(a). According to the South African researchers, Crowther and Paiker (2003:43), familial hypercholesterolaemia, which is caused by mutations in the LDL receptor gene, is characterised by severe hypercholesterolaemia (s-cholesterol ranges between 5.6 mmol/L and 14.9 mmol/L). Familial hypercholesterolaemia accounts for up to two per cent of coronary events occurring before the age of 60 years and is associated with a very high risk of CHD (Woods, 2001: S 54).

Renal insufficiency and proteinuria can cause increases in Lp(a) levels. It is not the Lp(a) level as such, but the size of the polymorphism of this protein constituent that shows a significant relationship to coronary events in patients with renal disease. In the asymptomatic male population, elevated levels of Lp(a) interact with traditional risk factors, increasing CHD risk for men especially. Lp(a) increases the risk of stroke and venous thromboembolism in children and adolescents with genetic thrombophilic risk factors. In some intervention trials, individuals with a high Lp(a) benefited from statins or postmenopausal hormone replacement therapy. However, this has not yet been validated in large intervention trials.

Other variants of lipoproteins, namely non-high density lipoprotein and apolipoprotein B, were strong predictors of CHD in a male cohort study by Pischon, Girman, Sacks, Rifai, Stampfer and Rimm (2005:3345) in 2004.

⇒ ***The role of the nurse in managing hyper-Lp(a)***

When patients are screened for dyslipidaemia, and hyperlipidaemia is diagnosed, especially in cases where LDL-C is elevated, the prevalence of hyper-Lp(a) should be

investigated. Patients with familial hyperlipidaemia should also be screened for hyper-Lp(a) because of the increased possibility of genetic phenotype and the incidence of hereditary LDL-C disorders associated with hyper-Lp(a).

3.4.1.3.6 Hypertriglyceridaemia

Linton and Fazio (2003:2) state that recent meta-analytical studies have shown that elevated triglycerides are often seen in association with low HDL levels and increased VLDL particles. This combination of dyslipidaemias is considered an atherogenic phenotype (Grundy, 1998, in Fair & Berra, 2005:901). Furthermore, hypertriglyceridaemia and various other risk factors, such as insulin resistance, hypertension, central obesity, and prothrombotic and proinflammatory states, often coexist. The interrelationship or coexistence of these risk factors is referred to as the “metabolic syndrome” and is associated with increased CHD risk.

Elevated triglyceride levels are an independent risk factor for CAD. The atherogenicity of triglycerides is related to the lipoproteins with which they associate. Therefore, elevated triglycerides are markers for atherogenic lipoprotein particles and are also an element of the metabolic syndrome, which triggers atherosclerosis (Fair & Berra, 2005:901). According to Harjari (2000:761), there is increasing evidence that supports the independent role of hypertriglyceridaemia in cardiovascular disease and that decreasing triglyceride levels could reduce the risk of CHD.

⇒ *The role of the nurse in the management of hypertriglyceridaemia*

In South Africa, the reduction in plasma triglycerides to less than or equal to 1.5 mmol/L is the goal in the management of hypertriglyceridaemia (Fair & Berra, 2005:901; Raal, 2003:379). The management guidelines for hypertriglyceridaemia are similar to the management guidelines for dyslipidaemia and the dietary recommendations of the NCEP (2001) cited in Fair and Berra (2005:901). (See section 3.4.1.2.1 on dyslipidaemia.)

3.4.1.3.7 Renin

The enzyme, Renin, which converts angiotensinogen to angiotensin 11, may be a precursor for the development of CHD. The polymorphic ACE is possibly the most researched variable in relation to pre-clinical phenotypes and CHD. It appears to be a response modulator and affects the hypertrophic response of the myocardium to physical

training, the re-stenotic process after coronary stent angioplasty and the evolution of cardiac function after a myocardial infarction. More research is needed to investigate the effect on the risk of developing CHD (Wood, 2001:S 51).

According to Lonn and Yusuf (1999:1337), experimental and clinical studies have reported that inhibiting ACE may reduce cardiovascular risk by means of cardio- and vasoprotective effects. These beneficial effects are accentuated by their antiproliferative and antimigratory effects on the smooth muscle cells, improving endothelial function and acting as antithrombotic agents by means of decreasing platelet aggregation and enhancing endogenous fibrinolysis.

Randomised trials showed a significant reduction in the risk of adverse cardiac events in symptomatic and asymptomatic patients with CAD and left ventricular dysfunction who had been treated with ACE inhibitors for approximately three years (Lonn & Yusuf, 1999:1338). In other clinical trials associated with the treatment of ACE inhibitors, patients with a low left ventricular ejection fraction experienced a 23 per cent reduction in the risk of a myocardial infarction.

⇒ ***The role of the nurse in the management of renin as emerging risk factor***

In individuals with CHD, secondary therapeutic prevention could include the use of ACE inhibitors in plaque stabilisation. Angiotensin 11 is a known inflammatory mediator and there is increasing evidence that the modulation of the renin-angiotensin system reduces cardiovascular mortality and morbidity (Lindsay & Gaw, 2004:9). The nurse should monitor the haemodynamic status of patients on ACE inhibitors, as well as the decrease in cardiac events.

3.4.1.3.8 Uricaemia

Gueli, Del Nero, Zia, Carmenini and Cacciafesta (2001:267-77) accessed the main metabolic variables of cardiovascular risk in a sample population of workers in Rome, Italy. A direct correlation between increased uricaemia and increased levels of triglycerides and cholesterol, a BMI of more than 30 kg/m² and increased systolic blood pressure was observed. These findings were later validated by Guimardes, Devesa, Reis, Parente, Alexandrino and Moura (2004:155) who reported an association between uric acid and cardiovascular disease, as well as a casual correlation between uricaemia and cardiovascular disease risk and mortality.

It has been difficult to establish the specific role of elevated serum uric acid because of its association with other traditional risk factors, such as hypertension, diabetes mellitus, obesity and hyperlipidaemia. Thus, available data could not identify hyperuricaemia as an independent risk factor of cardiovascular disease.

⇒ ***The role of the nurse in the management of uricaemia***

When assessing a patient with increased levels of triglycerides and cholesterol, a BMI of more than 30 kg/m² and/or increased systolic blood pressure for cardiovascular risk factors, the professional nurse should suspect a direct correlation between increased uricaemia and these risks for CHD. A comprehensive history of increased uric acid will also be valuable in evaluating the extent of uricaemia.

3.4.1.3.9 Oxidative stress

The Nurses Health Study (Newton & Froelicher, 2005:820) showed a 35 per cent reduction in major CHD events and a 60 per cent reduction in CHD death in women in the highest quintile of vitamin E supplementation compared to women in the lowest quintile. Among men in the USA who consumed more than 60 IU (International units) of vitamin E per day, there was a 36 per cent reduction in CHD risk compared to those who consumed less than 7.5 IU per day. Generally, there was a 67 per cent reduction in CHD risk mortality compared to non-users of vitamin E. The implication is that the supplementation of vitamin E in high doses may provide CHD protection. Van der Merwe (2004:175) states that research has shown that a dosage of 100 IU of vitamin E per day lowers the risk of cardiac events by 43 per cent, and a dosage of 400 IU lowers the risk by up to 77 per cent.

Haemodialysis patients are more prone to oxidative stress, which may be due to the capacity of the dialyser membranes to induce leukocyte oxidative activation. This is considered to be a fundamental causative factor in the pathogenesis of cardiovascular disease. Therapeutic strategies to reduce oxidative stress are directed at reducing inflammatory cell activation, removing inflammatory mediators, maintaining host antioxidant defences and using sorbent regenerated ultrafiltrate as replacement fluid in haemodialysis.

⇒ ***The role of the nurse in the management of oxidative stress***

Antioxidants and vitamin E supplementation in CHD have been shown to have a beneficial effect on elevated LDL-C levels due to oxidation, decreasing pathogenesis of atherosclerosis and lowering the risk for CHD. Harjari (2000:761) supports this and states that among the antioxidant micronutrients, the supplementation of vitamin E has been shown to be beneficial in primary and secondary prevention of CHD. According to Lonn and Yusuf (1999:1337), antioxidants, such as vitamins E and C, carotenoids, flavonoids, selenium, magnesium, monounsaturated fat and beta-carotene, may reduce the oxidation of LDL-C and therefore CHD risk.

Individuals can enhance their antioxidant intake naturally by means of certain nutrients, including the following:

- ◆ Carotenes found in carrots;
- ◆ Pycnogenol found in grape seed;
- ◆ Resveratrol found in the skin of red and purple grapes;
- ◆ Lycopene found in tomatoes;
- ◆ Bioflavonoids found in the colour pigment of all fresh fruit and vegetables; and
- ◆ Alpha lipoic acid found in spinach, broccoli, liver and red meat.

The supplementation of vitamin E and other antioxidants is relatively cheap and can have only beneficial effects.

3.5 HEALTH RISK MANAGEMENT RELATED TO RISK FACTOR TRENDS IN SOUTH AFRICA

Global trends of cardiovascular disease development also apply to the up-and-coming higher class and the growing group of rich indigenous South Africans (Bisseker, 1999:55). Cardiovascular heart disease affects a large proportion of South African society, with predictors of substantial increases in Africa due to urbanisation. According to Opie (cited in Bisseker, 1999:55), environmental factors are also partly responsible for the high and growing incidence of IHD among South Africa's black and coloured populations. Everyone, he says, should strive to control the main risk factors by adopting a healthy lifestyle and being aware of the different risk factors, such as smoking, high blood pressure, high blood cholesterol, stress, diet, alcohol and a sedentary lifestyle. Organisations, whether part of a state or private health service, have the responsibility to

emphasise and support measures that prevent the development of cardiovascular disease by means of atherosclerosis (Marais, 2003:363).

A risk factor that shows definite population distribution differences in South Africa is familial hypercholesterolaemia. In South Africa, the prevalence is very high amongst particular population groups, such as the Gujerat Indian community, the Afrikaans-speaking portion of the white community, Ashkenazi Jews and the coloured population. A prevalence rate of 1/72 has been reported in the Afrikaans-speaking group, whilst in the South African Ashkenazi Jewish population the prevalence is 1/67. The Indian Gujerat population of South Africa also has a high prevalence, in contrast to the African population, which has a very low prevalence of familial hypercholesterolaemia (Crowther & Paiker, 2003:46).

The prevalence of the disease is associated with LDL receptor gene mutations carried by these population groups. Data from the Multiple Risk Factor Intervention Trial (MRFIT), which has a registry nearly 70 times the size of the Framingham Heart Study, revealed that in men who have a total s-cholesterol of greater than 4.7 mmol/L, there was a progressive increase in coronary artery disease mortality. As total s-cholesterol increased to a level greater than 6.5 mmol/L, the relative risk increased by 3.8 in this group of patients (Ker, 2004:8). In this context, and because of growing Westernisation in South Africa (with reference to culture and diet), the risk management of high cholesterol is of paramount importance.

3.6 RISK SCREENING

3.6.1 THE SIGNIFICANCE OF PRIMARY RISK SCREENING

Due to the potential for risk reduction in high-risk individuals, it is imperative that these individuals are identified. Because of advances in preventative cardiovascular medicine, it is wholly possible to reduce the risk of coronary disease development. Individuals without CHD, whose absolute risk for acute coronary syndromes is as high as that for patients with established CHD, are the highest priority for primary prevention (Grundy, 2001:8E).

As discussed in Chapter 1, studies such as the Framingham Heart Study introduced the significance of risk screening and identified primary risk factors such as smoking, blood pressure, total cholesterol, low HDL-C and diabetes. However, according to the ATP111

report (Linton & Fazio, 2003:8), the Framingham calculation has important limitations relating to *family history, severe hypercholesterolaemia, hypertriglyceridaemia, abdominal or central obesity* and *emerging risk factors*.

◆ *Family history*

The calculation formula does not take a positive family history into consideration. Prospective studies have shown that a family history of premature CAD, such as a positive family history of familial hypercholesterolaemia, is an independent risk factor.

◆ *Severe hypercholesterolaemia*

The value of s-cholesterol as predictor of clinical events is not consistent and is limited to values of total cholesterol of 15 mmol/L (Blom, 2002:288). Familial hypercholesterolaemia should be considered as a metabolic disorder carrying the highest risk weighting in adults.

◆ *Hypertriglyceridaemia*

Triglycerides are not given adequate relevance in the Framingham equation, despite the fact that they contribute to the pathogenesis of atherosclerosis and are a predictor of CAD.

◆ *Abdominal/central obesity*

The Framingham equation does not take adiposity or central obesity, the central element of the metabolic syndrome, which presents a high risk for CHD, into account.

◆ *Emerging risk factors*

The clinical utility of additional testing only has practical relevance in healthy individuals who have a single severe risk factor, such as family history, extreme hypercholesterolaemia, severe hypertension or a long-standing habit of heavy smoking.

In the global risk assessment of pre-symptomatic patients, it is known that the atherosclerotic process begins early in life. Primary risk screening for risk factors, risk management and the prevention of atherosclerosis development should start in adolescence or even earlier (Ker, 2004:9).

Risk factor screening is not only applicable in the South African context, but is also of vital importance to the healthcare provider, the corporate shareholder and the individual South African. Cardiovascular risk factor screening is important to health insurers who have vested interests in health management and promotion. Furthermore, from an economic

workforce perspective, the significance of risk screening is influenced by an awareness of health risks in the corporate environment.

Within the healthcare community, it is a constant challenge to balance funds utilised for preventative medicine and for the management of acute and chronic diseases. From an economic perspective, the utilisation of funds for preventative health, risk screening and appropriate health promotion is more beneficial, as it prevents members of the workforce from developing a sequence of cardiovascular disease manifestations. These issues are of paramount importance as a result of the real and predicted rise in the incidence of cardiovascular disease in and the progressive urbanisation and Westernisation of the South African population. Moreover, this is coupled with increasing healthcare costs, and the restraints and limitations of medical aid coverage in South Africa.

It is evident in this study that the application of the Health Belief Model can be very successful in assisting the patient in changing behaviour related to modifiable and emerging cardiovascular risk factors and thus reduce the risk of the development of cardiovascular disease.

3.6.2 CONCLUSIVE REMARKS ON THE COST-EFFICIENCY OF RISK SCREENING AND RISK MANAGEMENT

Different health and disease management strategies, such as case and disease management programmes, have been implemented to provide high-level interventions to high-cost individuals. However, an important differentiation has not been made between the 'high-cost' and 'high-risk' members. 'High-cost' individuals are those people who have already developed a pathological condition, which has demanded high costs and which could to a certain extent have been prevented. This has resulted in what is known as the Pareto principle, also known as the 80/20 rule (Wikipedia, 2007). According to this rule, approximately 80 per cent of healthcare costs are incurred by approximately 20 per cent of enrolees. These figures have been updated by the PHM to 85 per cent of the yearly costs being generated by 15 per cent of enrolees (refer to section 1.2.2 and Table 1.6.)

In contrast, the 'high-risk' individual or the 'ticking time bomb' is still unknown and has not yet incurred any expensive healthcare costs, but may become high-cost if he/she is not screened and preventative measures initiated. Identifying the high-risk individual and implementing appropriate healthcare interventions, before the high healthcare costs start, could keep this individual to the low cost range. The individual would then belong to the

desirable 85 per cent of enrolees whose healthcare costs represent 15 per cent of the available money (Anderson, 2003:7).

There is an increasing impetus to develop cost-effective strategies to not only alleviate the individual burden of coronary heart failure, but also to shift the focus of care away from the hospital to less costly forms of self-care at community or primary care level. This is reflected by the PHM Strategy Components (see Table 1.6) and the Joubert Model for Risk and Disease Management (Figure 1.1). It is within this context that there has been increasing interest in the role of specific heart failure programmes, driven by the specialist nurse as facilitator of the multidisciplinary team in prevention of further complications and deterioration of existing pathology (Stewart & Harowitz, 2003:225-8).

The aim of cardiovascular risk management is to identify high-risk individuals by means of risk screening and implement healthcare measures that could prevent the occurrence of higher costs. This approach (risk screening and risk management) allows healthcare providers to identify individuals at risk before the disease develops and requires an acute sequence of medical care. Human suffering, economic demands on the different shareholders and accelerated healthcare costs will be avoided, and substantial savings achieved (Duncan, 2002:7, 8).

A secondary prevention survey (or delay in complication of cardiovascular disease, such as heart failure) was done in Australia to determine the role of the specialist nurse in and the economic benefits of heart failure management programmes. It concluded that coronary heart failure programmes of individualised multidisciplinary post-discharge healthcare, with a major focus on specialist nurse management to ensure that the patient receives optimal treatment, are clinically and economically effective in reducing the burden imposed by chronic heart failure (Stewart & Harowitz, 2003:226).

The key feature of this programme was the reduction in recurrent hospitalisation, thereby reducing costs and improving patients' quality of life. Its success was due to a commitment to individualised healthcare, a multidisciplinary approach to managing the patient and the major role played by the specialist nurse in assessing the patient's needs and providing ongoing management to optimise care within the health programme. Other aspects that contributed to the success of the programme were the promotion of self-care behaviours and the monitoring of high-risk patients to prevent clinical deterioration and the associated costs. Lastly, the application of gold standard pharmacological protocols, according to the patient's status and need for titration of therapy, all contributed to the

positive outcome. A recent meta-analysis of disease management programmes, and the overall beneficial effect of these programmes, demonstrated that such programmes can reduce the risk of hospitalisation by up to 95 per cent.

According to Stewart and Harowitz (2003:232-3), nearly all risk management programmes produced improved morbidity rates and health outcomes that could be considered clinically important. However, a key feature not explored in their analysis was the critical role of the specialist nurse in the management and coordination of the multifaceted, multidisciplinary team. These programmes' greatest effect was the minimising of recurrent medical costs.

3.7 CONCLUSION

The risk factors discussed in this chapter have extensive adverse effects on both the body and mind and can lead to the development of atherosclerosis and cardiovascular disease. Clinical trials have clearly demonstrated that a multifactor risk reduction approach can be effective in risk management programmes. Research models using a nurse-managed approach to risk reduction have been successfully disseminated in various community settings (Haskell, 2003:252). One component of a successful risk management programme is the utilisation of a multidisciplinary team with a nurse case-manager. In the programme, the role of the nurse is to establish the individual goals for optimal risk factor status by mutual goal setting and to advise the patient regarding interventions to reach these goals. Patient education requires motivation and commitment from the patient and multidisciplinary team in order to acquire the necessary behavioural changes, and should assist the patient in identifying resources, as well as frequent and regular monitoring of progress. The implementation of a risk reduction management programme in a wide range of clinical and community settings can have an enormous impact on reducing cardiovascular disease morbidity, mortality and improving health-related quality of life.

The first phase of the study consisted of an in-depth exploration of the literature in order to analyse the role of the nurse in health risk management programmes. The researcher focused on the role of the nurse as facilitator of the programme, and therefore the literature reviewed the principles of health risk management and clinical risk screening. In the literature study, resources concerning the risk factors of cardiovascular disease and their management were consulted. A guide for developing a successful cardiovascular risk reduction programme was explored in order to determine the specific role the nurse plays

as facilitator of the multidisciplinary team. The literature took the form of books, articles, journals and electronic information services.

The second phase of the study entails exploring and describing the role of the nurses currently involved in cardiovascular risk management in the South African context. This phase of the study and the empirical data are discussed in Chapter 4.

CHAPTER 4

DISCUSSION OF DATA AND LITERATURE CONTROL

4.1 INTRODUCTION

Chapter 4 is a discussion of the second phase of this study, which made use of the qualitative data collection methods described in Chapter 2. The two phases consisted of:

- ◆ **Phase 1:** An in-depth exploration of the literature was conducted by the researcher to increase her knowledge of the field of study, to gain a better understanding of the diverse role of the nurse in a cardiovascular risk management programme globally and be able to analyse the role of the nurse in such a programme in the South African context.
- ◆ **Phase 2:** An exploratory and descriptive research design was used to explore the role of nurses currently involved in cardiovascular risk management and the potential role of the nurse as facilitator of such a programme.

The extensive literature study and explorative part of the study will be used together to make recommendations for the expansion of the role of the nurse in a cardiovascular risk management programme.

4.2 IDENTIFIED CATEGORIES

Unstructured but guided interviews were conducted with eight participants. These participants were employed in two programmes dealing with health risk management. Seven of the participants were employed in a general health risk management programme, which included cardiovascular health risk management, and one participant was employed in a secondary prevention programme specifically for cardiovascular health risk management. Although the focus of this programme is currently on secondary prevention, it is in the process of shifting focus from secondary prevention to include the broader family and thus primary patients. After the data collected was transcribed verbatim, it was analysed. Themes, categories and subcategories, represented in Table 4.1 on page 149P, were identified.

TABLE 4.1: IDENTIFIED CATEGORIES RELATED TO THE ROLE OF THE NURSE IN A CARDIOVASCULAR RISK MANAGEMENT PROGRAMME

Theme	Category	Subcategories
4.3.1 The characteristics of the nurse in a cardiovascular risk management programme	4.3.1.1 Specific personality traits	<ul style="list-style-type: none"> ▪ Friendliness and kindness ▪ Empathy and understanding ▪ Patience ▪ Listening and perceptiveness ▪ Trustworthiness ▪ Approachability ▪ Open-mindedness ▪ Willingness to interact with people ▪ Acknowledging limitations
4.3.2 Competencies in cardiovascular risk management that have to be acquired by the nurse	4.3.2.1 Clinical skills	<ul style="list-style-type: none"> ▪ Specialised knowledge of, training in and experience with cardiovascular conditions and other health sciences underlying the risk management discipline ▪ Competent in and knowledgeable about cardiovascular nursing aspects ▪ Competent in assessing cardiovascular risk ▪ Competent in managing health risks

	4.3.2.2 Educational skills and abilities	<ul style="list-style-type: none"> ▪ Sharing knowledge openly on the level of the patient ▪ Being qualified to educate and transfer knowledge ▪ Knowledge of the anatomy and physiology of the heart ▪ Specialised knowledge for cardiovascular risk management
	4.3.2.3 Other diverse specialised competencies	<ul style="list-style-type: none"> ▪ Communication and listening skills ▪ Organisational skills ▪ Observational skills ▪ Accompanying patient toward a worthwhile experience
4.3.3 The role of the nurse in a cardiovascular risk management programme	4.3.3.1 Facilitative role within team	<ul style="list-style-type: none"> ▪ Guiding role ▪ Coordinating role ▪ Facilitating teamwork ▪ Supporting role ▪ Advocate role within team ▪ Facilitating proactive action ▪ Liaising with family
	4.3.3.2 Patient education	<ul style="list-style-type: none"> ▪ Assessing the patient's level of readiness ▪ Providing information on warning signs of disease episodes

		<ul style="list-style-type: none"> ▪ Providing information on general and cardiovascular risk factors <ul style="list-style-type: none"> ➤ Exercise ➤ Smoking cessation ➤ Blood pressure control ➤ Nutrition/diet ➤ Weight reduction ➤ Cholesterol control ➤ Stress management ▪ Helps with the interpretation of diagnostic tests ▪ Information on medication use ▪ Information on enhancing and promoting health
	<p>4.3.3.3 The role of the nurse in risk reduction strategies (lifestyle changes and counselling)</p>	<ul style="list-style-type: none"> ▪ Smoking cessation ▪ Stress management ▪ Ensuring rest ▪ Drinking/alcohol use ▪ Nutrition ▪ Cholesterol control ▪ Weight reduction ▪ Physical activity/exercise ▪ Blood pressure control ▪ Glycaemic control ▪ Medication/treatment regimen compliance ▪ Spiritual considerations

	<p>4.3.3.4 Multi-disciplinary team interactions</p>	<ul style="list-style-type: none"> ▪ Liaise with patients, families, doctor and members of the multidisciplinary team ▪ Refer to general practitioner and/or cardiologist ▪ Refer patients to other members of the multi-disciplinary team <ul style="list-style-type: none"> ➤ Dietician ➤ Psychologist and stress management professionals ➤ Professional for spiritual guidance ➤ Physical trainer/ biokineticist/ physiotherapist ➤ Occupational therapist ➤ Social worker
	<p>4.3.3.5 Follow-up and monitoring role</p>	<ul style="list-style-type: none"> ▪ Monitoring in order to refer to doctor ▪ Treatment and medication compliance ▪ Control process <ul style="list-style-type: none"> ➤ Monitor cholesterol ➤ Monitor diabetes mellitus/glycaemic control/insulin resistance ➤ Monitor blood pressure

		<ul style="list-style-type: none"> ➤ Monitor overweight/ diet/healthy eating/ exercise ▪ Monitors adaptation to lifestyle changes ▪ Follow-up <ul style="list-style-type: none"> ➤ Follow-up visits ➤ Follow-up with doctor ➤ Follow-up with employer ➤ Progress and improvement or deterioration ➤ Monitoring emotional progress of patient ▪ Monitoring process <ul style="list-style-type: none"> ➤ Group basis – group support/ cohesion ➤ Telephonically ➤ Pre-booked telephone appointments for follow-up (re-assessment) ▪ Future planning ▪ Questionnaire ▪ Patient independence
	<p>4.3.3.6 Ensuring a dynamic programme</p>	<ul style="list-style-type: none"> ▪ Family support/ involvement ▪ Involvement of employer ▪ Involvement of

		professional team members <ul style="list-style-type: none"> ▪ Quality control/assurance by implementing best practices
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4.3 DISCUSSION OF CATEGORIES

The discussion of the different sections is conducted as follows: the themes as listed in the first column are outlined and discussed in general. These are followed by the category or categories within that specific theme (second column) and then the subcategories (third column), which are included with data chunks that validate them. The subcategory is then followed by literature that serves as literature control or as general comments.

Three themes emerged from the interviews with participants in this study, namely the characteristics, competencies and role of the nurse in a cardiovascular risk management programme.

4.3.1 THEME 1: THE CHARACTERISTICS OF THE NURSE IN A CARDIOVASCULAR RISK MANAGEMENT PROGRAMME

The first theme identified by the researcher is that a nurse involved in a cardiovascular health risk management programme should have specific characteristics. Only one category emerged from this theme, namely specific personality traits.

These character traits are those a registered nurse should embrace in his/her profession when working in a cardiovascular risk management programme. This includes the way in which the nurse interacts with patients, their families and the other members of the multidisciplinary team, which is a vital element in the success of such a programme.

Personality is defined by Nicholas (2003:213) as the unique blend or composition of characteristics of the individual that renders the person distinctive from others. It is the enduring and repetitive modes of thinking, feeling and acting that a person resorts to over time and context. Although different people may have similar personality features, they are individually configured. Thus each personality is a unique composition of preferences,

dislikes, attitudes, perspectives, behavioural patterns, thoughts and emotions. Personality is thought to be stable over time and characterises a person's adjustment to a given situation and environment.

4.3.1.1 CATEGORY 1: SPECIFIC PERSONALITY TRAITS

The participants of this study indicated that a nurse working in a risk management programme should possess certain qualities or personality traits.

Dynamically organised psychophysical systems within an individual, which determine characteristic behaviours and thought, manifest as personality traits. Two assumptions regarding personality traits are that the traits are stable over time and that they directly influence the individual's behaviour. Traits are relatively permanent and relatively consistent general behaviour patterns, which an individual exhibits in many situations and through which his/her adjustment to the environment is revealed. These personality traits are the durable disposition to behave in a particular and unique manner across different contexts (Matthews, Deary & Whiteman, 2003:3).

Personality therefore refers to the enduring nature of a person, his/her psychological make-up, tendencies, temperament, character, intelligence, outlooks, sentiments, attitudes, interests, disposition, likes and dislikes. These form the unique constellation of consistent behavioural traits or patterns and emotional responses with which an individual reacts to others and the environment (Nicholas, 2003:214).

Gordon Allport, the father of the trait theory developed in 1937 (as cited in Nicholas, 2003:217), distinguishes between common and individual personality traits. A disposition that is shared by many people is called a common trait. For example, friendliness exists to some extent in everyone. Individual traits, however, are those personality traits that are unique to the individual. The uniqueness of the personality trait is determined by the frequency, intensity and degree of manifestation of that trait. Individual traits have several dimensions.

An individual trait that is the most pronounced and always evident in a person's behaviour is his/her cardinal characteristic. This cardinal characteristic is a dominant trait that occurs in the widest range of settings. Central traits or characteristics are manifested more frequently than cardinal ones and are adjectives that describe a person. Another

dimension of personality traits is the secondary characteristics of an individual's nature. These are rarely manifested and displayed only under special circumstances.

When discussing the entry level competencies for registered nurses in Manitoba (College, 2005), the first competency listed was the demonstration of professional characteristics. These should form an integral part of nurses' personalities and include identifying the effects of their own values and assumptions on their interactions with the patients.

Trait theorists believe that the natural way of identifying a person by his/her traits is the best means of describing and evaluating that person's personality. They maintain that a unique pattern of traits exists within each personality and that these traits play a dominant role in determining the person's personality. Therefore the described personality traits are central to exploring the role of a nurse in a health risk management programme.

Nine subcategories emerged under the category of personality traits. Each is discussed separately below.

◆ **Friendliness and kindness**

... friendliness and openness to understand ... to be comfortable and friendly with the patient.

I think it must be someone who is kind ...

It is clear that a nurse should display an attitude of friendliness toward his/her patients and their families. Both friendliness and kindness are essential to the role that the nurse must fulfil in a cardiovascular risk management programme in order to enable him/her to effectively relate interpersonally with the patient.

According to the College of Registered Nurses of Manitoba (College, 2005), nurses should provide care that demonstrates sensitivity to their patients' diversity. This embraces kindness and friendliness to patients and setting them at ease within the risk management programme. The Oxford English Dictionary (Soanes, 2002:459) defines "to be kind" as considerate and generous behaviour, which can be viewed as an extension of being kind. Being friendly and kind are relationship-building skills that the nurse needs to apply effectively in a health promotion programme. According to Burke and Fair (2003:259), when developing relationships with patients, nurses should reflect positive feelings through their demeanour and behaviour in order to promote the patients' sense of

worth and acceptability. Friendliness, confidence and attentiveness can foster a trust relationship. The qualities of a therapeutic relationship thus greatly depend on the personality traits displayed by the nurse when in visual, non-visual and verbal contact with the patient. Genuineness, an unconditional positive attitude in accepting others as individuals who are entitled to respect, intimacy and reciprocity, and considerate care are the attributes that embody emotional security for patients taking part in a risk reduction programme.

◆ **Empathy and understanding**

*I think her personality should say everything about her ... and then her empathy ...
Understanding – put herself in the position of the patient. She must be a person who understands ...*

These characteristics are vital for the patient-nurse relationship. Empathy and understanding will enable the patient to feel at ease within the risk reduction programme, regardless of the risk factors he/she may have.

According to the College of Registered Nurses of Manitoba, an entry level competency for a nurse is that he/she should demonstrate personal attributes such as respect, empathy, understanding, honesty and caring, which contribute to effective partnerships with patients (College, 2005). According to Burke and Fair (2003:259), one of the qualities of a therapeutic relationship is sensitivity to the patient's feelings. In order to achieve this sensitivity, the nurse should exhibit empathy and understanding. This will make the patient feel safe when disclosing information that will assist in the identification of cardiovascular risk factors and the planning of a healthier lifestyle.

◆ **Patience**

She must be patient ...

Patience is a crucial attribute that a nurse in the role as risk management professional should have. The nurse must composedly wait for the patients and be tolerant, not forcing his/her opinion on patients before they have indicated their opinions and feelings.

According to the Oxford English Dictionary (Soanes, 2002:614), patience denotes the ability to accept trouble or suffering without becoming angry or upset. This implies that the

nurse should exhibit this attribute toward patients by allowing them to maintain his/her own opinion about healthcare issues, without getting upset or showing any uneasiness.

◆ **Listening and perceptiveness**

... be able to listen, that is very important.

... and be willing to listen to the patient.

...willing to answer their questions and to listen to the patient. Listens attentively. Being very perceptive.

Listening and being perceptive are essential aspects of the nurse's non-verbal communication. These are also important personality traits which the nurse should have, not only to obtain all the information the patient is disclosing, but also to show recognition and awareness of the patient.

By being perceptive, the nurse shows insight and demonstrates the ability to understand the true nature of what the patient is saying (Soanes, 2002:621). Becker (1998) as cited in Burke and Fair (2003:258) identifies ten principles of good communication, of which active listening skills is one of the most important. The nurse should ask for clarification of what was said, paraphrase, reflect and/or summarise what he/she heard the patient say. In a study by McHugh *et al.* (2001, in Riley, 2003:ii34), in which there was a significant reduction in cardiovascular risk factors, one of the nursing strategies that was a success was taking the time to listen to the patient.

◆ **Trustworthiness**

She should be somebody that you can trust.

Being trustworthy was another important personality trait identified, which the nurse should possess to make the patient feel safe in imparting information regarding possible risks that could be detrimental to his/her health.

The Oxford English Dictionary (Soanes, 2002:901) defines trust as the firm belief in the reliability, truth, ability or strength of someone or something. It is essential that the nurse displays this personality trait in order to ensure that true and reliable interaction between him/her and the patient takes place in the risk reduction programme. Burke and Fair (2003:259) state that another quality a nurse should display in a therapeutic relationship is

that of mutual trust. When patients are asked to disclose personal information, there is an expectation of acceptance and understanding. Patients need to know that they are respected even if they disagree with the nurse's perspective. If patients know that they can trust the nurse, they feel more open to discuss their opinions and feelings regarding any barriers that they may experience in making lifestyle changes to reduce their cardiovascular risk.

◆ **Approachability**

... she must be ... very approachable

If the nurse is approachable, the patient will feel at ease and willing to share the information needed to determine risk in the cardiovascular risk management programme.

According to the Oxford English Dictionary (Soanes, 2002:35,588), to be approachable is to be friendly and easy to talk to, as well as to be willing to consider new ideas. An approachable nurse will make patients feel confident and free to disclose information needed to identify his/her cardiovascular risk factors. In building a therapeutic relationship with patients, the nurse should be genuine and adopt a non-discriminatory and honest approach to make patients feel that they can approach him/her in any circumstance or with any problem (Burke & Fair, 2003:259).

◆ **Open-mindedness**

... she must be open-minded, very approachable ... not force her opinions onto the patient.

An open-minded nurse does not have preconceived ideas and will therefore not force his/her opinion onto patients, but rather allow the patients to share their opinions, feelings and any relevant information regarding possible risk factors, and how they perceive these as risks to their health. The College of Registered Nurses of Manitoba lists critical thinking and openness to the patient and to new ideas that change, enhance or support the nursing practice, for the benefit of the patient, as entry level competencies for registered nurses (College, 2005).

Burke and Fair (2003:259) outline the skills and attributes needed by nurses to promote behavioural change and reduce a patient's risk. Of these skills and attributes, building a

therapeutic relationship with the patient, is considered vital. The nurse should give patients the emotional space and time to communicate their concerns, queries or uncertainties regarding the cardiovascular risk factors and the impact of risk reduction strategies on their lives, with him/her.

◆ **Willingness to interact with people**

Knowledge to work with other people and be somebody who is willing to work with people and listen to what other people are saying – it is interaction ... you interact with other people in risk management.

The nurse should demonstrate a willingness to work with people and interact with patients, their families and the other members of the multidisciplinary team in coordinating an effective health risk management programme.

The College of Registered Nurses of Manitoba (College, 2005) suggests that a nurse with the necessary knowledge and evidenced-based information can assist the patient to understand the link between interventions and expected beneficial outcomes. He/she should also maintain a caring attitude when supporting patients and their families in achieving health outcomes. The nurse should be aware of how his/her own values and assumptions affect interactions with patients, their family and the other members of the interdisciplinary health team in the management of cardiovascular risks.

◆ **Acknowledging limitations**

... If you cannot answer the patient, ask the specialist.

A nurse's professional characteristics should include recognising the limitations of his/her own competence and seeking direction and consulting with other members of the interdisciplinary team when necessary.

According to the College of Registered Nurses of Manitoba (College, 2005), a nurse should recognise the limitations of his/her individual experience and knowledge, and seek guidance from experienced practitioners in the multidisciplinary team. When the nurse, for example, cannot answer a patient's questions, he/she should consult with the specialist doctor or expert.

4.3.2 THEME 2: COMPETENCIES IN CARDIOVASCULAR RISK MANAGEMENT THAT HAVE TO BE ACQUIRED BY THE NURSE

The second theme identified by the researcher is that a nurse requires certain competencies in order to be able to function effectively in a cardiovascular risk management programme. Three categories emerged within this theme, namely clinical skills, educational skills and abilities, and other diverse specialised competencies.

According to Hall (1993:31), competence should be appreciated as a generalised human trait, a widespread capacity to do what needs to be done and not just the possession of a special expertise. Competence embraces a fundamental capacity and is more than just special skills belonging to experts. Competence implies an enriched ability including skills, knowledge and attitude.

Personal competence is continually enhanced by learning how to deal with and solve any number of problems, how to innovate, how to continue to learn and how to profit from personal experiences. Robert White (cited by Hall, 1993:33) defines competence as “the key to adaptive fitness.” The more competent a person is, the more fit he/she is to interact effectively with the social and physical surroundings, and to respond productively to their demands.

In the entry level competencies for registered nurses in Manitoba (College, 2005), competencies were defined as behavioural statements that reflect the integrated knowledge, skills, judgment and personal attributes required.

The competencies that the participants in this study identified can be grouped into three categories: clinical skills, educational abilities and other diverse specialised competencies relevant to a competent nurse’s function in a cardiovascular risk management programme.

4.3.2.1 CATEGORY 1: CLINICAL SKILLS

Participants indicated that, in this type of risk management programme, the nurse should possess certain clinical skills. In an attempt by the American Hospital Association to improve cardiovascular health, the clinical nurse specialist’s role in prevention and wellness was discussed and then exerted in different spheres. Within the patient/client sphere, outcomes were achieved through the clinical nurse specialist’s use of clinical

expertise and knowledge on heart disease and preventative cardiology (Halm & Denker, 2003:109). Being able to conduct good clinical interviews and facilitate groups of patients and/or their families are valuable skills required by the nurse in health promotion and risk management. Furthermore, training in communication skills will assist the nurse to assess needs, problems and risks in a risk reduction programme, as well as provide preventative counselling regarding risk reduction strategies. This has the potential to impact on the morbidity and mortality associated with cardiovascular disease (Burke & Fair, 2003: 263-4).

Four subcategories emerged within the category of clinical skills. Each is discussed separately below.

◆ **Specialised knowledge of, training in and experience with cardiovascular conditions and other health sciences underlying the risk management discipline**

Additional training on cardiovascular conditions and treatment ... will add to the management itself. I think the additional skills come into the programme you are working with ... she should have a background of the patient interaction with prior experience with cardio knowledge and experience ... that is the criteria to work on the cardiovascular programme ... being able to identify what contributes to cardio conditions. She needs to be really practical and know what she is talking about ...

According to the above data chunk, a nurse should possess definite knowledge of and practical experience with cardiovascular conditions and their treatment in order to effectively practise clinical skills within the risk programme.

The entry level competencies for registered nurses in Manitoba (College, 2005) state that additional knowledge, training and experience in the cardiovascular field and other health sciences underlying the risk management discipline will refine the nurse's technical and time management skills, and develop proficient practices. Quinn (1993:567-9) states that reflective practice has been the dominant model for professional practice in both the nursing and teaching professions. It is the reflection on the combination of theory and experience to enhance the nurse's clinical knowledge and patient interaction. According to the participants, the nurse should also have knowledge-in-action. This is a practical professional knowledge, inherent in the action itself, which develops by the process of reflection-in-action. The process of reflecting upon the intuitive knowledge that is implicit in

a nurse practitioner's actions, whilst at the same time carrying out those actions, constitutes reflection-in-action. The nurse in the cardiovascular risk management programme should have a 'cardio-reflective practice' knowledge base.

In clinical and observational studies in Scotland, Canada and the USA, it was found that cardiac risk factors, such as dyslipidaemia, hypertension and tobacco smoking, decreased significantly in patients participating in nurse-led risk reduction programmes. An important strength of these interventions was that the nurse was well integrated into the practice. (McPherson, Swenson, Pine & Leimer, 2002:552.)

◆ **Competent in and knowledgeable about cardiovascular nursing aspects**

Knowledge of different cardiovascular units and ECGs ...

A nurse should have gained the necessary skills and information through experience and formal education to be knowledgeable about specific cardiovascular aspects, such as recognising and interpreting abnormalities of the ECG. According to Bucher and Melander (1999:164), an ECG records the electrical changes in the heart muscle caused by an action potential. The electrical activity of the cardiac cells is recorded externally through the skin, reflecting the cardiac cycle. It provides diagnostic information regarding the heart's conduction system and clues to various cardiac pathologies, the effects of medication and the effects of electrolyte abnormalities on the heart muscle. The nurse should therefore be knowledgeable about the conduction system of the heart and the electro-physiology of electrical impulse conduction through the heart muscle. The nurse should also be familiar with the normal ECG waves, as well as the components and recording of a twelve lead ECG in order to be able to distinguish ECG abnormalities that occur during the cardiovascular assessment. Knowledge regarding cardiac pathologies, dysrhythmias and extra-cardial pathological effects on the ECG is vital in the meticulous interpretation of the ECG and the early detection of cardiovascular abnormalities. The participants felt that it is imperative that nurses possess this competency.

◆ **Competent in assessing cardiovascular risk**

You have to be sharp ... to detect any need, problems or risks.

Special skills in cardiovascular management ... more cardio orientated and not such a wide knowledge but more centred in cardio as such ...

It is important that nurses possess the specific knowledge, skills and attitudes required to assess cardiovascular risks and detect deviations from the desired benchmark parameters.

The document on the entry level competencies for registered nurses of Manitoba (College, 2005) states that nurses should develop the ability to individualise assessment and care through experience and reflection on practice experiences. The nurse thus collaborates with members of the multidisciplinary team in implementing strategies related to the prevention and early detection of prevalent disease.

In this specialised competency, the nurse focuses on the cardiovascular risk management of the individual, displaying specialised cardio-orientated skills. Risk factor ethiology, the pathological manifestations and effects on the cardiovascular system, as well as the assessment and risk reduction interventions, should be internalised by the nurse in a risk management programme. In a national cardiovascular health improvement fellowship regarding primary prevention programmes to reduce heart disease risk in women, Halm and Denker (2003:109) concluded that the clinical nurse specialist's influence was evident in the use of clinical expertise and knowledge regarding women, heart disease and preventative cardiology. The nurse plays a pivotal role in teaching the community about cardiovascular risk factors, common signs and symptoms of cardiovascular disease and ways to reduce risk through lifestyle and medical management.

Interviewing and communication skills are essential for performing thorough cardiovascular risk assessment and management. The accuracy and completeness of data gathered during cardiovascular risk assessment depend on the nurse's ability to communicate effectively and elicit pertinent information. By showing concern and sensitivity to the patient, the nurse establishes a meaningful nurse-patient relationship (Kinney & Packa, 1996:10).

Astute and sensitive nurses function at their highest level when open to subtle cues and intuitive feelings that can have an impact on the data collected and conclusions formulated during cardiovascular risk assessment. The nurse must obtain a health history, including any medication being taken and current health problems, such as palpitations, fatigue or chest pain. Any previous medical and surgical history, which could have an impact on patients' cardiovascular system and predispose them to cardiovascular risk, should be gained in an interview with the patients. Social and occupational history should be obtained and factors, such as a stressful work environment, social isolation, excessive

alcohol use or smoking, contributing to cardiovascular risk deduced. Knowledge about the patient's family history of cardiovascular disease or personal history of atherosclerotic vascular disease, such as peripheral arterial disease, abdominal aortic aneurysm and/or symptomatic carotid artery disease, is essential to a holistic assessment of cardiovascular risk determination. It is vital for the nurse to possess not only a theoretical knowledge base of the cardiovascular system but also the clinical skills of cardiovascular risk assessment. The nurse should possess the knowledge and clinical skill of performing a comprehensive physical examination, focusing on the cardiovascular system, in order to be able to deduce information regarding cardiovascular disease.

According to Kinney and Packa (1996:15), nurses should determine the patient's perception, expectations and knowledge of illness. This is essential in order for patients to understand their cardiovascular risk, its impact on cardiovascular disease and the expectations of risk reduction strategies.

◆ **Competent in managing health risks**

... Early detection of the main risks and be able to handle those risks.

In order to be competent in managing health risks, the nurse should be able to detect these risks timeously or as early as possible to enable effective risk management and reduction before end-organ damage occurs.

The nurse should be able to manage modifiable and emerging cardiovascular risk factors leading to cardiovascular disease. Health risks are qualified as relative or absolute risks (Lindsay & Gaw, 2004:31). An absolute risk is the expected rate of cardiovascular disease for any given combination of age, gender and other risk factors. A relative risk refers to the ratio between the absolute risk in an individual and the absolute risk in someone of the same age and gender who has no other cardiovascular disease risk factors. According to McManus, Mant, Meulendijk, Salter, Attison, Roalfe and Hobbs (2002:459), the prevention of cardiovascular risk factors requires major action to reduce the adverse consequences. Specific management and interventions must be used for hypertension, hypercholesterolaemia, smoking and diabetes in terms of primary prevention strategies. These health risks and the role of the nurse in their management in a cardiovascular risk programme are discussed comprehensively in Chapter 3. In a study that examined whether nurses could manage coronary risk factors in patients with unstable angina, it was found that patients managed by a nurse had significant improvements in cholesterol

control and weight reduction compared to patients managed by physicians practising usual care (Allison, Farkouh, Smars, Evans, Squires, Gabriel, Kopecky, Gibbons & Reeder, 2000:133).

4.3.2.2 CATEGORY 2: EDUCATIONAL SKILLS AND ABILITIES

Participants in the study indicated that the nurse in a risk management programme should possess certain educational skills and abilities in order to be competent. A nurse with educational abilities has the knowledge and skills to transfer appropriate knowledge to the patient.

Educational skills must be based on practical, relevant and scientifically sound methods and accessible technology (Nies & McEven, 2001:131). Educational advice should be provided in both written and verbal forms, as the one complements and supports the other. The written information should be simple, clear and presented in an attractive way. Educational programmes on risk reduction should cater for different ages, mental abilities and cultural backgrounds (Coats, McGee, Stokes & Thompson, 1995:24). Videos can be a useful alternative and can provoke discussion.

In the multicultural society of South Africa, cultural differences should be taken into account, although the essential meaning of the information must not be changed in the process of translation. When using different teaching aids, such as audiovisual aids and handouts, it is vital that their suitability, readability, clarity of expression and length are appropriate for the desired risk reduction.

Only through the educational skills of the nurse can lifestyle behaviour change imperative to a risk management programme be facilitated. A theoretical knowledge base, experience in practice and an understanding of theoretical attributes of clinical situations are needed to manage complex clinical situations and achieve a wide range of competencies.

Four subcategories emerged under the category of educational skills and abilities. Each is discussed separately.

◆ **Sharing knowledge openly on the level of the patient**

... You have to openly share your knowledge on the level of the patient. She must be able to converse in ordinary language, not too high for patient

...To be comfortable with patient, friendly, helpful and to share your knowledge with them...

The ability of the nurse to share knowledge openly, on the level of the patient, is of vital importance in making it meaningful to the patient. It is essential to identify the patient's level of understanding and readiness to learn. In conveying knowledge correctly, the nurse can lay the ground for effective cooperation in the risk management programme.

One of the three spheres of influence of the clinical nurse specialist identified by the American Hospital Association's cardiovascular health improvement fellowship was the nursing personnel sphere (Halm & Denker, 2003:109). In this sphere of influence the clinical nurse specialist has the opportunity to share knowledge regarding heart disease with staff so that they can incorporate it into their practice and teach cardiovascular patients and their families the importance of cardiovascular risk modification.

The seventh competency in the document on the entry level competencies for registered nurses in Manitoba (College, 2005) is the teaching and verification of knowledge. When sharing knowledge openly and on the level of the patients, the nurse in a cardiovascular risk management programme should address the health-related learning needs of the patients and their families independently, as well as with the other members of the multidisciplinary team and/or employer in consultation.

According to Kozier, Erb, Berman and Snyder (2004:446), patient education is a major aspect of nursing practice and an important independent nursing function. Patient education is multifaceted and involves promoting, protecting and maintaining health. Patients should be taught about health risk factors in order to increase their level of wellness and encourage the implementation of specific proactive health measures. Verbal information should be provided at an appropriate level to the patient and his/her family (Coats *et al.*, 1995:15). It should not be assumed that a patient is literate, as some people may find it difficult to say that they cannot read, especially in a third world country. The nurse should be on the alert for a patient who does not appear to be taking in written information or asks inappropriate questions during counselling, as he/she may be unable to comprehend the information imparted by the nurse. Other educational methods that

may be useful are videos, as they may transmit the information to the individual on another level and stimulate discussion.

The major attributes of the cognitive theory are its recognition of the developmental level of the patient as learner and acknowledgement of the learners' motivation and environment (Kozier *et al.*, 2004:449). The cognitive theory of learning also recognises the personal characteristics that have an impact on how cues are perceived and thus would encourage the development of appropriate teaching approaches to target different patients with different learning styles. Assessment of the patient's developmental and individual readiness to learn is done in order to adapt teaching strategies to the patient's developmental level. It is important to select behavioural objectives and teaching strategies that encompass the cognitive, affective and psychomotor domains of learning.

◆ **Being qualified to educate and transfer knowledge**

I think the most important is that you must be knowledgeable. The nurse must be qualified ... educating and transferring knowledge to the patient...

I think knowledge of the person itself because that is the information that the patient will actually need and must be able to answer all questions that will be asked from the patient, so in general she must be well informed...

The Oxford English Dictionary (Soanes, 2002:463) defines being knowledgeable as having gained the necessary skills and information through experience and education, thus being intelligent and well informed. In order to be qualified, a nurse must complete certain basic and post-basic training courses to procure the necessary knowledge required in the specialised field of nursing.

Being qualified and knowledgeable in the area of education and transferring of knowledge is a necessary ability for nurses involved in a cardiovascular risk management programme. It is imperative that nurses achieve this before conveying the appropriate information to patients regarding cardiovascular risk management. Nurses, who are qualified in the specialised field of cardiovascular health management, have a sound knowledge base that can be transferred to patients in the course of the risk management programme.

In order to ensure the success of health education strategies, nurses functioning in the sphere of community health must be knowledgeable about the socio-political, cultural,

environmental and ecological forces that affect risk factor reduction and community health (Nies & McEven, 2001:164). According to Meetoo (2004:14), education has long been a cornerstone of self-care management, especially in the case of atherosclerosis, as the multi-factorial causation makes education a priority for nurses in its prevention. The focus of the management approach to health is changing to a more aggressive approach aimed at empowering patients to take responsibility and cognisance of their own health (Fraser, 1999:18). This can only be accomplished if the qualified nurse educates the patient adequately. The literature illustrates the need to clarify the skills, knowledge and confidence needed by nurses to provide risk prevention and management, and maximise the potential for cardiovascular disease prevention (Burke & Fair, 2003:257). According to Coats *et al.* (1995:31), the knowledge and skill base needed by nurses to function effectively in cardiovascular risk management include the following:

- The process of cardiovascular disease;
- Health physiology;
- Adult education theories;
- Theories regarding behavioural change and motivation;
- Counselling skills;
- The physiology of exercise training and prescription;
- Management of cardiac emergencies;
- Nutritional guidelines regarding weight loss, cholesterol control, hypertension, insulin resistance and diabetes;
- Occupational advice;
- Assessment, audit and evaluation skills; and
- Management, administration and research skills.

◆ **Knowledge of the anatomy and physiology of the heart**

Knowledge of the anatomy and physiology of the heart, in cardiovascular management ...

It is crucial that nurses are knowledgeable and possess the ability to educate patients about the cardiovascular system, including the normal anatomy and physiology of the heart (Coats *et al.*, 1995:31). According to Morton, Fontaine, Hudak and Gallo (2005:199), this would include the micro- and macrostructure of the heart, the coronary and peripheral circulation and the mechanical events of contraction, such as the electrical activity of depolarisation, repolarisation and resting membrane potential. This acts as the foundation of a cardiovascular risk management programme. A scientific understanding of the

physiological basis of the cardiac cycle, cardiac output regulation and concepts of haemodynamics is imperative for the nurse to attain and be able to teach.

◆ **Specialised knowledge for cardiovascular risk management**

... Yes, specialised knowledge is needed ... more cardio orientated and not such a wide knowledge but more centred in cardio as such and not just a general knowledge.

In a risk management programme, nurses require not only a general knowledge, but also a specialised knowledge regarding cardiovascular risk management in order to be able to educate patients adequately about their specific risk factors, the appropriate reduction strategies and the prevention of further atherosclerosis. According to Coats *et al.* (1995:15), specialised information regarding cardiovascular risk management will include traditional demographic details and information regarding coronary risk factor assessment, including:

- Family and personal history of CHD;
- Relevant medical history;
- Risk factor history including smoking, cholesterol profile, dietary habits, body weight, blood pressure or hypertension, diabetes, physical activity, emotional status, behavioural style or hostility;
- Risk stratification;
- Socio-economic status;
- Occupational status; and
- Leisure activities or sedentary lifestyle.

Stewart and Harowitz (2003:226) confirm the fact that specialised knowledge is a prerequisite for nurses in their emerging role as specialist nurse in specific programmes. These nurses usually need advanced training in order to acquire the specific skills required to assess and manage difficult disease syndromes in an effective manner. According to Coats *et al.* (1995:31), in order to provide a comprehensive service, qualifications in areas such as teaching, counselling, nutrition, exercise training and stress management are needed in addition to the core professional qualifications of the team members.

Specialised knowledge can be seen as expertise in a specialised field, and an expert as someone who possesses advanced knowledge. Burke and Fair (2003:257) suggest that healthcare workers or nurses working in the specialised field of cardiovascular risk

management have extensive knowledge in risk factor counselling and/or advanced preparation in this field. Examples of these are clinical nurse specialists, nurse practitioners or certified diabetes educators. Requisite basic knowledge includes knowledge of cardiovascular disease risk factors and how to prevent, modify or reduce risk. Studies have shown that patients want specialised information about recommended lifestyle modifications for risk reduction, such as lipid control or stress management, and that the nurse needs to improve his/her knowledge base to answer to these needs (Burke & Fair, 2003:258). Healthcare workers or nurses should keep their knowledge of empirical literature updated and apply the new information and research findings in preventative risk reduction counselling. The nurse should be able to help put the latest reports on cardiovascular risk management they have come across into perspective for patients. The knowledge required is extensive and should be acquired through experiential learning.

In a cardiovascular risk management programme, nurses should cover the areas of patient education vital to the patient's well-being. According to Kozier *et al.* (2004:446), these are:

- Promotion of health including increasing the patient's level of wellness, nutrition, exercise, stress management and lifestyle modification;
- Prevention of illness, health screening (e.g. blood glucose levels, blood pressure, blood cholesterol) and reducing health risks (e.g. lowering cholesterol levels);
- Restoration of health by educating the patient about tests, diagnoses, treatment, medication and healthcare resources within the community; and
- Adapting to altered health changes including changes in lifestyle, health status, strategies to deal with current health problems (e.g. diet, medications) and information regarding outcomes of risk reduction.

In a home-based case management approach to cardiac rehabilitation in a secondary prevention programme, nurses were selected to coordinate patient activities because their experience in cardiac care provided them with the requisite knowledge to guide patients through medication, exercise, and nutritional and smoking cessation regimens (Bucher & Melander, 1999:254).

4.3.2.3 CATEGORY 3: OTHER DIVERSE SPECIALISED COMPETENCIES

Participants indicated that nurses should possess several specialised competencies to function as knowledgeable, skilful and competent nurses within a cardiovascular risk management programme.

In the entry level competencies for registered nurses in Manitoba (College, 2005), one of the specialised competencies in developing patient-focused care is the use of evidence-based knowledge and critical thinking skills to select individualised nursing interventions and approaches.

Four subcategories emerged under the category of other diverse specialised competencies. Each is discussed separately.

◆ **Communication and listening skills**

... Good communication skills, good knowledge of the programme that she is working on

... Communication skills are very important.

... With communication skills you should be able to communicate clearly, precisely ...

Good communication skills are imperative in any health management programme, but especially if facilitated through telephonic communication or other means of communication. Communication with the patient should be accurate, actual, clear and explicit in order to ensure the effective transfer of information. Effective communication can only take place if the nurse is knowledgeable about the programme.

According to Burke and Fair (2003:258), nurses should be able to communicate using simple, non-technical language that patients can understand. The skill component entails being able to obtain and convey to the individual the necessary information in an appropriate format and at the right time. The format and the timing of the information delivery should be conducive to transferring the intended message. The nurse then needs to assist the patient in translating it into behavioural change, such as smoking cessation or diet modification, acceptable to that individual.

Multiple communication approaches must be considered when conveying important messages. For example, when patients are provided with pamphlets regarding risk reduction, it should be determined whether they can read and understand the information.

The nurse must also communicate effectively with the multidisciplinary health team in a scientific medical language in order to facilitate input from other members. Becker (1998) as cited by Burke and Fair (2003:259) identified the characteristics of nurses who implement the ten principles of effective communication. These nurses:

- Are attentive to the patient and listen actively;

- Elicit the patient's underlying concerns and objectives regarding his/her risk factors and risk reduction strategies;
- Construct reassuring messages that alleviate the fears of the patient and his/her family;
- Engage the patient in an interactive conversation (e.g. open-ended questions, understandable language for the patient);
- Streamline the treatment regimen in addressing potential problems;
- Use appropriate non-verbal encouragement and verbal praise when the patient complies with risk reduction strategies; and
- Review the long-term plan for the patient's treatment and his/her expectations in achieving successful risk reduction.

According to the College of Registered Nurses of Manitoba, communication and listening skills are of vital importance in selecting the methods of communication appropriate to the patient's circumstances (College, 2005). The nurse should employ a range and variety of communication skills specifically suited to the patient and his/her family's needs by applying basic and complex communication skills in consultation.

Nurses in risk management programmes communicate with patients both verbally and non-verbally. In order for the programme to be effective, nurses should be sound in both these types of communication skills. The following are effective non-verbal communication skills that can be implemented during interaction with the patient (Muller, 2005:227):

- Keeping good eye contact and changing facial expression without using disapproving body language;
- Maintaining a relaxed posture during interaction with the patient and showing concern and warmth by using relevant non-verbal responses, such as nodding; and
- Avoiding closed or aggressive body language.

The following principles should be implemented during verbal communication in the course of the therapeutic relationship between the patient and nurse (Muller, 2005:229):

- Focusing on the proposition by displaying good listening skills, being open-minded, avoiding argumentative approaches and concentrating on the aspect (specific risk factor) at stake.
- Being empathetic by identifying the emotional message and acknowledging it verbally. This reflects the nurse's sensitivity, awareness and sense of understanding of the patient's feelings. The nurse should be able to identify both the patient's positive and negative emotions, and respond appropriately. Reflection, which can be used to

manage and evaluate the patient's thoughts, can be accomplished by providing feedback, thereby achieving clarification of the issues.

According to Burke and Fair (2003:258), the communication process affects the recall of medical advice. When barriers to communication are present, the patient may struggle to effectively recall the knowledge imparted to him/her by the healthcare provider. The patient may feel as if he/she is wasting the nurse's time, feel uncomfortable to reveal unfavourable information, omit information perceived as unimportant or feel embarrassed about not understanding the terminology used. Burke and Fair suggest using the patient-centred model, where the patient's point of view is actively sought. The use of good communication skills is likely to result in improved patient satisfaction and an increased willingness to participate in the recommended risk management programme.

◆ **Organisational skills**

... somebody that can plan and work systematically, she must have good organisational skills.

Nurses in cardiovascular risk reduction programmes should have organisational skills that allow them to work systematically and plan their work, as well as the programme as a whole. The organisation/network sphere is, according to the cardiovascular health improvement fellowship initiated by the American Hospital Association, one of the three spheres of influence of the clinical nurse specialist (Halm & Denker, 2003:109). In this sphere, the clinical nurse specialist is able to implement a primary prevention programme with a common vision and readily identifiable outcomes. The clinical nurse specialist systematically collaborates with other members of the health team and seeks their expertise in providing a specialised service, which includes primary prevention, programme development and evaluation.

According to the PCNA (Champagne *et al.*, 2002:15), organisation entails planning for different needs and logistics to ensure an efficient programme. These may be grouped as following:

- *Multidisciplinary staffing with specific job descriptions:* Staffing should reflect a multidisciplinary team approach in which the nurse works collaboratively with each member, while playing the pivotal role as facilitator and coordinator of the cardiovascular risk management programme. Team members could include a medical doctor, nursing staff, dietician, physical trainer, biokineticist and psychologist.

Administrative personnel who are designated to schedule patient consultation and appointments, health information specialist to prepare medical record charts regarding documentation, coding and billing, and laboratory support with knowledge of specialised cardiovascular tests could be included in a comprehensive cardiovascular risk reduction facility.

- *Risk stratification and appropriate risk reduction strategies:* These include treatment protocols and follow-up schedules for patients.
- *Financial:* Budgeting of expenses and revenues, including a *pro forma* business plan.

◆ **Observational skills**

You must be able to know, in fact, sometimes that when you see them, you can pick up and see immediately and be able to know where to go next. Actually your observational skills ...

Nurses should have a natural skill for observation rather than the controlled or quantitative measuring of signs and symptoms or the subjective exploring of reality from the perspective of an insider regarding cardiovascular risk. Nurses should fulfil the role of the objective observer (De Vos, 2004:79,96). This should be most evident during the interaction between the nurse and patient and when directly observing the patient and/or his/her family in order to identify risk factors. Nurses should be sensitive to their patients' verbal and non-verbal communication when determining cardiovascular risk factors, and their knowledge, experience and skills in the field of cardiovascular health should enhance their sensitivity. Nurses should be emotionally engaged, yet dispassionate regarding patients and their families.

The nurse must become part of the patient's risk stratification while obtaining information, without initially proposing any changes or risk reduction strategies. The nurse should acquire the skill of merely being present without taking on an advisory role in order to attempt to keep the situation as natural and near to reality as possible. The patient's presentation of his/her risk factors should be as real as if it were at home or outside of the clinical environment. The nurse must observe both the patient's risk factors and the physical setting in which these risk factors are present (De Vos, 2004:279). The nurse must understand the patient's feelings, impressions and experiences without directly confronting him/her to obtain the necessary information. These observations should then be interpreted accurately in the context of that patient.

In order for nurses to be skilled in observation, they must be culturally sensitive, and knowledgeable regarding cardiovascular risk factors and the lifestyle changes needed to reduce risk during the risk stratification and modification stage. Nurses should take an open-ended and naturalistic approach to observing the patient and understanding what he/she has to say. According to Neuman (2000) as cited in De Vos (2004:281), nurses exhibit sound observation through the use and application of different senses, including the ability to see, listen and inquire, in order to absorb all sources of information. The nurse should take a passive rather than assertive role, be unobtrusive in the course of interaction with the patient, but at the same time show interest in the information being imparted. This will ensure the nurse's objectivity.

◆ **Accompanying patient toward a worthwhile experience**

You know to let him see it as a worthwhile experience.

The nurse must assess the patient's locus of control and work to positively influence self-efficacy by instilling self-confidence and providing continuous support. This specialised competency is the ability to interact with patients in a therapeutically effective way (Uys, 2002:31), thereby inducing an expedient positive experience. This creates a sense of self-control and worthiness in the patient, which fosters a worthwhile experience.

An experience is defined by the Oxford English Dictionary (Soanes, 2002:287) as practical contact with and observation of facts or events that leave an impression. The nurse in a risk management programme must create an expedient imprint through personal contact and disclosure of facts regarding the patient's risk for cardiovascular disease. According to Burns and Grove (2001:422), the nurse should make the patient feel that the process is worthwhile.

The interpersonal skills of the nurse play a vital role in accompanying the patient toward a worthwhile experience in a risk management programme in which risks are identified and risk reduction strategies proposed.

4.3.3 THEME 3: THE ROLE OF THE NURSE IN A CARDIOVASCULAR RISK MANAGEMENT PROGRAMME

The third theme identified by the researcher is the different roles a nurse fulfils in a cardiovascular risk management programme. The six categories that emerged from this

theme are: a facilitative role within the team, patient education, risk reduction strategies, multidisciplinary team interactions, follow-up and monitoring, and ensuring a dynamic programme role.

4.3.3.1 CATEGORY 1: FACILITATIVE ROLE WITHIN THE TEAM

Participants indicated that, in a risk management programme, nurses should fulfil a facilitative role when interacting with patients, their families and other members of the multidisciplinary team.

In a nurse-based pilot study programme to reduce cardiovascular risk factors in a primary care setting, the impact nurses can have on cardiac risk reduction was revealed through the efficacy of the programme. The positive health changes in the study were attributed to the nurses' role in monitoring the health status of the patients, facilitating referrals for new or continued problems and encouraging behavioural changes. (McPherson *et al.*, 2002:553.)

Seven subcategories emerged from the category of the facilitative role of the nurse. Each is discussed separately.

◆ Guiding role

... she must be able to guide them ... give guidance. Guiding them, making sure that they know that they need to ...

When it comes to especially lifestyle changing, that is where the nurse plays a bigger role with the patients because most of the time the doctors only come for short space of time ... but the majority is spent with the nurse ... involving the family with the whole lifestyle change and adapting change, that is where the nurse plays a big role.

Nurses have a broad role in lifestyle change as they facilitate the patient's participation in identifying risk factors, and assessing and implementing risk reduction strategies in the cardiovascular risk management programme. This is accomplished by means of collaboration and networking with the patient, his/her family, community resources and the multidisciplinary team.

Uys (2002:22) refers to this comprehensive role of the nurse as a communicator and counsellor as the skilled use of interpersonal abilities to form an alliance with the patient to enhance health and reduce risk.

It is the role of the nurse to tactfully guide patients toward a healthier lifestyle in terms of their cardiovascular risk factors and the development of CHD. The nurse can give them advice regarding risk factor reduction and the implementation of risk reduction strategies and programmes, and monitor the processes.

The more comprehensive role of the nurse, which includes counselling, is linked to the giving of guidance. In the counselling process, the nurse assists and guides the patient to recognise and cope with physical, psychological and social needs. Counselling involves providing emotional, intellectual and psychological support (Kozier *et al.*, 2004:10). The nurse in a cardiovascular management programme should focus on helping the patient develop new attitudes and lifestyles by encouraging him/her to look at alternative behaviours, recognise the choices and develop a sense of control over the risk management process.

◆ **Coordinating role**

... She coordinates everything ... others just play some part or role.

In a cardiovascular risk management programme, it is the role of the coordinator to ensure the efficient provision of care. According to the PCNA (Champagne *et al.*, 2002:27), it is the nurse's role to provide programme coordination and, as clinical coordinator of a cardiovascular risk reduction programme, provide continuity of care for all patients. According to the Regulations relating to the Scope of Practice of Persons who are registered or enrolled under the Nursing Act, Regulation R.2598 (r) (SANC, 1984), nurses should coordinate the healthcare regimens provided to patients by other categories of health personnel, which, in a cardiovascular risk management programme, form part of the multidisciplinary team.

The nurse coordinates with the physician to adjust pharmacotherapy and help patients reach agreed-upon treatment goals for lipids, blood pressure, blood glucose and ideal body weight. Coordination of activities with the patient, his/her family, community resources support systems and members of the multidisciplinary team is important in the competent facilitation and continuity of lifestyle change in risk management.

Facilities, activities and programmes given to the patient by the different multidisciplinary team members must be coordinated by the nurse in a holistic risk management programme so that risk reduction strategies are not duplicated or omitted, but integrated into a workable programme for the patient. Although a diverse mixture of team members is needed to ensure the success of the programme, the coordinator has the overall responsibility for the daily functioning, network referrals and follow-up of care for the patient. According to Coats *et al.* (1995:32), the nurse in a coordinator's role may have other responsibilities in addition to the patient-orientated activities. These may include:

- Reviewing and developing procedures and policies for the programme;
- Budgeting and business plan management;
- Regular communication with team members and other departments, such as laboratory consultants;
- Training and developing staff, and conducting performance reviews;
- Collating data, and the auditing and evaluation of the programme;
- Initiating and collaborating in research related to the programme;
- Ensuring that equipment is ordered and maintained; and
- Coordinating facilities for confidential counselling, venues for group sessions and exercise facilities.

Communication is integral to the nurse in the role of coordinator (Kozier *et al.*, 2004:10), as well as all other nursing roles in which the nurse must communicate and coordinate with the patient, support systems and other members of the multidisciplinary team. In the role of communicator, the nurse identifies the patient's needs and communicates these accurately to the multidisciplinary team in order for those needs to be met.

◆ **Facilitating teamwork**

She ensures teamwork as a facilitator.

The nurse facilitates the appropriate involvement of individuals and families in the realisation of expected health outcomes. He/she communicates significant information about the patient's health risks to the appropriate members of the multidisciplinary team. It is the role of the nurse as facilitator to coordinate the implementation of the risk management programme, monitor the patient's progress and render remedial strategies if necessary.

In a document regarding the entry level competencies for registered nurses, the College of Registered Nurses of Manitoba states that nurses must collaborate and consult with patients and other members of the multidisciplinary team to prioritise needs (risk factors) and develop risk prevention strategies (College, 2005). They must facilitate teamwork within the multidisciplinary team. Nurses must also facilitate the patient's ownership of the programme and identify the patient's concerns and priorities.

◆ **Supporting role**

... She plays a supportive role. She needs to be supportive.

By establishing and maintaining a caring supportive environment for the patient and his/her family, the nurse assists in achieving the health outcomes of cardiovascular risk reduction. The patient requires support through developmental transitions and role changes. This is of vital importance in risk factor management, which entails lifestyle changes, such as smoking cessation, dietary modification or stress management. Nurses should keep their patients informed in the process of making decisions about their health care and support those decisions.

According to the College of Registered Nurses of Manitoba, the nurse plays an important role by supporting and encouraging patients to draw on their own assets and resources for self care and health promotion in the risk management programme (College, 2005). In a study on the role that nurses play in assessing the effect of intensive interventions in secondary prevention, McHugh *et al.* (2001) as cited in Riley (2003:ii34) demonstrated that there was a significant improvement in modifiable risk factors. One of the key issues that led to this success was the encouragement and support the nurses gave patients and their families.

◆ **Advocate role within the team**

She must be more than the patient's advocate and she must be a person who is assertive.

Another role that the nurse must fulfil is that of the patient's advocate. The nurse must act tactfully but authoritatively to protect the patient and represent his/her needs to the other members of the multidisciplinary team. This may include relaying the patient's wish for information to the physician or other members of the team or participating in specific risk

reduction strategies. The nurse must protect his/her patients' rights, provide them with information they need to take informed decisions and support their decisions.

According to Uys (2002:22), nurses should be patient advocates, upholding their patients' human rights in situations where it is difficult for them to do it themselves. This should be done with assertiveness on behalf of the patient. According to Muller (2005:229), assertive behaviour is the ability of the nurse to defend and protect the patient's rights without jeopardising the rights of others. A person who is assertive is able to:

- Express himself/herself verbally using "I " messages;
- Maintain positive non-verbal communication skills, such as a firm and open physical posture and an applicable, firm flowing tone of voice;
- Maintain positive behaviour, constructive evaluation of goal achievement and creativity in initiating solutions to problems;
- Receive and express criticism in a dignified and professional manner;
- Direct requests for change in negative behaviour on the part of other people; and
- Apply self-control.

Nurses should embrace the role of a patient's advocate. In doing so, the nurse also mediates by directly intervening on the patient's behalf during multidisciplinary team interactions (Kozier *et al.*, 2004:10,81).

◆ **Facilitating proactive action**

The nurse has to be the indicator, they have to know more about cardiovascular ... and how to treat the patient. Encouraging them ... making them proactive ...

In fulfilling the role of facilitator, the nurse should assist the patient in taking proactive actions and, through collaboration with the patient and his/her family, identify health needs, strengths or problems before problematic situations arise.

In the United Kingdom, the proactive role of the nurse in cardiovascular risk management has been reinforced by state publications, which suggest that the ideal manner to implement risk prevention is through nurse-led initiatives (Foxton *et al.*, 2004:48). The proactive role of the nurse in this sector is crucial in order to ensure intervention before vascular and organ damage has been done.

◆ **Liaising with family**

The nurse is somebody who has to interact and involve the family regarding the patient's treatment.

As coordinator, facilitator and supporter, the nurse constantly interacts with the patient and his/her family to identify risk factors, implement risk reduction strategies and achieve the risk reduction goals. It is imperative that the nurse involves the family and liaises with them on a constant basis in order to procure continuous support for the patient.

The first competency described in the entry level competencies for registered nurses in Manitoba (College, 2005) is the demonstration of certain professional characteristics. Within these competencies, the nurse's must fulfil a facilitative role by forming partnerships and liaising with individuals, families, groups, populations and communities to achieve mutually agreed upon health outcomes by means of consultation. Studies have shown that the partners of individuals with heart disease often lie awake at night monitoring their partner's breathing in order to make sure he/she is still alive (Coats *et al.*, 1995:18). Therefore to liaise with a patient's family regarding risk reduction strategies at a suitable level of involvement is invaluable.

4.3.3.2 CATEGORY 2: PATIENT EDUCATION

In this study, the participants indicated that a nurse involved in a cardiovascular risk management programme should educate the patients and their families regarding cardiovascular disease, the risk factors associated with the development of CHD and health promotion in this field.

According to the PCNA (Champagne *et al.*, 2002:27), it is the role of the nurse in a cardiovascular risk reduction programme to provide health education to the patient and his/her family. It is important to create a therapeutic relationship between the nurse and the patients, their families and the community through health education. It is vital that nurses facilitate the educational process and become partners with their patients, the families and/or significant others. Nurses can become catalysts for change through patient education and lifestyle modification. According to Rankin and Stallings as cited in Nies and McEven (2001:142), nurses should have the following key characteristics in order to facilitate the teaching-learning process: confidence, competence, caring and communication skills.

Patient education that is relevant for a specific target group is based on individual variables, and social, structural, political, cultural and economic factors within the larger community context. Nurses develop relevant teaching interventions by assessing the target patient group and by using an organised and systematic approach to educating patients regarding cardiovascular risk reduction strategies. Patient education can also be implemented through social action strategies, such as advocating health promotion lifestyles, creating an environment for problem-solving dialogue and providing links to health resources that support the philosophy of critical consciousness.

A variety of methods, materials and media can be used to achieve the health promotion goals of the programme. These could include individual counselling, group discussion sessions, lectures, pamphlets or handouts and electronic or web-based information. The nurse should review and evaluate these resources for their appropriateness within the intended target group or for the individual. Meeting the needs of the individual or family is influenced by internal and external factors. The nurse therefore needs to embrace the notion of health education as an ongoing dynamic interactive process (Nies & McEven, 2001:165).

Seven subcategories emerged under the category of patient education. Each is discussed separately.

◆ **Assessing the patient's level of readiness**

There are specific questions that you would have to ask to inquire ... what level of readiness the person is on to assess his adherence to the cardiovascular risk management programme.

It is imperative to assess the level of readiness of the patient in order for successful behavioural change to take place. According to Burke and Fair (2003:259), one of the important components of assessing behavioural change is the patient's readiness to make the change. This is a skill essential for a nurse when conducting a comprehensive assessment of the patient.

Girdano and Dusek as cited in Coats *et al.* (1995:23) define "readiness" as the possession of behaviours, attitudes, skills and associated resources that make it possible for the patient to incorporate a new health behaviour into a permanent lifestyle. The nurse can assess the patient's readiness to learn by assessing the questions being asked and

evaluating the kind of information being requested. According to Kinney and Packa (1996:15), when assessing readiness to learn, it is important to determine the educational level of the patient so that teaching content and material can be appropriately selected. The nurse should also evaluate whether there are barriers to learning, such as emotional or psychological conditions, which may have an impact on learning.

Coats *et al.* (1995:81) identify ten steps in the scale of readiness of a patient to learn a new lifestyle behaviour. This individual:

- Understands the concepts of behavioural change or risk reduction.
- Values the change and verbalises it as good or correct.
- Believes that new behaviour is possible.
- Visualises a new behaviour with low ambiguity.
- Believes in the ability to change behaviour.
- Can see proof of attainment.
- Possesses new skills.
- Practises new skills on a regular basis.
- Practises skills in reality and in actual life situations.
- Adopts new behaviour as his/her lifestyle naturally without thinking about it.

The nurse cannot assume that knowledge alone will lead to behavioural changes in the patient's lifestyle. According to Meeto (2004:16), patients' beliefs and values influence their intention to act in a specific way. The nurse's role in promoting behavioural change is to assess the patient according to several psychological models that look at the readiness of the patient to bring about change. The Locus of Control model, the Health Belief model and the Stage of Change model are recommended by Prochaska and DiClemente (1984, in Lindsay & Gaw, 2004:218) and identify the process of change, as well as the counselling strategies most likely to encourage the patient to change his/her behaviour.

The nurse, as educator, should be aware of the level of readiness of the patient to bring about change in implementing risk reduction strategies. According to Kozier *et al.* (2004:10), the nurse should assess the patient's learning needs and readiness to learn, set specific goals in collaboration with the patient, enact teaching strategies and monitor the educational process to evaluate whether the patient has acquired the knowledge and whether change has taken place.

◆ **Providing information on warning signs of disease episodes**

She will have to explain to the patient about angina, what kind of pain, about exercise and hot weather so that you can educate the patient and that the patient knows what is going on and what to expect.

I would say, basic information or patient education regarding warning signs so that the patient can know what is happening and also know ... dangers like stroke ...

... blood pressure, cholesterol, a balanced diet and exercise play a role.

... they need to know ...

Basically what they need to look out for ... like the warning signs, they must really get themselves to the doctor ... their signs and symptoms ...

It is the nurse's responsibility to educate the patient regarding the warning signs and symptoms of cardiovascular disease which could have fatal consequences. These include symptoms of angina pain and shortness of breath with a feeling of suffocation (Urden *et al.*, 2006:433).

According to Morton *et al.* (2005:425), angina, or chest pain, is perceived as the sensation of pressure, fullness, squeezing, heaviness or substernal pain, which may radiate down both arms and to the back, shoulders, jaw and or neck. Angina is caused by an imbalance between oxygen supply and demand. When the myocardial tissue's need for oxygen is not met, myocardial ischaemia occurs and the person will experience chest pain.

Patients should also be educated regarding the possible factors that could precipitate angina attacks, such as eating large meals, smoking cigarettes, cold temperatures, emotional stress or strenuous exercise. If the patient experiences chest pain or palpitations, he/she should be advised to stop the activity and rest (Bucher & Melander, 1999:223).

Explaining cardiac pain or angina to a patient with possible or existing cardiac pathology is essential to a proactive attitude. The patient should understand angina and how it is experienced. Generally, patient education should include what activities should be limited and what action should be taken when chest pains occur (Bucher & Melander, 1999:253). This will enable the patient to identify these manifestations and act appropriately before serious cardiac complications develop.

◆ **Providing information on general and cardiovascular risk factors**

Controllable and uncontrollable risks, so you make them aware and you emphasise those risk factors that are controllable risk factors that you already have control over ... structure your education around those controllable risk factors that they still need to work at.

The primary role would be health education, where are those specific risks that they are exposed to ... raising their awareness ...

In risk management and health promotion, the nurse plays an extensive role, as patient educator, in preventing general and cardiovascular risk factors.

Patient education regarding risk management and health promotion should include education about risk factors in general. General risk factors are divided into modifiable (controllable) and non-modifiable (non-controllable) risk factors. Non-controllable or non-modifiable risk factors are those risk factors that cannot be changed through risk reduction strategies and include age, gender, a family history of CHD and a personal history of atherosclerotic vascular disease (Lindsay & Gaw, 2004:32). Controllable risk factors are those which can be modified to reduce the risk of atherosclerotic plaque formation and eventual cardiovascular disease. It is the nurse's role to reduce these risk factors, in collaboration with the patient, by means of risk reduction strategies. The following risk factors can be modified: dyslipidaemia, smoking, hypertension, obesity, hyperglycaemia or diabetes, physical inactivity, psychological risk factors, excess alcohol consumption, left ventricular hypertrophy and other risk factors that are currently emerging. These risks factors are discussed extensively in Chapter 3.

In a cardiovascular risk management programme, nurses play a comprehensive role in educating patients regarding specific risks, their detrimental effects and risk reduction strategies. In nurse-led cardiovascular risk reduction programmes, it was found that nurses were able to address some of the major problems that doctors could not due to a lack of time for behavioural counselling, patient education and providing advice regarding cardiovascular disease risk reduction (McPherson *et al.*, 2002:553). This emphasises the crucial role nurses play in reducing the risk of cardiovascular disease by educating patients regarding specific risks.

Below, these specific risks are outlined and included with relevant data chunks. It should be noted that these risks are often interrelated, augmenting their pathological effect on the

cardiovascular system. Risk factor clustering can be seen in the majority of patients with multiple risk factors and is usually linked to insulin resistance or the metabolic syndrome (Haskell, 2003:246). According to Wellmann (2000:191), elevated total cholesterol, smoking and high blood pressure are linked to the development of atherosclerosis and the increased incidence of IHD.

In order for patients to achieve a low risk profile, they must be educated and consistently supported by the nurse to substantially decrease their cardiovascular risk. Campbell, Ritchie, Thain, Deans, Rawles and Squair (1998:448) state that the criteria used to define “appropriate secondary prevention” and patient education regarding the different risks that lead to CHD should be addressed in one clinical protocol.

➤ **Exercise**

In patient education, I think I'll incorporate all the lifestyle changes, one of those, and with the lifestyle changes I will include quit smoking, watch the diet, exercise ...

When they are very overweight ... get them on a proper diet, a well controlled diet and then also exercises ... advise the patient to exercise, think that is very important ...

Exercise is a strategy to reduce the general risk of physical inactivity and promote health. A sedentary lifestyle is linked to the development of several cardiovascular risk factors, such as obesity and hypertension. An exercise programme as a risk reduction strategy should be incorporated into the patient education component of a risk management programme.

Exercise programmes also promote the previously obese and sedentary patient's motivation to stop smoking and lose weight. Improved glucose control and lower plasma insulin levels, which protect against atherogenesis, have been observed with increases in physical activity (Meetoo, 2004:15).

Multiple research trials have demonstrated the positive effects of physical activity on other major cardiac risk factors, including the lipid profile, insulin resistance and hyperglycaemia, as well as weight loss in obese patients (Urden *et al.*, 2006:429). An endurance-based exercise programme performed on a regular basis can favourably change a variety of cardiovascular disease risk factors. Physical activity decreases LDL-C, hypertension, triglycerides and adiposity, and increases protective HDL-C, insulin-

mediated glucose uptake and fibrinolysis. Patients should be educated regarding these beneficial effects (Haskell, 2003:248).

The role of exercise in maintaining good cardiovascular health (Myers, 2005:916) has been confirmed by the epidemiological evidence of the beneficial effects of physical activity and physiological fitness. Nurses should stress the positive physiological benefits of exercise training compared to the negative cardiovascular effects of immobility. Certain physiological benefits of an exercise programme can be seen in the haemodynamic and metabolic adaptations of the body. Patient education predominantly concerned with cardiovascular risk reduction should include a step-by-step exercise programme for improved health and optimal cardiovascular fitness (Lindsay & Gaw, 2004:193).

➤ **Smoking cessation**

In patient education, I think I'll incorporate all the lifestyle changes ... I will include quit smoking ...

... advise the patient to exercise, think that is very important, I will also advise the patient about their social life, drinking and smoking.

Smokers, who characteristically have low HDL-C levels, can increase these levels by ten per cent in a relatively short time by stopping smoking (Haskell, 2003:246). Smoking causes endothelium dysfunction with subsequent changes in blood lipid and lipoproteins, followed by increased platelet aggregation and thrombus formation, thus augmenting cardiovascular risk of dyslipidaemia and cardiovascular disease (Meetoo, 2004:14). The risk of the combination of smoking with other risk factors should be explained to the patient. The nurse should also explain the harmful physiological effects, as well as the psycho-addictive effects, of smoking to patients in order to raise their awareness (Martin & Froelicher, 2005:839). According to Lindsay and Gaw (2004:134), the benefits of smoking cessation, both in the short and long term, should be highlighted by the nurse in the course of patient education in order to positively motivate patients to stop smoking.

➤ **Blood pressure control**

Mainly what the cardiovascular risks are ... factors like ... blood pressure – regular testing for blood pressure ...

It is vital that the nurse incorporates blood pressure control in patient education. High blood pressure or hypertension causes vascular changes that lead to the development of atherosclerosis and therefore presents a major risk. The patient should be empowered to participate in good quality hypertensive care. This can be achieved by assisting the patient to understand hypertension and its consequences. The *Hypertension Clinical Guideline 2000* (Milne, 2001:168) stresses that patient education should entail informing patients of their blood pressure readings and general cardiovascular risk at every visit. It is also vital to inform the patient about the name, dose, frequency, adverse effects and the necessity for regular use of hypertensive medication. The nurse should encourage the patient to adhere to blood pressure medication and lifestyle modifications in order to achieve the target blood pressure. Patient education should include anticipating the adverse effects of medication, and methods of adjusting therapy to prevent, minimise or ameliorate adverse events. Once a stable target blood pressure has been achieved, follow-up blood pressure measurements should be taken regularly. Anti-hypertension drugs should be reduced if the patient presents with symptoms of postural hypotension.

The nurse should also stress the importance of blood pressure control by means of non-pharmacological interventions (Cunningham, 2005:881).

➤ **Nutrition/diet**

... with regard to diet and exercise, medication requirements and ... level of readiness is important here ... When they are very overweight ... get them on a proper diet, a well controlled diet ... and then also exercises...

Dietary guidelines should be incorporated into the patient education component of risk reduction programmes in order to elicit the necessary lifestyle changes. Nurses should educate the patients regarding the beneficial effects, not only in terms of weight reduction, but also lipid control, of a nutritional diet.

The first line of treatment of hypercholesterolaemia is a low-fat, high-fibre diet in conjunction with increased physical exercise. Dietary guidelines are an important part of patient education aimed at reducing these inter-linked risk factors.

➤ **Weight reduction**

When they are very overweight ... get them on a proper diet, a nutritional ... Okay, I'll approach them in their diet, nutrition, what to eat, what to avoid ...

It is the nurse's role to identify and assess overweight and obese patients in the course of patient education. Being overweight or obese is a modifiable risk factor, which the nurse can target by providing patients with certain dietary guidelines, in collaboration with a dietician if necessary. Obesity collectively interacts with other risk factors, such as diabetes, dyslipidaemia, hypertension, hypercoagulation and insulin resistance (Haskell, 2003:249), which are concurrently interrelated in the pathological development of cardiovascular disease (Fraser, 1999:18). An obese, and especially a centrally obese, patient is strongly associated with the development of insulin resistance, which can lead to type 1 diabetes and subsequent cardiovascular disease (Meetoo, 2004:15). Reducing weight can only be beneficial to the patient's health as a whole.

➤ **Cholesterol control**

*Mainly what the cardiovascular risks are ... factors like high cholesterol ... regular testing for ... cholesterol.
... their diet, nutrition, what to eat, what to avoid, especially fatty foods ... and then I will also advise the patient to exercise, think that is very important.*

Reducing hypercholesterolaemia is imperative in halting the development of atherosclerosis and CHD. In many cases, dyslipidaemia and insulin resistance play a dominant role (Maritz, 2003:365). The patient should be educated regarding the protective effect of HDL-C, which is reduced by smoking, obesity and physical inactivity, increasing the risk of atherogenesis. Furthermore, a diet rich in animal fat promotes the accumulation of cholesterol by inverting the production of LDL-C in the liver, also increasing the risk of atherosclerosis. Strategies for reducing dyslipidaemia include patient education regarding dietary guidelines (for example, a Mediterranean style diet), exercise programmes and lipid modifying drugs. According to Maritz (2003:368), lifestyle modifications have been shown to be a very cost-effective way to reduce the risk of cardiovascular mortality, with excellent results.

➤ **Stress management**

Diet, exercise, blood pressure – regular testing for blood pressure and cholesterol ... and stress management ... and then your stress level.

Stress is often accompanied by other risk factors. Therefore patient education should not be approached in a fragmented manner, but should rather be integrated and address all the risk factors that may play an adverse role in the development of stress and CHD. The nurse should teach the patient to identify the different signs and symptoms of stress, so that it can be dealt with before definite clinical manifestations occur. According to Van der Merwe (2004:22,30), the physical indicators of stress are fatigue, loss or increase in appetite, decreased immune response (frequent colds or colds sores), muscle tension, chest pain, tremors, diaphoresis, palpitations due to dysrhythmias, nausea, insomnia, headaches and hypertension.

Mental or psychological stress produces higher diastolic blood pressure and lower heart rate responses than physical activity. Ischaemia experienced during psychological stress could be due to inappropriate vasoconstriction (Madan & Froelicher, 2005:827). The mental and emotional symptoms of stress are irritability, aggression, poor memory or concentration ability, confusion, anger and hostility, depression, anxiety, feelings of frustration, bitterness, restlessness, short-temperedness and emotional lability (crying easily).

The patient should be educated regarding the interrelationship of stress and other cardiovascular risk factors, which can lead to a higher frequency of clinical cardiac events. Stress is a contributory factor in the development of hypertension, and also leads to poor eating habits, smoking and increased alcohol consumption. Randomised clinical trials showed a reduction in occurrence of clinical cardiovascular disease events in patients who included stress reduction strategies in their lifestyle changes (Haskell, 2003:250). It is therefore imperative that the nurse teaches the patient to relax, how to handle stressful situations and control the effects of increased stress levels in order to help reduce the risk of developing CHD (Blenkinsopp, 2004, as cited in Foxton *et al.*, 2004:51).

◆ **Helps with the interpretation of diagnostic tests**

Background anatomy and the risk factors ... and why they have lead to the diagnosis as seen by the tests.

In addition to the roles of facilitator and coordinator, being knowledgeable and acquiring certain clinical skills, the nurse should also be able to explain cardio-specific tests and interpret the results for the patient. This should include consolidating the appropriate anatomy, physiology and biochemistry knowledge in terms of the risk factors into a whole for the patient.

According to the College of Registered Nurses of Manitoba, the nurse should refine and extend assessment information by collecting data from a variety of sources and involving the patient in the analysis and interpretation of the data (College, 2005). This incorporates the determinants of health in the assessment process, leading the patient to an understanding of the diagnostic tests and the risk factors involved.

◆ **Information on medication use**

You have to explain ... the medication ... why you give it, when do you give it and how to give it.

... if they are on the treatment that they have to take the treatment on time ... medication ... education on what to do, sort of the emergency management...

According to the Scope of Practice of registered nurses (SANC, 1984), it is the nurse's responsibility to provide information regarding treatment, care and the administration of medicine to a patient. The use of medication and its dosage, administration and side effects should be meticulously explained to the patient.

Patient education is vital to treatment interventions in which patients use the medications effectively and correctly. According to Bucher and Melander (1999:223), the nurse should educate the patient about the prescribed medication regimen. For example, the patient should understand how to use sublingual nitroglycerin and know to seek emergency medical advice if the pain does not subside or worsens after using three sublingual tablets. The patient should also be taught about the course of action should a dose be missed, the process of monitoring for adverse side effects and the correct storage of medication in a cool, dry place, out of the reach of children. All this information should be in a language that the patient understands.

According to the College of Registered Nurses of Manitoba, as an entry level competency for registered nurses, the nurse should be able to implement preventative strategies related to safe and appropriate use of medication (College, 2005).

◆ **Information on enhancing and promoting health**

... The education would be part of making them aware of signs and symptoms, when to take action, enhancing healthcare, promoting healthcare for the patient ...

The nurse should assist the patient to understand the link between health promotion strategies and health outcomes by identifying priority areas for health promotion in collaboration with the patient. The nurse should develop risk prevention strategies by means of patient education in consultation with the patient and his/her family or support structure. It is also essential to facilitate the patient's ownership of the health promotion plan (compare the entry level competencies for registered nurses of Manitoba) (College, 2005).

4.3.3.3 CATEGORY 3: THE ROLE OF THE NURSE IN RISK REDUCTION STRATEGIES (LIFESTYLE CHANGES AND COUNSELLING)

Participants indicated that the role of the nurse in a cardiovascular risk management programme should include counselling patients and their families, as well as members of the multidisciplinary team. According to the PCNA (Champagne *et al.*, 2002:27), it is the role of the nurse to implement lifestyle and medical interventions to decrease or prevent further risk for the development of cardiovascular disease. This role is similar to that of educating the patient; however patient education focuses on the interrelationship of cardiovascular risk factors and the basics of how to minimise these risks. The focus of risk reduction strategies is the counselling of the patient with regard to evidence-based interventions in reducing these cardiovascular risks. Clinical trials in Scotland and observational studies in Canada have shown that nurse-led risk reduction programmes can effect cardiac risk factor reduction in patients with cardiovascular disease (McPherson *et al.*, 2002:552).

Twelve subcategories emerged under the category of the role of the nurse in risk reduction strategies. Each is discussed separately below.

◆ **Smoking cessation**

Firstly ... stop smoking ... these are ... very important parts of their lifestyle change. Lifestyle change, I would say, that includes if a patient smokes, he should stop smoking ... it is very important that ... they should stop smoking ...

Well, certain lifestyle changes are necessary such as smoking ... and all his risk factors.

In the data chunks above, the importance of implementing the risk reducing strategy of smoking cessation emerged strongly. Smoking reduces the supply of oxygen to the myocardium and therefore precipitates ischaemia and angina (Bucher & Melander, 1999:223). After providing the appropriate education to the patient who smokes, emotional support and behavioural modification guidelines should be provided to assist the patient.

In clinical and observational studies in the USA (McPherson *et al.*, 2002:552), it was found that cardiac risk factors such as tobacco smoking decreased significantly in patients participating in nurse-led risk reduction programmes. Supporting the attribution of success to the nurse-based programme is the fact that the percentage of cardiovascular disease risk reduction increased from seven to 30 per cent in patients who stopped smoking in these studies, a considerably higher percentage than reported in the literature for the control group in primary care.

While permanent smoking cessation is the goal, this is difficult to achieve as a result of the biochemical and physical addictive effects of nicotine and carbon monoxide (Martin & Froelicher, 2005:839).

◆ **Stress management**

Stress ... and then also to involve the family...

... so that you can obtain the optimal life.

... where they are unable to handle the stress due to their job or the family situation that they are in, maybe they need ...

...stress, diet, exercise and then also to involve the family.

The participants emphasised family involvement in the implementation of stress management. According to the College of Registered Nurses of Manitoba, the competency of promoting stress management strategies is an entry level competency for registered nurses (College, 2005:3).

The physical and psychological effects of a patient's mental stress affect everyone around him/her. Madan and Froelicher (2005:830) suggest that stress reduction should be initiated by the monitoring of negative reactions or responses by the individuals themselves in order to create an awareness of their behaviours and emotions. Van der

Merwe (2004:84) suggests identifying and writing down the stress triggers or situations that evoke a feeling of stress. Thereafter the patient should be taught to decrease this physiological response by means of relaxation training. Strategies to reduce stress by means of meditation therapy, guided imagery or music therapy have been shown to be beneficial in decreasing cortical arousal, decreasing breathing rate, decreasing sympathetic nervous system activity and improving sleep. The psychological benefits include improved emotional status and the increased ability of the patient to re-evaluate stress-related situations more objectively. Nurses with the appropriate stress management training can successfully implement these strategies.

Stretching exercises reduce stress by releasing physical tension, increasing oxygen blood flow and focusing the mind away from the immediate stress trigger.

◆ **Ensuring rest**

Firstly ... rest ... these are ... very important parts of their lifestyle change.

By ensuring that he/she gets enough rest, the patient not only reduces stress but 'refuels' physically and mentally, improving the ability to handle life and its demands in an efficient manner. The Scope of Practice (Regulation R.2598 (f)) of registered nurses recommends that the patient takes brief rest periods throughout the day and has a good night's rest (SANC, 1984). Taking regular vacations can decrease the amount of catecholamines and stress hormones circulating in the blood, reducing anginal attacks (Bucher & Melander, 1999:223). According to the College of Registered Nurses of Manitoba, an entry level competency for a registered nurse is the promotion of a balance between rest or sleep and activity (College, 2005:3). According to Van der Merwe (2004:89), six to eight hours sleep every night, with the greater portion in the fore-night, is needed for sufficient physical and mental rest.

◆ **Drinking/alcohol use**

... and that they leave the alcohol ... alcohol not being used excessively, if they do need to have a drink, keep it down ... minimum not excessive.

... decreased alcohol use – these are ... very important parts of their lifestyle change.

... That it is very important that they leave the alcohol ... they should stop ... alcohol not being used excessively...

For lifestyle counselling ... any[thing] that is detrimental like drinking ... hmm ... that is not beneficial for the body.

The excessive use of alcohol is detrimental to the body as a whole. There has been some controversy regarding the possible cardio-protective effect of alcohol in moderate measures. According to Lindsay and Gaw (2004:163), there is a strong inverse relationship between the moderate consumption of alcohol (30 g alcohol/day) and the incidence of CHD. The possible beneficial effect is the capacity of alcohol to increase HDL-C and reduce thrombotic tendency. Red wine contains polyphenols, which are antioxidant compounds that may also contribute to cardio-protection. In sharp contrast to this, there is evidence that consumption of amounts of alcohol above moderate levels is associated with an increase in CHD. Furthermore, the non-pharmacological treatment for lowering blood pressure includes the achievement of ideal body weight, avoidance of excessive intake of alcohol, improving physical fitness levels and reducing salt intake in food (Lindsay & Gaw, 2004:88). Therefore the nurse's promotion of strategies to reduce the risk of cardiovascular disease should include dissuading the patient from consuming excessive amounts of alcohol.

◆ **Nutrition**

Nutrition, I think ... about diet ... that it is very important that they follow that diet. Firstly ... good diet ... these are ... very important parts of their lifestyle change ...
... Well, certain lifestyle changes are necessary, such as a balanced diet ... a diet low in fats ...
For lifestyle counselling, OK, I think diet is the first thing. Always good diet practices ...

It is evident that following the correct nutritional diet is an important part of risk reduction strategies. Suitable dietary strategies include educating the patient regarding foods high in cholesterol, triglycerides and LDL-C. The nurse should encourage the patient to lose weight by means of a balanced diet if needed. High-fibre foods decrease the appetite, prevent constipation, and help to reduce weight and decrease anginal attacks by lowering cholesterol and triglyceride levels. Cardiovascular disease in general, but also the cardiovascular disease risk factors of hypertension and dyslipidaemia are less common in patients with a high intake of dietary fibre than those with lower intakes (Bucher & Melander, 1999:223).

Advice regarding a change of diet in order to reduce risk should highlight the beneficial effects of the Mediterranean diet. This diet includes a low intake of total saturated fats (<30% of total caloric intake per day) and an increased intake of plant and omega 3 fatty acids, and fresh fruit and vegetables, legumes, fibre cereals, antioxidants, vegetable protein, folates and vitamin B (De Lorgeril, Salen, Martin, Monjaud, Delaye & Mamelle, 1999:779). Where a dietician is not available in a risk management programme, the nurse should fulfil this role.

◆ **Cholesterol control**

Then in lifestyle counselling ... secondly, your cholesterol must be under control ... take advantage of the campaign where they check the cholesterol.

What lifestyle counselling is concerned ... regular check-ups, especially ... cholesterol regular follow-ups.

By reducing the risk factor of cholesterol, several other risk factors, such as being overweight, hypertension, insulin resistance and diabetes, are reduced. Nurses should promote the reduction of the risk factor of dyslipidaemia, which can be achieved through lifestyle modifications, dietary control and lipid-modifying drugs. In clinical and observational studies in the USA (McPherson *et al.*, 2002:552), it was found that cardiac risk factors such as dyslipidaemia decreased significantly in patients participating in nurse-led risk reduction programmes.

◆ **Weight reduction**

... if they are obese or overweight what programme to follow to reduce the weight ...

Reducing the risk factor of being obese or overweight has an effect on several other risk factors, such as hypertension, dyslipidaemia, insulin resistance, fibrinolytic abnormalities or thrombotic disorders and C-reactive protein which is an emerging risk factor. A ten per cent reduction in baseline weight has numerous benefits for a patient's health in general, but in particular for the cardiovascular system (Burke & Cartwright, 2005:937). The aim of weight reduction strategies is to achieve and maintain a target weight.

Firstly, the nurse must identify and assess the overweight or obese patient. Reduction in weight and obesity can only be successful if an energy deficit, in which energy intake is decreased and/or energy expenditure increases, is created. This will lead to loss of body

fat while still meeting the patient's nutritional requirements. Lindsay and Gaw (2004:169,171) suggest that weight loss programmes should be safe and embody beneficial effects.

According to Burke and Cartwright (2005:942), the following interventions can be included in weight reduction strategies:

- Dietary interventions;
- An increase in physical activity through different physical activities;
- Behavioural modification strategies; and
- Pharmacotherapy as a last resort.

◆ **Physical activity/exercise**

Firstly, exercise ... these are ... very important parts of their lifestyle change.

Well, certain lifestyle changes are necessary such as ... exercises. Always good, exercise...

What lifestyle counselling is concerned ... Exercises ... The lifestyle in general ... exercise.

The three pillars would be diet, exercise, medication components ... exercise...

According to the participants, exercise plays a very important role in cardiovascular risk reduction. The Scope of Practice (Regulation R. 2598 (f)) states that it is the responsibility of the nurse to promote exercise (SANC, 1984). Exercise programmes should include at least 30 minutes of exercise three times a week or, if possible, four hours of exercise per week. This will have beneficial effects on the cardiovascular system, including improving coronary perfusion and the formation of collateral circulation, reducing and/or managing weight risk and indirectly controlling hypertension, hyperglycaemia and dyslipidaemia. Clearly, there is substantial evidence that a physically active lifestyle is linked to cardiovascular health (Myers, 2005:917). The nurse should prescribe and work out an exercise programme for the individual according to the FITT principle:

F: Frequency that physical activity should be undertaken.

I: Intensity of exertion required.

T: Type of physical exercise recommended.

T: Time spent performing an activity. (Refer to section 3.4.1.2.6.)

According to Lindsay and Gaw (2004:194), a physical activity programme can be divided into two stages, namely the improvement of health, progressing to a more active stage of

the improvement of cardiovascular fitness. In both these stages, the FITT principle can be applied. Initially, a daily recommendation of at least 30 minutes of moderate-intensity exercise should be achieved. This should then be increased, with longer periods of activity, including moderate intensity aerobic training.

◆ **Blood pressure control**

Then in lifestyle counselling, blood pressure control is primary ...

Well, certain lifestyle changes are necessary such as ... blood pressure ... all his risk factors.

What lifestyle counselling is concerned ... regular check-ups, especially ... blood pressure monitoring...

The nurse's role in reducing the risk factor of hypertension is to achieve blood pressure control and modify the lifestyle of patients in a manner that supports their treatment plan. Making the decision to control blood pressure is critical because it precedes lifestyle changes and successful blood pressure risk reduction. The successful management of hypertension has been reported in literature since the 1970s (Cunningham, 2005:885).

The current era of cost containment creates a receptive climate for the further development of the nurse's role in the reduction of this major cardiovascular risk factor. In clinical and observational studies in the USA (McPherson *et al.*, 2002:552), it was found that cardiac risk factors such as hypertension decreased significantly in patients participating in nurse-led risk reduction programmes. Supporting the attribution of success to the nurse-based programme is the fact that the improvement in blood pressure control in these studies was considerably higher than that reported in the literature for the normal community primary care setting.

Risk reduction strategies which the nurse should implement include using the correct technique of measuring blood pressure, diagnosing high blood pressure, communicating the importance of reducing a major risk factor for the development of atherosclerosis and implementing an effective plan of treatment that fits the patient's lifestyle and economic situation. To achieve this, the nurse needs skills in assessment, diagnosis, communication and behavioural counselling. This is of utmost importance to a patient's adherence to the programme and compliance with risk reduction strategies (Cunningham, 2005:881).

According to Milne (2001:166) and Cunningham (2005:870), lifestyle modification in the reduction of the risk factor of hypertension should include the following (summarised):

- Maintaining an ideal body weight;
- Following a healthy, balanced diet;
- Regularly doing moderate aerobic exercises;
- Limiting alcohol intake; and
- Stopping smoking.

(Refer to section 3.4.1.2.3.)

Lifestyle modification is the first line of treatment for reducing the risk factor of hypertension. If blood pressure remains elevated for six to 12 months after implementing lifestyle modification, pharmacological management should be started in conjunction with lifestyle modification, provided that the presence of other risk factors, such as heart failure, diabetes mellitus or renal insufficiency, indicates that the patient is at moderate to high cardiovascular disease risk. The risk reduction strategies in controlling blood pressure and combating the dangerous effects of hypertension should be evaluated and adapted at regular intervals by the multidisciplinary team involved in this intervention strategy.

◆ **Glycaemic control**

Then in lifestyle counselling ... there are other diseases like diabetes, the glucose control is vital.

Well, certain lifestyle changes are necessary ... diabetes mellitus and all his risk factors.

What lifestyle counselling is concerned ... regular check-ups, especially taking your glucose ... monitoring...

As mentioned in the above data chunks, lifestyle modification or changes are of vital importance in risk reduction strategies targeting diabetes and glucose control. Type 1 diabetes is a lifestyle disease, as is evident in its prevalence in the younger generation. This is primarily due to increased caloric intake, reduced energy expenditure as seen in a sedentary lifestyle and resulting increases in adiposity, especially centrally with increased abdominal circumferences. The role of the nurse in reducing the risk factor of diabetes entails assisting the patient to achieve glucose control by facilitating his/her self-management.

Risk reduction strategies and current recommendations in the risk stratification of patients with hyperglycaemia and diabetes are categorised below (Wallhagen, 2005:953-4):

- Glycaemic control: The general goals are the maintenance of an average glycosylated haemoglobin (HbA_{1c}) of 7.2 per cent in Type 1 diabetes, a blood glucose measurement of 5.0-7.2 mmol/L (adults) before meals and a blood glucose measurement less than 10.0 mmol/L (adults) after meals.
- Aggressive lipid management to reduce elevated triglycerides and LDL-C levels and to increase the low HDL-C levels.
- Blood pressure control (as previously discussed).
- Neurological assessment and foot care.
- Risk reduction should often also include pharmacological therapy. Insulin replacement therapy should be discussed with the patient.

To evaluate the effectiveness of an ongoing risk reduction strategy in individuals with diabetes, HbA_{1c} should be assessed at three- to six-month intervals to provide data on metabolic control over the past two to three months (Wallhagen, 2005:954).

◆ Medication/treatment regimen compliance

If they are on medication, they need to talk about medication ... regular monitoring ...

The three pillars would be diet, exercise, medication components ... It would be medication compliance ...

According to the PCNA, the nurse's role in a cardiovascular risk reduction programme includes providing strategies to enhance compliance to treatment plans in order to reach agreed-upon goals for the patient (Champagne *et al.*, 2002:27). In a nurse-based pilot study programme to reduce cardiovascular risk factors in a primary setting, nurses discussed the recommended frequency of regular medical tests and reviewed the importance of medications such as lipid-lowering drugs and anti-hypertensive therapy to decrease the risk of cardiovascular disease (McPherson *et al.*, 2002:545). The results demonstrated that drug treatments and counselling strategies aimed at enhancing compliance with treatment programmes to improve cardiac risk factor were well established when implemented in nurse-based programmes.

Physicians found that the cardiovascular disease nurse-based programme was extremely useful in addressing problems such as the patient's under-use of drug therapy. The positive changes were attributed to the nurse's role in emphasising compliance with

medication regimens (McPherson *et al.*, 2002:553). Effective communication also plays an important role in treatment regimen compliance or adherence. In an empirical review of clinical interventions, Haynes (1976) as cited in Burke and Fair (2003:258) reported that strategies to improve adherence to prevention and therapeutic regimens by changing knowledge alone had a 64 per cent success rate. Against this, behavioural strategies alone had an 85 per cent success rate. In combination, however, educational and behavioural strategies had an 88 per cent success rate.

◆ **Spiritual considerations**

It would be ... spiritual, especially for a cardio patient..., I think that is the most important factors to focus on ...

Spirituality includes a system of beliefs and values that people have about life, which can influence all aspects of their life, including their health behaviours. Burke and Fair (2003:262) recommend that the nurse considers the attitudes, beliefs and environment of patients, because all these aspects have an influence on their willingness to engage in or adhere to risk reduction preventative strategies. Beliefs are influenced by culture and religion, and the ability of health beliefs to predict behaviour is related to whether or not the patient has experienced the behaviour and adjusted his/her beliefs accordingly. An example of this is if a person belongs to a religious denomination in which smoking is discouraged, he/she may quit smoking more easily than others that do not have the same religious beliefs or values.

According to Haskell (2003:251), people with greater spiritual awareness appear to display less distress, anxiety and depression during times of personal stress which often has direct and indirect effects on cardiovascular disease risk. Research has demonstrated that people with higher scores of spiritual or religious participation have lower mortality rates due to CHD. It is therefore essential that nurses explain to their patients the positive contribution that spirituality and religious involvement may have in cardiovascular risk reduction. This should be done with the necessary cultural and ethical sensitivity toward the patient's beliefs and values.

4.3.3.4 CATEGORY 4: MULTIDISCIPLINARY TEAM INTERACTIONS

Participants indicated that the nurse in a cardiovascular risk management programme should facilitate networking between the multidisciplinary team, the patients and their

families. According to Bucher and Melander (1999:223), risk reduction programmes should educate patients and assist them and their families to modify risk factors that are present, as well as provide positive reinforcement to continue the lifestyle changes. Health education regarding risk factors should include nutritional counselling, medication teaching, exercise training and other risk modification. Only approximately one third of eligible patients continue risk factor interventions over the long term, but a significant increase in this number can be achieved with a multidisciplinary team approach.

The multidisciplinary team usually consists of physicians, nurses, dieticians, exercise physiologists, pharmacists, social workers and psychologists, and aims to achieve the overall benefits of a cardiovascular risk reduction programme (Bucher & Melander, 1999:253). These benefits include an improvement in exercise tolerance, dyslipidaemia, blood pressure control, glycaemic control, weight reduction, smoking, stress and/or behavioural risk management and reduction in or cessation of excessive alcohol consumption. The interactions between the nurse and the multidisciplinary team are reciprocal in nature. This was demonstrated by the Change of Heart Study (Hilton *et al.*, 1999:7) which promoted healthy behaviour among adults at increased risk of CHD as a result of the following risk factors: smoking, increased cholesterol, overweight, physical inactivity and a sedentary lifestyle, hypertension and a family history of cardiovascular disease. In this study, multidisciplinary team members, including psychologists, doctors, experts in smoking cessation and exercise training professionals, trained nurses in understanding the process of assisting patients to change, taught them skills appropriate to health promotion interventions and increased their ability to work in a patient-centred manner.

Interactions within the multidisciplinary team are of vital importance for the most efficient delivery of a cardiovascular risk management programme. According to the PCNA (Champagne *et al.*, 2002:27), it is the role of the nurse in a cardiovascular risk reduction programme to refer patients to the members of the multidisciplinary team and other community resources, such as exercise training gyms or support groups for weight reduction, smoking cessation or diabetes control.

Three subcategories emerged under the category of the role of the nurse in multidisciplinary interactions. Each is discussed separately.

◆ **Liaises with patients, families and members of the multidisciplinary team**

I was thinking, when I was working on the programme, initially we did not have the expertise of the biokineticists, a dietitian or psychologist initially but it was only the nurse you worked with the background ... I think family members are left behind most of the time. We usually deal with the patient and we refer the patient most of the time but we leave the family behind and when somebody in the family knows what the person is supposed to do then they are actually very helpful towards the patient ... I think the family needs to be involved most of the time and, exercise, like a programme that the person has to go through, like they have to actually assist the patient, especially if it is a controlled diet then they must not have a separate diet there and let the patient eat different food from all of them and after all what we say, patients, to cardiovascular patients ... everything a person should follow ...

... getting it from the patient or the family but to get the information first-hand from the doctor ... between the family, the doctor ... but to interact with the family, try to interact with the co-workers and also with the doctors.

As coordinator and facilitator, the nurse should liaise with all patients, their families and the members of the multidisciplinary team in order to ensure a successful cardiovascular risk management programme. In primary and secondary prevention, the nurse is involved in the physical care of the patient, coordinating interventions, arranging laboratory tests, implementing risk reduction strategies and giving the patient appropriate education and the necessary information. The nurse is involved in consultations with the patient, his/her family, and members of the multidisciplinary team in order to ensure proper adherence to medication, the implementation of risk modification by the different team members, the provision of medical health education by the doctor and the scheduling of follow-ups in the programme (Bucher & Melander, 1999:224).

◆ **Refers to general practitioner and/or cardiologist**

If they smoke we can refer them to their general practitioner for meds or a “stop smoking” group.

In our situation it would be the nurse ... the doctor, ja ... that’s basically it.

The nurse could refer a patient to the doctor, physician or cardiologist to interpret diagnostic tests, commence pharmacotherapy for a given risk factor (such as hypertension, smoking or lipid control) or evaluate pharmacotherapy and make changes.

According to Champagne *et al.* (2002:26), the medical doctor is often the leader of the multidisciplinary team and plays a supervisory role. However, the doctor may also be required to fulfil other roles within the multidisciplinary team, such as that of providing direct patient care. One of the key features of a successful programme of care for a cardiac patient is the extent of the role the nurse plays in assessing patients' needs and providing ongoing management to optimise their care within the multidisciplinary team. This entails collaborating with cardiac specialists or the primary physician regarding the medical management of the patient in the programme (Stewart & Harowitz, 2003:231).

In a study of the management of coronary risk factors by registered nurses versus the usual care provided to patients with unstable angina pectoris, nurses instituted certain risk reduction strategies, including the initiation of pharmacological lipid management by referring them to a doctor and reporting abnormal results to the primary physician with the request for further evaluation of therapy. In secondary prevention, the patient's care consisted of a follow-up appointment with a cardiologist within 48 hours of discharge from a chest pain unit. Physician follow-up after hospitalisation was at the discretion of the cardiologist (Allison *et al.*, 2000:134).

◆ **Refer patients to other members of the multidisciplinary team**

The nurse plays a major role in referring the patient to other members of the multidisciplinary team and other community resources. This is by virtue of the unique position in which nurses are placed. They are in continuous and direct contact with the patient, family, employer, community and members of the multidisciplinary team. Combined with their knowledge, experience and skills, this allows them to closely monitor the changes taking place in cardiovascular health in the patient, as well as future developments. Nurses can thus make valuable contributions in making decisions regarding appropriate health options, as well as referrals to other members of the multidisciplinary team, in a cardiovascular risk reduction programme. Functional accessibility is important in primary healthcare, and can be incorporated into the health planning process through adequate referral systems (Hattingh, Dreyer & Roos, 2004:121).

➤ **Dietician**

In our situation it would be the nurse, the dietician ... Yes, we have a dietician, we do have the biokineticists and the doctors [laughing], we have trainers and they are involved here.

Yes, the dietician ...

Overweight people, I refer to the dietician if there is something specific to handle.

... a dietician, not everyone is compliant ...

It is clear from the above data chunks that the participants felt that a dietician should be included in a cardiovascular risk management programme, specifically to target weight. Discussions about risk modification often develop around diet and levels of activity (Bucher & Melander, 1999:253). Referring a patient who needs dietary guidance to lose weight or achieve lipid or glycaemic control to a dietician is highly recommended for the efficacy of the risk management programme. Arranging a consultation with the dietician, the patient and the patient's significant others, such as the caregiver who normally purchases and prepares the food, is suggested in order to support programme adherence. According to Champagne *et al.* (2002:27), the dietician or nutritionist is a critical member of the cardiovascular risk reduction team.

The nurse could also refer a patient with dyslipidaemia to a dietician for recommendations regarding the principles of a lipid-lowering diet, which could include reducing total dietary fats and modifying the quality of fats by increasing the amount of mono-unsaturated fatty acids and polyunsaturated fatty acids, dietary fibre and antioxidants (Lindsay & Gaw, 2004:160). Guidelines to the management of obesity include safe weight loss and maintenance of target weight.

➤ **Psychologist and stress management professionals**

In our situation it would be the nurse ... psychologist, ja [yes] ... that's basically it.

... and when they have emotional problems you refer them to the psychologist.

I think when you have a patient who is non-compliant or who is actually not coping with the treatment regime itself what the conditions itself ... sometime people need psychological support.

In a study by Rutledge *et al.* (1999:226), regarding a lifestyle modification programme for patients with CAD, patients were referred to a clinical psychologist for psychological

assessments comprising of an evaluation of personality, social support, depression, anger/hostility, self-efficacy, health insights and beliefs, coping strategies and Type A behaviour. The goal of this evaluation was to address the stress-related issues of cardiovascular disease and provide appropriate coping skills, to determine personality traits that identified areas of strengths and potential problems, and to generate a psychological support group. These goals were achieved by providing practical and theoretical information in areas that would support the patient's efforts to manage the lifestyle modifications needed.

According to Champagne *et al.* (2002:28), psychologists can contribute important information regarding stress management and the modification of lifestyle, which are particularly relevant issues in view of the growing literary evidence of the effects of psychological factors on the development of cardiovascular disease. Psychologists with expertise in stress management are equipped to assist the patient with depression, anxiety, social isolation, chronic life stress and other psychological issues which could play a factor in the development of cardiovascular disease.

➤ **Professional for spiritual guidance**

... the social worker, spiritual, family ... the family need to know the reasons and other members of the multidisciplinary team.

According to Burke and Fair (2003:263), there are four types of mediating resources that have great potential to be collaborates in health promotion. These are mutual help groups, the Internet community, community coalitions and religious organisations. Religiosity or spirituality is a factor in the maintenance of health. Often religious organisations provide their own outreach efforts for health-related and risk reduction activities, such as five-day smoking cessation programmes. These external multidisciplinary organisations make ideal partners in health promotion efforts, especially in addressing the gaps in health status between certain racial and ethnic groups.

The role of a spiritual guidance professional is very important, though sometimes overlooked, especially when the patient displays signs of depression, anxiety and emotional turmoil. People with greater spiritual awareness appear to be less affected by negative emotional states during stressful events in their life, which may have direct and indirect effects on cardiovascular disease. Research has demonstrated that people with

higher spiritual or religious participation have lower mortality due to CHD (Haskell, 2003:251).

➤ **Physical trainer/biokineticist/physiotherapist**

I would say supervised exercises by an instructor or physiotherapist where they actually go hand in hand so that you can reduce your weight so that you can obtain the optimal life.

... refer them to the specialists like the biokineticist, explain a bit more in detail how to comply with the exercises.

Regular exercise and physical activity are integral elements of lifestyle modifications aimed at reducing cardiovascular risks. Experts in exercise physiology and psychology should be included in the cardiovascular risk reduction programme in order to make recommendations regarding a professional and safe physical activity training programme. A physical trainer's recommendations for increased physical activity should be geared to the patient's age, medical diagnosis, tolerance, and abilities. Individualised exercise programmes are important for patient success (Champagne *et al.*, 2002:28).

➤ **Occupational therapist**

... other members of the multidisciplinary team ... occupational therapist.

Nurses can refer patients to an occupational therapist for help when returning to work. In primary prevention, this may have already taken place if the risk factors, such as stress experienced in the workplace, are identified at an early stage. An analysis of the patient's working environment with respect to the physical and psychological demands, and an assessment of the person's ability to return to work, may be conducted by the occupational therapist. In order to address stress in the workplace, the patient's time management, assertion and problem-solving skills should be examined. Expert advice can then be given regarding how to manage these areas effectively in order to reduce the risk of CHD. In the case of secondary prevention, after a major cardiovascular event, the level of physical activity required to perform certain tasks may need to be assessed, and targeted with graded activity programmes and an individual vocation-related exercise prescription (Coats *et al.*, 1995:26).

➤ **Social worker**

Refer to social worker ...

If during interaction with the patient that has social problems that they experience outside I will refer them to a social worker.

... the social worker, spiritual, family ... the family need to know the reasons and other members of the multidisciplinary team.

Because cardiovascular disease risk factors (such as depression and social isolation, and anger, hostility and hypertension) are often interrelated, the nurse often has to refer a patient to other members of the multidisciplinary team and work in collaboration with them to implement the different strategies aimed at reducing these risk factors.

In a study of the management of coronary risk factors by registered nurses versus usual care in patients with unstable angina pectoris, it was found that it was the nurses' responsibility to review the results of the risk factor assessment and management programme (Allison *et al.*, 2000:134). The nurses had to develop a risk modification programme, instituting risk specific interventions and making appropriate referrals to other members of the multidisciplinary team, such as a social worker.

4.3.3.5 CATEGORY 5: FOLLOW-UP AND MONITORING ROLE

According to the participants, the nurse in a cardiovascular risk management programme should fulfil a follow-up and monitoring role in order to ensure control of the process and programme being implemented. According to Bucher and Melander (1999:223), the number of patients who continue with risk factor modification on the long term can be increased with a multidisciplinary team approach, which includes managing risk reduction interventions by using follow-up techniques, such as office or clinic visits and telephone contacts to monitor patient progress. By means of monitoring and following up on the patient, the nurse can evaluate the patient, as well as the risk reduction programme. Evaluation can form the basis and provide incentive for further risk reduction planning, health promotion and dynamic change. The risk reduction programme should be evaluated in order to ensure that quality of service is maintained, productivity is enhanced and risk reduction goals are met (Hattingh *et al.*, 2004:119).

Seven subcategories emerged under the category of the follow-up and monitoring role of the nurse. Each is discussed separately.

◆ **Monitoring in order to refer to doctor**

I mentioned ... also a doctor to monitor ... If they are on medication, they need to talk about medication ... regular monitoring by the doctor...

Refer to ... doctor ... problems refer them to the doctor...

... regular follow-ups with your doctor ... and the treatment regime that is prescribed by the doctor or the physician.

... and if you have referred them to the doctor, you call the doctor to find out whether the person has been there ...

... jy kan opvolg met die dokter, miskien as sy bloeddruk, sy cholesterol onder beheer is

[Translation: ...you can follow up with the doctor, and determine whether his blood pressure (or) his cholesterol is under control]

In the USA, in a national cardiovascular health improvement fellowship, the American Hospital Association launched a programme to improve the health of all communities across the country (Halm & Denker, 2003:106). As part of the programme, each fellow designed and implemented an action learning project, of which one was the development of a primary prevention centre to reduce cardiovascular risk factors in women in Minnesota. Risk reduction in terms of hypertension control, weight loss, exercise frequency, glycaemic control, lipid control, estrogens loss, smoking cessation, stress management and mental-emotional wellness was monitored by nurses. The majority of women in the project had hypertension and were on antihypertensive medication, and were thus referred back to their primary care physician for management (Halm & Denker, 2003:106).

◆ **Treatment and medication compliance**

I think when you have a patient who is non-compliant or who is actually not coping with the treatment regime itself ... sometimes people need support with the treatment regime ... what is more important is the compliance ... and you also get them to be more compliant.

It would be medication compliance ... I will emphasise to comply and give feedback all the time on the treatment programme.

It is vital for the nurse to follow up and monitor treatment regimens and pharmacological therapy in order to ensure that the patient adheres to the treatment plan. Non-compliance can lead to ineffective risk reduction and failure of the management programme. A key

feature of a successful programme for cardiovascular care is the application of gold-standard pharmacological treatment with flexible protocols to allow for change in patient status. It is similarly imperative to concentrate on achieving high adherence rates in patients with recognition of potential side effects (Stewart & Harowitz, 2003:232).

According to Wiles (1997:730), a follow-up programme should incorporate the monitoring of patients' symptoms and progress, as well as a review of their medication. It is thus essential that nurses assess the compliance, effect on the specific risk factor and adverse effects of the medication regimen in order to ensure optimal treatment and adherence to the medical programme. In a nurse-based pilot programme to reduce cardiovascular risk factors, results suggested that the effectiveness of cardiovascular disease prevention programmes were related to the follow-up care and monitoring, by means of visits from nurses, in order to understand patients' medication needs and to assist them to adhere to medications. The physicians in this study emphasised the usefulness of the nurse-led programme in helping with the continuity of care and reinforcement of clinical goals set between the patient, doctor and nurse (McPherson *et al.*, 2002:544;553). Compliance cannot be assumed, nor can the clinician make a clinical judgement that adherence is present.

In the long-term care of the cardiac patient, one of the principles of rehabilitation is to ensure that the benefits of cardiac rehabilitation are sustained over time, by encouraging long-term compliance to the treatment regimen and desirable lifestyle changes, and by anticipating recidivism (Mulcahy, 1991:41). In the absence of repeated counselling, follow-ups and medical supervision, achieving the principle of long-term compliance with lifestyle changes may be problematic. The nurse should anticipate factors that may influence satisfactory long-term compliance with desirable behavioural change. These factors could include how well patients are informed regarding the scientific basis of risk identification and modification, and whether they were counselled verbally with the involvement of the family. The nurse should also ensure long-term follow-up supervision for at least two years.

◆ **Control process**

This includes the monitoring of cholesterol, diabetes mellitus, glycaemic control, insulin resistance, blood pressure, body mass, diet, eating habits and exercise. Each is discussed separately.

➤ **Monitor cholesterol**

To control progress, follow-up appointments ... Other tests that can be done to monitor patient are cholesterol...

... high cholesterol and other heart conditions but it needs to be linked to a diabetes programme as well because these people often have conditions that are structured with insulin resistance, so that needs to be worked into it. At the moment we have it separately but it needs to be linked together...

Ten tweede moet jou cholesterol onder beheer wees. [Translation: Secondly, one's cholesterol should be under control.]

... jy kan opvolg met die dokter ... sy cholesterol onder beheer is ... [Translation: you can follow up with the doctor ...(whether) his cholesterol is under control...]

The monitoring of cholesterol should be done holistically so that all the management strategies are assessed in order to attain an optimal s-cholesterol and therefore reduction in cardiovascular risk. For cholesterol measurement to be meaningful, lifestyle modifications, including smoking cessation, dietary changes, increased activity and medication, should be maintained for at least two weeks before measurement. For accuracy, cholesterol measures should be made not earlier than eight hours after a myocardial infarction, surgical procedure, trauma, or an acute bacterial or viral infection. Furthermore, a 12-hour fasting period (except for water) should be observed before sampling, the patient should sit quietly for five minutes before the venipuncture and the sample should be obtained within one minute of tourniquet application (Fair & Berra, 2005:905).

The different management strategies that should be followed to control dyslipidaemia, as discussed in Chapter 3, include pharmacological treatment, smoking cessation, dietary guidelines, exercise training and weight reduction.

➤ **Monitor diabetes mellitus/glycaemic control/insulin resistance**

... high cholesterol and other heart conditions but it needs to be linked to a diabetes programme as well because these people often have conditions that are structured with insulin resistance, so that needs to be worked into it. At the moment we have it separately but it needs to be linked together...

To control progress, follow-up appointments ... Other tests that can be done to monitor patient are diabetes mellitus ...

... en as daar enige ander siektes is soos diabetes moet jou suiker onder beheer wees. [Translation: ...and if there are any other conditions such as diabetes, one's blood sugar level must be under control.]

Insulin resistance is a syndrome in which there is overlapping of several cardiovascular risk factors, including hyperglycaemia, central obesity, hypertension and dyslipidaemia. It also combines with the risk factor of diabetes mellitus. The diabetes mellitus prevalent in insulin resistance is Type 1 diabetes. These two risk factors should be followed up and monitored as a whole. To monitor diabetes mellitus and insulin resistance as cardiovascular risk factors in a follow-up programme, the following, as discussed in Chapter 3, should be assessed in order to determine whether the patient is complying with risk reduction strategies:

- Glycaemic control;
- Lipid control;
- Blood pressure control;
- Reduction in central obesity;
- Increase in physical activity;
- Dietary guidelines;
- Smoking cessation;
- Stress reduction; and
- Pharmacotherapy. (Refer to section 3.4.1.2.4.)

➤ **Monitor blood pressure**

To control progress, follow-up appointments ... to monitor patient ... blood pressure tests ... for hypertension...

Eerstens moet jou bloeddruk onder beheer wees ... [Translation: First your blood pressure must be under control...]

Blood pressure can be monitored by the patients themselves at home by means of self-monitoring devices.

A history of current general health should be sought along with an assessment of adherence to pharmacological and non-pharmacological treatment strategies. The monitoring of the effects of medication is important in order for the nurse to seek advice from the primary physician regarding appropriate modifications to therapy. Initially, when hypertension is diagnosed, effective treatment involves regular contact with members of

the multidisciplinary team, such as a doctor, nurse, dietician and physical trainer. Thereafter, regular follow-ups are essential and can initially be conducted on a weekly or monthly basis. As treatment is stabilised, the *Hypertension Clinical Guideline 2000* (Milne, 2001:169) recommends a three- to six-month interval between appointments in order to adequately monitor the control of hypertension. According to these guidelines, routine investigations at follow-up visits to control hypertension should include the following:

- Monitoring of target blood pressure: <140/85 mmHg (<140/80 mmHg in diabetes).
- Body weight measurement.
- Urine dipstick analysis for protein, blood and glucose.
- Serum urea, creatinine, potassium, glucose and cholesterol monitoring.
- Resting ECG. (Milne, 2001:165.)

At an annual review of hypertension control, risk factors that are interrelated should be monitored and an assessment made as to whether the patient has adhered to lifestyle modifications to reduce the risk of hypertension. Induced end-organ damage, including strokes, left ventricular hypertrophy, heart failure, peripheral blood vessel pathology, renal failure and retinopathy, should be assessed for in the patient with hypertension on an annual basis (Lindsay & Gaw, 2004:85-7). It is also essential to monitor pharmacological therapy, its adverse effects and drug interactions, if non-pharmacological measures have not been sufficient to control blood pressure.

➤ **Monitor overweight/diet/healthy eating/exercise**

To control progress, follow-up appointments ... also determining if the patient is overweight and how fit the person is.

Weight control is important and can be achieved through behavioural changes, such as dietary modifications and regular moderate exercise, as described in Chapter 3 (Foxton *et al.*, 2004:49). The patient's eating habits should be assessed in terms of these guidelines.

Whether the patient is following, and coping physically with, the individualised exercise programme can be monitored by a physical trainer or nurse or by means of self-evaluation. The patient's cardio-respiratory endurance/tolerance of an exercise programme can be monitored by measuring the following:

- Target heart rate.
- Patient-perceived exertion.
- Breathlessness.

- Metabolic equivalents.
- Other less frequently used parameters, such as blood pressure, ECG, maximum oxygen consumption and physical working capacity.

Any unpleasant symptoms, such as chest pain, dyspnoea, muscle fatigue, feeling faint, heart palpitations or general exhaustion, which may develop during exercise training, should be monitored. A person's exercise progression can be monitored by the frequency and duration of exercise, whilst the exercise intensity should remain constant.

◆ **Monitor adaptation to lifestyle changes**

Monitor ... the lifestyle of the patient, who is there, what the support system of the family is, how well will the support of the family be when she has to go on a special diet. ... follow up on education on "quit smoking" ... they need to be able to tell me exactly how they coped with it ... it does not mean that they would have already quit by that time but how they progressed with it, did they think more seriously about it, have they decided in cutting down ...

According to Wiles (1997:730), a follow-up programme for patients with cardiovascular disease should include the monitoring of the patient's progress and encouragement in appropriate lifestyle changes targeting his/her cardiovascular risk factors. As seen in the above data chunk, it is imperative that patients trying to stop smoking are monitored through follow-up contact sessions. An important part of follow-up sessions is the provision of support and information to patients in order to address their anxieties and fears regarding the development of cardiovascular disease and the necessary lifestyle modifications.

◆ **Follow-up**

This subcategory includes the following sub-subcategories: follow-up visits, follow-up with doctor, follow-up with employer, progress or deterioration, and monitoring the emotional progress of patient.

➤ **Follow-up visits**

Following up the patient after the initial consultation is vitally important in order to ensure the implementation and maintenance of the risk reduction programme. Follow-up can be

executed by means of telephone calls, home visits, individual counselling sessions and group sessions or by specifically scheduled educational sessions. The results of a nurse-based pilot programme to reduce cardiovascular risk factors in a primary setting (McPherson *et al.*, 2002:544) suggested that the effectiveness of cardiovascular disease prevention programmes, in sustaining a patient's behavioural changes whilst resuming an active life, may be related to follow-up care in the form of additional nurse visits.

One of the key features of a successful programme of care for patients with cardiac pathology is that at least one home visit for a comprehensive assessment of the patient's circumstances is conducted (Stewart & Harowitz, 2003:232). Through this, an evaluation can be made of programme adherence, the progress of risk reduction and any problems arising at home regarding the patient's risk reduction programme. According to Bucher and Melander (1999:253), the nurse can use follow-up visits to ensure that patients and their families understand the risk reduction programme and monitoring of progress. Use of medication, further risk reduction modification and lifestyle changes, including dietary interventions, exercise training, glucose control, blood pressure control, smoking cessation, lipid control, weight control or management of stress or other behavioural risk factors, should be monitored and adapted to ensure that the agreed-upon goals are successfully reached.

In the study Assessment of Implementation Strategies (ASSIST) of a nurse-led clinic, follow-up by nurses was found to be at least as effective as follow-up by general practitioners (Riley, 2003:ii33). The American Hospital Association launched a national cardiovascular health improvement fellowship, which included wellness follow-up by nurses (Halm & Denker, 2003:101-2). These studies show the absolute importance of follow-up programmes to monitor the efficacy of risk reduction.

➤ **Follow-up with doctor**

Risk reduction follow-up care can be facilitated by the nurse, but the medical management of the risk reduction, including the evaluation of diagnostic tests and adaptation of pharmacological therapy to the target goals, should be monitored by the physician. Risk reduction strategies which need medical follow-up and/or pharmacological adjustments include hypertension control, glycaemic control and lipid control, as well as smoking cessation, weight loss and stress management if pharmacotherapy has been prescribed. Lindsay and Gaw (2004:113) agree that routine follow-up visits for patients with

hypertension can be organised by the nurse, but a doctor should be available for advice and adjustment of antihypertensive therapy.

Medical follow-up is also appropriate in the evaluation and control of left ventricular hypertrophy when it is managed pharmacologically. The early detection, evaluation and management of emerging cardiovascular risk factors are important.

➤ **Follow-up with employer**

... and also communicate with his employer ...

It is imperative that the nurse communicates with the patient's employer in order to assess and monitor his/her physical and psychological functioning in the workplace. According to Coats *et al.* (1995:26), the nurse may need to liaise with the patient's employer or occupational health nurse in order to report on the patient's progress and perhaps implement a graded return to work, while still maintaining his/her self-esteem. The nurse should emphasise the need for a change in the pattern of the patient's employment if this would reduce his/her cardiovascular risk.

➤ **Progress and improvement or deterioration**

The most important thing is to follow up, whether it is a visit or a follow-up, that is what we normally do, so that you can see, because if you see a patient for the first time you do all those information and whatever the basic things that you have and from then you subsequently see whether the patient is improving, stable or went down.

A follow-up programme for patients with primary or established heart disease should provide for the monitoring of patients' symptoms and progress, the reviewing of medication and encouragement in appropriate risk reduction and lifestyle changes (Wiles, 1997:730).

In the national cardiovascular health improvement fellowship by the American Hospital Association, a new set of skills was developed in order to shift the paradigm from the curative to preventative focus (Halm & Denker, 2003:101-2). One of the key features of a successful programme of care for the cardiac patient is greater levels of monitoring of high-risk patients in order to prevent clinical deterioration (Stewart & Harowitz, 2003:232). According to Stewart, Blue, Walker, Morrison and McMurray (2002:1371), different models

of follow-up care can be instituted, one of which involves visits to the patient's home. The nurse should promote self-care, provide a means for the early detection of clinical deterioration and follow-up according to the needs of the patient.

➤ **Monitoring emotional progress of patient**

Emotional aspect is very important for me ... for the patient to have an open platform to ask questions and get information and to specifically find out from patients how they are doing or coping.

Monitoring the emotional progress of patients, providing them with an open platform to ask questions and gaining information to assess whether they are coping can be done by means of individual counselling sessions. The advantage of individual counselling is that it is private and therefore allows the patient the freedom to make queries or discuss concerns alone or as a couple or family (Coats *et al.*, 1995:22). It is essential that nurses make their patients feel comfortable and at ease, so that they may ask questions and clarify uncertainties, without feeling socially or emotionally intimidated. It is crucial that emotional progress is monitored, because the patient's frame of mind will influence his/her motivation to comply with the prescribed risk reduction programme.

◆ **Monitoring process**

Initially they will have monitoring devices ... phone calls and saying that they are actually doing what they are supposed to do ... that is the kind of follow-up that you look at.

There are different approaches to the monitoring process, namely in a group, telephonically or by means of pre-booked telephone appointments which could include follow-up visits. According to Kinney and Packa (1996:406), it is essential that the patients have frequent contact with the nurse, whether by telephone or face-to-face appointments, in a formal rehabilitation or risk reduction programme. Through this, the patient's symptoms and problems can be monitored, and the necessary advice and support given to the patient. The sub-subcategories group basis – group support/cohesion, telephonically, and pre-booked telephone appointments for follow-up (re-assessment) are discussed separately.

➤ **Group basis – group support/cohesion**

...patients have a weekly appointment on a group basis... the patients support each other as a group ... you know, like group cohesion. The nurse is the coordinator.

Monitoring patients on a group basis is a time-effective and, to some extent, cost-effective monitoring method. There are many advantages to group sessions, such as the provision of peer group and professional support. Group sessions can also employ peer group pressure as a strategy to promote risk reduction processes, such as weight loss, smoking cessation and lipid control with dietary modification.

Patients can be motivated by meeting others with similar risk factors. Group sessions allow patients to listen to answers to queries which others may have, which they were hesitant to raise themselves (Coats *et al.*, 1995:22). Group sessions can also create excellent group cohesion, allowing patients to positively motivate each other and support the weaker individuals. However, the benefits of group sessions may only last while members are attending the group sessions and come to an end when the group dissolves.

➤ **Telephonically**

Telephone calls, anything else that can be done? We can maybe do a follow-up on a one-to-one basis, a physical follow-up, go to their homes.

Telephonically ... maybe a visit ...

Telephone follow-ups, yes, but there is also consultations which is done every week but different patients are selected accordingly and they even have a chance to meet the multidisciplinary team and they can ask questions and they can even have one-to-one consultation, so that helps a lot.

According to the participants, telephonic monitoring or follow-up is the generally used method to monitor patients' progress and adherence, and to detect any problems encountered with the risk reduction management programme. Telephonic follow-up is widely used because it is less time-consuming and costly than home visits, while still providing reassurance to patients and monitoring risk reduction. Nurses conducting telephonic follow-ups should have excellent communication skills in order to detect verbal clues, as they do not have the benefit of visual contact and clues from the patient's body language. These nurses should also be able to gain information while making the patient

feel comfortable, especially in the case of psycho-emotional risk factors (Coats *et al.*, 1995:21).

In a nurse-based pilot programme to reduce cardiovascular risk factors, it was found that follow-up in the form of nurse visits or telephone calls may be necessary to monitoring the patient's sustained behaviour changes (McPherson *et al.*, 2002:544). The results of a study of specialist nurse management programmes showed that interventions consisted of home follow-up with frequent telephone contact. Similarly, in a randomised study of telephonic case management of patients with CHD, the outcomes showed a 50 per cent reduction in readmissions, which confirms the general utility of telephonic follow-up (Stewart & Harowitz, 2003:229).

➤ **Pre-booked telephone appointments for follow-up (re-assessment)**

... OK, all the calls that we have are always pre-booked basically. You have an appointment with the patient, we are structured, good ... we have telephonic appointments, it makes it easier in a sense they do not have to go anywhere for their specific check-up. I always try to let them know in advance what it is that we are going to discuss in that follow-up course, so that they can prepare or if it is re-assessment...

In the literature, pre-booked telephone appointments are not addressed as such, but rather pre-booked or scheduled home visits and telephonic follow-ups. In the researcher's opinion, a pre-booked telephone appointment could be useful, as it eliminates unnecessary telephone calls and saves nursing staff time. Follow-up by means of pre-booked telephone appointments also gives the patient a timeframe in which his/her progress will be monitored, which could enhance adherence to risk reduction strategies. The patient can also prepare queries regarding uncertainties, making the pre-booked telephone conversation structured and goal orientated.

◆ **Future planning**

The subcategory future planning involves the sub-subcategories questionnaire and patient independence. Each is discussed separately.

➤ **Questionnaire**

There are specific questions that you would have to ask to enquire, also depending on what level of readiness the person are, that will also dictate to what extent, to what effect you will actually probe, much more ...

I will say, the patient must be followed up every month or three by means of a telephone call or questionnaire ...

Questionnaires can be used to determine the patient's level of readiness to comply with risk reduction strategies and to monitor progress regarding these intervention strategies. In a home-based case management approach to cardiac rehabilitation in secondary prevention, scheduled interactions with the nurse consisted of nurse-initiated telephone contacts, mailed progress reports based on questionnaires completed by the patients and the patients' follow-up visits to the nurse (Bucher & Melander, 1999:254). Different risks are assessed by means of questionnaires, follow-up visits or telephonic follow-ups, allowing for the planning of individual counselling for the patient. Nutritional counselling was provided to all patients in the above home-based case management programme, based on their responses to a food frequency questionnaire.

More recently, instruments have been developed that measure the patient's readiness for and likely success in risk reduction behaviour, including adopting a low-fat diet and stopping smoking. The nurse is often in the best position to address adherence by arranging the necessary follow-up sessions and continuously evaluate whether the patient is ready to move on more independently or still needs support in maintaining risk reduction strategies (Burke, Tschirpke & Polakoski, 2005:969).

➤ **Patient independence**

Then lifestyle and future planning ... so that the patient can become independent ... I wean him from the rehabilitation programme.

Rutledge *et al.* (1999:234) state that many lifestyle modification programmes have shown favourable trends, even though the patients have been recruited at periods varying between several months to years after the initial event. According to these authors, this observation supports the proposition that favourable trends stem from patients' motivation to live independently from a cardiology service or rehabilitation programme.

It is important that patients become aware of identified cardiovascular risk factors and their risk reduction management in order to internalise changes in their lifestyles in the long term, even after following a structured rehabilitation programme. An aggressive approach is used in the management of risk factors in order to empower patients to look to themselves in caring for their health (Fraser, 1999:18).

A key feature of a successful programme of care for cardiac patients is the achievement of a high adherence rate and the promotion of self-care behaviours (Stewart & Harowitz, 2003:232). The importance of the independence of patients is emphasised by the College of Registered Nurses of Manitoba (College, 2005:4). It values the support provided by nurses to patients and their significant others in accessing community resources in order to adapt their environment to risk reduction strategies, promoting independence and social integration.

4.3.3.6 CATEGORY 6: ENSURING A DYNAMIC PROGRAMME

Participants indicated that the nurse in a cardiovascular risk management programme should ensure a dynamic programme for the patient and multidisciplinary team. Components of a successful risk reduction programme include utilising a multidisciplinary team with a nurse as coordinator and facilitator, establishing individualised goals for optimal risk factor reduction and carefully instructing the patient regarding risk reduction strategies in order to achieve the target goals. According to Haskell (2003:252), educating patients and their families in achieving behaviour change, identifying available resources and frequently monitoring patients' progress will ensure a dynamic risk reduction programme. To accommodate and facilitate changes in the healthcare environment in South Africa, an approach which is proactive, innovative, creative, flexible and permits the maximum input at operational level should be taken (Hattingh *et al.*, 2004:119). This will ensure a dynamic cardiovascular risk reduction programme.

Four subcategories emerged under the category of nurse's role in ensuring a dynamic programme. Each is discussed separately.

◆ Family support/involvement

I think family members are left behind most of the time. We usually deal with the patient and we refer the patient most of the time but we leave the family behind and when

somebody in the family knows what the person is supposed to do, then they are actually very helpful towards the patient ... so you would like the family to be more involved ... I think the family needs to be involved most of the time and exercise, like a programme that the person has to go through, like they have to actually assist the patient, especially if it is a controlled diet, then they must not have a separate diet there and let the patient eat different food from all of them and, after all what we say (to) patients, to cardiovascular patients ... everything a person should follow...

The benefits of nurse-led clinics and viewing the nurse as an expert practitioner in global cardiovascular risk management were validated in a study in Glasgow by McHugh (2001) and described by Riley (2003:ii33-ii34). In this study, the role nurses played, through a variety of strategies, in the secondary prevention of cardiovascular disease resulted in an improvement in global cardiovascular risk. Encouragement and family support were key issues that led to the success of this programme. Patient education and information when combined with counselling, lifestyle advice and the facilitation of family support could motivate long-term behavioural change. According to Mulcahy (1991:71), patients and their families should be encouraged to become involved in the management of cardiovascular risk factors.

The success of various risk reduction strategies and behavioural changes can be attributed to the involvement of patients' families, especially spouses. It is therefore essential that the nurse involves the family and constantly reinforces advice in order to ensure the maintenance of the lifestyle changes necessary in the particular situation.

◆ **Involvement of employer**

... and also what the support will be from the job, what type of work does she do and what would be the support structure in the job, how can the job be adjusted to suit the patient. Anything else, maybe be in contact with the doctor so that you can know how the patient is doing and not be getting it from the patient or the family but to get the information first-hand from the doctor ... between the family, the job, the doctor; not to get the information from the patient but to interact with the family, try to interact with the co-workers and also with the doctors.

Facilitating patients' early return to work and leisure activities, depending on their clinical status, is imperative for their optimal functioning as physiological and psychological human beings (Kinney & Packa, 1996:406). It is crucial that the nurse involves the

employer in understanding the patient as a whole and assisting him/her to return to work as early as possible.

In evaluating the long-term success of cardiac rehabilitation, the principle of ensuring that the benefits are sustained over time by means of encouraging long-term compliance is evident in the early return of patients to work. According to Mulcahy (1991:44), this has been extensively studied and is an indication of increased success of up to 90 per cent in some cases. Therefore, the employer should be involved in understanding and assisting the patient to reach this success. It is well established that no occupation is contra-indicated on medical grounds in patients fully recovered from a cardiac event and that careful risk factor modification will ensure that all patients, who are not permanently disabled, can return to their former occupations. Financial support for costs related to cardiac rehabilitation programmes has increased and most insurance companies provide some degree of reimbursement (Bucher & Melander, 1999:253). The nurse should therefore involve the patient's employer and communicate with them from the initial event or beginning of the programme. This will ensure their 'buy-in' in the employee's risk management programme.

◆ **Involvement of professional team members**

*Somebody to advise them on the diet ... the psychologist, a doctor, of course, a nurse.
I mentioned a psychologist, gym should be part of their lives ... dietician ... also a doctor
to monitor ... Gym ...*

The involvement of members of the multidisciplinary team, such as a physical trainer/biokineticist, dietician, psychologist and doctor, in a holistic approach to all the cardiovascular risk factors is essential. Lindsay and Gaw (2004:113) state that one of the major shortcomings and contributory factors in the inadequate control of blood pressure in Britain is the failure to develop a management strategy in partnership with the patient.

Managing cardiovascular risk factors is not easy. It requires lifestyle changes facilitated by different members of the multidisciplinary team, multiple pharmacotherapies with many adjustments due to adverse effects, and lengthy periods of trial, error and tribulation before the best risk reduction strategy and treatment regimen for an individual are consolidated. Most importantly, it requires effective communication, networking, facilitation and perseverance from all members of the multidisciplinary team and the patient.

Lindsay and Gaw (2004:115) state that an annual review may be necessary to monitor risk factors, risk reduction strategies and target damage. Monitoring the risk reduction programme, making adjustments and instituting state-of-the-art strategies as changes occur in the health sector will ensure a dynamic programme. It may also be necessary to institute more stringent measures, such as an increase in drug therapy or referral to other members of the multidisciplinary team.

Regular review of patient registration in the risk reduction programme can identify those lost to follow-up measures, and assist in identifying patients at risk and who need prompting. On diagnosis of the risk factor, a standardised prompt letter can be drafted, reminding the patient to attend the annual review with the appropriate members of the multidisciplinary team. Carefully completing documentation for each patient at the initial diagnosis through to the annual reviews allows access to data that can be evaluated and used for research, thus ensuring a dynamic and effective programme in cardiovascular risk reduction.

◆ **Quality control/assurance by implementing best practices**

A lot of things have been done by technology, nurses must be well trained.

A programme that is designed as a best-practice model of care, in that it reflects up-to-date knowledge, skills and clinical research in cardiovascular heart disease and primary risk prevention, ensures that the best possible quality of care is provided.

Halm and Denker (2003:109) state that nurses can partner with other nursing and interdisciplinary colleagues by exercising their expert knowledge and leadership skills. This can affect healthcare outcomes across the care continuum from prevention to diagnosis and disease management. Nurses' knowledge regarding best practices or international research on cardiovascular risk management should be current, accurate, represent the views of different groups, disciplines, community leaders and consumers and providers of healthcare, and be relevant to health and nursing teams. This can be ensured through networking, full consultation and contact on a regular basis in a climate of mutual respect and trust for each member of the multidisciplinary team. A climate of mutual trust and respect can be established by the professional nurse through his/her visibility, knowledge and competency, and ability to communicate effectively in a group context (Hattingh *et al.*, 2004:120). In assessing the worth of new information obtained for health promotion and future planning purposes, the nurse should be sensitive to the

needs of the other members of the multidisciplinary team. Nurses should be future-orientated and develop the ability to integrate present and future plans into coordinated and comprehensive healthcare approaches.

In order to ensure a dynamic cardiovascular risk reduction and management programme, an audit can be executed. The long-term follow-up care facilitated by the multidisciplinary team should be of a high standard. By setting targets and benchmarks for the management and reduction of cardiovascular risk factors, protocols can be developed to encourage optimum care. This can be achieved through the inclusion of adequately educated nursing staff in the programme and the use of agreed protocol with recall facilities for patients who fail to attend the cardiovascular risk reduction programme (Lindsay & Gaw, 2004:115).

4.4 CONCLUSION

In conclusion, in a study by Rutledge *et al.* (1999:226) about a lifestyle modification programme in the management of patients with CAD, it was revealed that multidisciplinary lifestyle modification programmes addressing cardiovascular risk factors were shown to have significant impact on cardiac risk factors in patients with atherosclerosis.

In this chapter, the role of nurses currently involved in health/cardiovascular risk management programmes and the all-encompassing role of the nurse as facilitator of such programmes were explored and described. Themes, categories and subcategories that emerged from guided interviews with eight participants were analysed and compared to data obtained during a thorough literature study of the subject. Participants agreed that nurses involved in risk management should possess specific personality traits and have acquired a variety of clinical, educational and specialised skills. These characteristics and skills, according to the participants, would enable the nurse to fulfil his/her role as facilitator of a cardiovascular risk reduction and management programme. Not only do nurses act as facilitator and coordinator of risk reduction and management strategies, they act as patient educator, lifestyle counsellor, and patient advocate as well.

In Chapter 5, recommendations will be made for changes to, improvements in and the expansion of the role of the nurse in a cardiovascular risk reduction and management programme in the South African context.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In Chapter 4, the data analysis was presented and themes related to the role of the nurse in a cardiovascular risk management programme described. The global role of the nurse was explored in an extensive literature study. The methodology used in this study mainly comprised of a qualitative research approach. The aim of this study was twofold: firstly, to explore the current role of the nurse in a cardiovascular risk management programme and, secondly, to describe how this role can be extended in order to make optimal use of the nurse as facilitator in this kind of programme within a South African context. This study was conducted in two phases.

Three study objectives were identified. They were formulated as follows:

- ◆ *To conduct an extensive literature study of cardiovascular health risk management in order to analyse the role that the nurse could fulfil in a health risk management programme.*

The *first objective* was reached by conducting an in-depth literature study of the role of the nurse in health risk management programmes. Current literature on the principles of health risk management and clinical risk screening, as well as the role of nurses in health risk management, was systematically explored, studied and analysed. Particular attention was paid to the role of the nurse as facilitator in a cardiovascular health risk management programme. The scope of functions of the nurse in these types of programme was determined.

Literature regarding health promotion and the prevention of cardiovascular disease was examined in an effort to identify the role of the nurse in cardiovascular health risk management. Central concepts regarding the role of the nurse were clarified. The nurse's facilitative role within the multidisciplinary team in a cardiovascular risk reduction programme received special attention. These are presented in Chapter 2.

- ◆ *To explore the role of the nurses currently involved in cardiovascular health risk management.*

Because of insufficient literature regarding the role of the nurse in a cardiovascular risk management programme within a South African context, the *second objective* was reached by doing mainly qualitative research, using an exploratory, descriptive research design and qualitative methodology. The study population consisted of professional registered members of the SANC who at the time of the study were involved in health risk management programmes in Gauteng. Unstructured guided interviews were conducted with nurses who were involved specifically in the risk management part of these programmes. The researcher captured the participants' "lived experiences" of the role of the nurse as facilitator and was able to describe how the participants understood the current functions of the nurse in a cardiovascular risk management programme in the South African setting. The participants' responses to and reflections on their experiences of fulfilling the role of facilitator served as a basis for the formulation of recommendations for, changes to and expansion of this nursing role.

- ◆ *To make recommendations for changes to, improvements in and expansion of the role of the nurse in such a programme.*

The *third objective* was reached by formulating the recommendations presented in Table 5.1.

5.2 STUDY FINDINGS: AREAS OF CHANGE, IMPROVEMENT OR EXPANSION OF THE ROLE OF THE NURSE

5.2.1 INTRODUCTORY REMARKS

In order to identify areas in which the facilitative role of the nurse in a cardiovascular risk management programme in a South African context can be changed, improved and expanded, this chapter synthesises the findings of the first and second phases of the research. The synthesis of these findings is presented in Table 5.1. Although non-modifiable risk factors should always be kept in mind, they are (as the term implies) not modifiable and therefore were excluded from the synthesis.

5.2.2 TABLE CONSTRUCTION

Modifiable (emerging) cardiovascular risk factors (topics) are listed in the first column of Table 5.1. The findings of the literature study are reflected in the second column and relate to the specific role of the nurse in relation to the risk factor. The third column contains the data obtained during the second phase of the study.

Three themes emerged from the second phase of the study in which the role of the nurse in a cardiovascular risk management programme was described. These themes are summarised below:

- ◆ The nurse in a cardiovascular risk management programme should have certain characteristics or *personality traits* that make patients to feel at ease and disclose information regarding their risk factor status. These personal attributes also enhance the nurse's interaction with patients' families and the multidisciplinary team.
- ◆ Certain *competencies*, including clinical skills and educational abilities, were identified as necessary to the role of the nurse in a cardiovascular risk management programme. Diverse categories of competencies, including specialised cardiovascular management skills, communication and listening skills, organisational and observational skills, and the ability to accompany the patient toward a worthwhile experience, were deduced from data obtained during the unstructured, guided interviews.
- ◆ The *role of the nurse* in a cardiovascular risk management programme, as described by the participants, was defined under the following headings: facilitative role within team, patient education, risk reduction strategies for specific cardiovascular risk factors, interactions with multidisciplinary team, family, and general practitioner, follow-up and monitoring role, and ensuring a dynamic programme.

In the fourth column of Table 5.1, the results of the synthesis of the information obtained in the two phases of the research are reflected. The researcher compared the empirical data, in other words the current role of the nurse in a cardiovascular risk management programme, to the ideal role as it emerged from the literature. The results of this comparison are presented in the form of recommendations of areas in which the role of the nurse in a cardiovascular risk management programme can be changed, improved and expanded. Specific and detailed descriptions are provided in the fourth rather than the second column of Table 5.1 in order to prevent duplication.

TABLE 5.1: AREAS FOR CHANGE, IMPROVEMENT OR EXPANSION OF THE ROLE OF THE NURSE

	NURSING ROLES IDENTIFIED FROM THE LITERATURE STUDY (PHASE 1 OF STUDY)	DATA FROM PHASE 2 OF STUDY	AREAS FOR CHANGE, IMPROVEMENT OR EXPANSION OF THE ROLE OF THE NURSE
RISK FACTOR (TOPIC) DISCUSSED	SPECIFIC NURSING ROLES IDENTIFIED		
MODIFIABLE CARDIOVASCULAR RISK FACTORS			
Dyslipidaemia	Monitoring of blood lipid levels and specific recommendations for accuracy of lipid measurement	<p>The monitoring of cholesterol and control tests were briefly addressed</p> <p>Role of the nurse in risk reduction strategies (4.3.3.3: subcategory)</p> <p>Follow-up and monitoring role of the nurse (4.3.3.5: subcategories)</p>	To maintain recommended lipid levels, the patient should be able to benchmark his/her progress against specific goals set for the patient (refer to 3.4.1.2.1)

	Assessment of the individual's current dietary pattern	Not discussed/mentioned in relation to the management of dyslipidaemia	Assessment of the patient's dietary pattern in order to intervene successfully and motivate him/her to adopt a healthier lifestyle.
	Dietary recommendations	<p>Briefly mentioned</p> <p>Patient education regarding specific risks (4.3.3.2: subcategory)</p> <p>Risk reduction strategies (4.3.3.3: subcategory on nutrition)</p>	<p>Recommendations regarding diet and nutritional composition, including reduction in fat intake (<30% of calorie intake), carbohydrate and protein adaptations, and increasing consumption of fruit, vegetables and fibre (refer to 3.4.1.2.1)</p>

	Knowledge and behaviour skills concerning dietary modifications	Not addressed	<p>Educational strategies should be aimed at helping the patient learn skills and internalise knowledge with a view to effect dietary changes and support the maintenance thereof (refer to 3.4.1.2.1)</p> <p>Involvement of the multidisciplinary team expert, e.g. dietician (refer to 3.4.1.2.1)</p>
	Weight reduction by means of various strategies	<p>Weight reduction not addressed as management strategy for dyslipidaemia per se</p> <p>Exercising advice and family involvement were briefly mentioned</p> <p>Patient education regarding specific risks (4.3.3.2: sub-categories)</p> <p>Ensuring a dynamic programme (4.3.3.6: subcategory)</p>	<p>A specific weight reduction programme should be incorporated into the programme where necessary and should include the three dimensions mentioned in the literature</p> <p>Weight reduction strategies are discussed in detail under the management of obesity (refer to 3.4.1.2.1)</p>

	Pharmacological management	Not addressed	Nurses should advise the patient regarding pharmacotherapy, <i>i.e.</i> hypolipidaemic drugs and their side effects (refer to 3.4.1.2.1)
Cigarette smoking	<p>Initiate smoking cessation through behavioural modification</p> <p>Smoking cessation guidelines and an intervention programme were discussed</p> <p>A suggested <i>Clinical Practice Guideline</i> to aid patients to prevent relapse</p>	<p>Smoking cessation was briefly addressed but no specific behavioural modification techniques, guidelines or programme were obtained</p> <p>Patient education on lifestyle changes (4.3.3.2: subcategories)</p> <p>Risk reduction strategies regarding lifestyle changes (4.3.3.3: subcategory)</p> <p>Multidisciplinary team interactions (4.3.3.4: subcategory)</p>	<p>Nurses should be trained in counselling and applying behavioural modification guidelines in order to effect smoking cessation (refer to 3.4.1.2.2)</p> <p>Involvement of the multidisciplinary team members (refer to 3.4.1.2.2)</p>
Hypertension	Risk management in collaboration with the multidisciplinary team using different strategies	Involvement of the multidisciplinary team members not addressed	Risk management in collaboration with the multidisciplinary team (refer to 3.4.1.2.3)

	<p>Comprehensive assessment of hypertension:</p> <ul style="list-style-type: none"> ▪ Blood pressure assessment ▪ History taking ▪ Physical examination ▪ Urine analysis ▪ Biochemistry ▪ 12-lead ECG 	<p>Only regular blood pressure assessment was briefly addressed.</p> <p>Patient education on specific risks (4.3.3.2: subcategories)</p> <p>Risk reduction strategies regarding lifestyle changes (4.3.3.3: subcategory)</p> <p>Follow-up and monitoring role of the nurse (4.3.3.5: subcategories)</p>	<p>Comprehensive assessment of the patient with hypertension including:</p> <ul style="list-style-type: none"> ▪ Accurate measurement of blood pressure ▪ Physical examination and interpretation ▪ Urine analysis and interpretation ▪ Biochemistry and interpretation ▪ 12-lead ECG and interpretation (refer to 3.4.1.2.3)
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	<p>Patient education:</p> <ul style="list-style-type: none"> ▪ Lifestyle modification/stress management ▪ Physical activity ▪ Smoking cessation ▪ Reducing alcohol intake ▪ Dietary modifications ▪ Adherence to treatment regimen ▪ Anti-hypertensive drug therapy 	Not addressed	<p>Counselling/patient education addressing:</p> <ul style="list-style-type: none"> ▪ Stress management and lifestyle changes that impact hypertension ▪ Physical activity programmes that reduce hypertension ▪ Smoking cessation ▪ Reducing alcohol intake ▪ Dietary modifications aimed at weight loss and sodium restriction to reduce high blood pressure ▪ Adherence to anti-hypertension treatment (refer to 3.4.1.2.3)
Overweight and obesity	Baseline assessment	Not addressed	<p>Comprehensive baseline assessment including BMI, waist circumference, cardiovascular risk profile and an assessment of the non-cardiovascular conditions (refer to 3.4.1.2.5)</p>

	Assessment of patient's absolute and relative risk	Not addressed	Determine the overweight/obese patient's absolute risk according to the Framingham calculation and relative risk based on being overweight/obese and abdominal obesity criteria (refer to 3.3.2.2.4)
	Assisting the patient to achieve a healthy body mass by gradual weight reduction through different behavioural strategies	Weight reduction briefly addressed Patient education on specific risks (4.3.3.2: subcategories) Risk reduction strategies for lifestyle changes (4.3.3.3: subcategory) Multidisciplinary team interactions (4.3.3.4: subcategories) Follow-up and monitoring role of the nurse (4.3.3.5: subcategories) Ensuring a dynamic programme (4.3.3.6: subcategory)	Assisting the patient to achieve a healthy body mass (refer to 3.4.1.2.5) Gradual weight reduction through: <ul style="list-style-type: none"> ▪ Counselling by trained nurses ▪ Involvement of multidisciplinary team experts, e.g. dietician ▪ Dietary advice ▪ Increased physical exercise and activity (refer to: 3.4.1.2.5)

	Pharmacotherapy	Not addressed	The nurse should explain the pharmacotherapy (anti-obesity agents) in conjunction with lifestyle modification (refer to 3.4.1.2.5).
Hyperglycaemia/Diabetes mellitus	Glycaemic control and diet	Briefly addressed. Lifestyle changes (4.3.3.3: subcategory) Ensuring a dynamic programme (4.3.3.6: subcategory)	Glycaemic control and diet (refer to 3.4.1.2.4)
	Weight control	Briefly addressed. Lifestyle changes (4.3.3.3: subcategories)	Weight control: <ul style="list-style-type: none"> ▪ Dietary measures such as a low intake of saturated fat and low calorie diet ▪ Decreased alcohol intake (refer: 3.4.1.2.4) ▪ Regular exercise, e.g. 4-5 times per week ▪ Involvement of the multidisciplinary team (refer to 3.4.1.2.4)

	Lipid control and exercise	Briefly addressed Follow-up and monitoring role of the nurse (4.3.3.5: subcategories)	Lipid control to achieve desired blood values (refer to 3.4.1.2.4) <ul style="list-style-type: none"> ▪ Lipid control via interventions such as diet modification, regular exercise and hypolipidaemic therapy (statins) (refer to 3.4.1.2.4)
	Blood pressure control	Not addressed in relation to hyperglycaemia/diabetes mellitus	Blood pressure control: BP <130/80 mmHg (refer to 3.4.1.2.4)
	Foot care and neurological assessment	Not addressed	Foot care and neurological assessment (refer to 3.4.1.2.4)
	Summary of important lifestyle interventions “Do’s and Don’ts” for diabetics	Briefly addressed Lifestyle changes (4.3.3.3: sub-category) Follow-up and monitoring role of the nurse (4.3.3.5: subcategories)	Other important interventions: <ul style="list-style-type: none"> ▪ Smoking cessation ▪ Patient education regarding: <ul style="list-style-type: none"> ➢ Regular blood glucose measurement/control ➢ Regular follow-up ➢ Hypoglycaemic therapy (oral agents/insulin) ➢ Adherence to glycaemic control programme (refer to 3.4.1.2.4)

<p>Physical inactivity/lack of exercise</p>	<p>Physical fitness programme according to the “FITT” principle of 30 minutes or more, five days a week</p>	<p>Briefly addressed Patient education (4.3.3.2: subcategories) Strategies regarding lifestyle changes (4.3.3.3: subcategories) Multidisciplinary team interactions (4.3.3.4: sub-categories) Follow-up and monitoring role of the nurse (4.3.3.5: subcategory) Ensuring a dynamic programme (4.3.3.6: subcategories)</p>	<p>Physical fitness programme including:</p> <ul style="list-style-type: none"> ▪ Warm-up and cool-down period: important for cardiac patients (refer to 3.4.1.2.6) ▪ Training to identify and minimise barriers to regular exercising (refer to 3.4.1.2.6) ▪ Involvement of the multidisciplinary team, e.g. physical trainer, biokineticist (refer to 3.4.1.2.6).
<p>Psychological risk factors (as listed below)</p>	<p>Assessment and identification of adverse effects, such as physical symptoms, psycho-emotional symptoms, cognitive symptoms, behavioural manifestations</p>	<p>Not addressed</p>	<p>Training of the nurse to identify and assess patients with psychological risks displaying adverse manifestations (refer to 3.4.1.2.7)</p>

	<p>Generic psychological risk factor reduction interventions:</p> <ul style="list-style-type: none"> ▪ Motivation to change/modify behaviour ▪ Behavioural change strategies ▪ Madan and Froelicher's psychological risk factor reduction interventions 	<p>Psychological risk factors not individually identified or addressed; stress briefly addressed</p> <p>Stress management briefly addressed</p> <p>Patient education on specific risks (4.3.3.2: subcategories)</p> <p>Strategies for lifestyle changes (4.3.3.3: subcategories)</p> <p>Multidisciplinary team interactions (4.3.3.4: subcategories)</p> <p>Follow-up and monitoring role of the nurse (4.3.3.5: subcategories)</p> <p>Ensuring a dynamic programme (4.3.3.6: subcategories)</p>	<p>Acquisition of knowledge and skills that will enable the nurse to educate and motivate the patient, and facilitate behavioural change and interventions (refer to 3.4.1.2.7)</p> <p>Suggest training in:</p> <ul style="list-style-type: none"> ▪ Psychological assessment ▪ Counselling ▪ Relaxation techniques ▪ Stress management techniques ▪ General stress management ▪ Trauma management (refer to 3.4.1.2.7)
Depression	Increased socialisation		
Anxiety, hysteric or panic disorder	Increased involvement in activities		

<p>Hostility, anger and Type A personality behaviour</p>	<p>Comprehensive management of hostility, anger and Type A personality behaviour</p>		<p>Assist patient to:</p> <ul style="list-style-type: none"> ▪ Recognise internal hostility/anger ▪ Be introspective and understand the effect of hostility/anger on body systems ▪ Adopt acceptable expressions of feelings and behaviour ▪ Make use of appropriate interpersonal skills <p>Emphasise benefits of exercising, relaxation training and stress management</p>
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Lack of social support and resultant isolation	Interventions to address lack of social support		Encourage social interaction: cardiac rehabilitation programme, risk prevention clubs and inclusion of family and friends
Life events that make an acute impact	Counselling and support regarding stressful events		Counselling for the following life events: bereavement, retirement, financial disposition and environmental catastrophes (natural and non-natural disasters) Especially in the case of women Comprehensive assessment:

Psychosocial work features	Comprehensive assessment and identification of psychosocial aspects with risks attached		<ul style="list-style-type: none"> ▪ Identify effort-reward imbalance or job strain ▪ Identify cardiovascular disease precursors including hypertension, dyslipidaemia, low vagal tonus, hypercoagulability, smoking, sedentary lifestyle, obesity, and hostility ▪ Comprehensive assessment of adverse effects (physical and emotional) <p>Involvement of multidisciplinary team members, such as psychologist, physical trainer, doctor and social worker (refer to 3.4.1.2.7)</p> <p>Standardised universal assessment tools can be used, but assessment and interventions should be individualised (refer to 3.4.1.2.7)</p>
Excess intake of substances	Comprehensive assessment,	Patient education on specific	<ul style="list-style-type: none"> ▪ Train nurses in assessing

Micro-albuminuria	Determine s-albumin in patient with hypertension or diabetes mellitus Proven benefits of: ACE-inhibitors Angiotensin 11 receptor antagonists	Not addressed	Monitor s-albumin Assess correlating cardiovascular risk factors Implement risk reduction strategies to minimise effects of correlating cardiovascular risk factors if present (refer to 3.4.1.3.1)
C-reactive protein	Assess C-reactive protein levels in patients presenting with cardiovascular co-morbid risk factors	Not addressed	Encourage patient to: <ul style="list-style-type: none"> ▪ Stop smoking ▪ Maintain glycaemic control ▪ Exercise ▪ Receive statin therapy (if dyslipidaemia exists) (refer to 3.4.1.3.2)
Fibrinogen	Reduce by low dose aspirin	Not addressed	Monitor fibrinogen levels in high-risk cardiovascular patients Involve general practitioner: low dose aspirin daily (refer to 3.4.1.3.3)
Hyperhomocysteinuria	Hyperhomocysteinuria	Not addressed	Monitor homocysteine levels if

	<p>management</p> <p>Dietary supplementation</p>		<p>cardiovascular risk factors are present</p> <p>Do accurate sample collection</p> <p>Treat with:</p> <ul style="list-style-type: none"> ▪ Folic acid (400 mg) ▪ Vitamin B₆ ▪ Vitamin B₁₂ ▪ Antioxidants: Vitamin E <p>Increase dietary consumption of foliate and Vitamin B₆ (refer to 3.4.1.3.4)</p>
Hyper-Lp(a)	<p>Monitor hyper-Lp(a) Lp(a) levels in certain circumstances</p>	Not addressed	<p>Monitor hyper-Lp(a) in presence of severe hypercholesterolaemia, dyslipidaemia or familial hyperlipidaemia</p> <p>Manage dyslipidaemia (as discussed above) (refer to 3.4.1.3.5)</p>
Hypertriglyceridaemia	Management guidelines for	Not addressed	Reduction of triglycerides:

	dyslipidaemia		<p>management guidelines for dyslipidaemia (as discussed above) with additional increased consumption of:</p> <ul style="list-style-type: none"> ▪ Omega 3 and 6 fatty acids ▪ Raw vegetables, fruit and fibre <p>Regular monitoring of s-triglycerides (refer to 3.4.1.3.6)</p>
Renin	<p>Prevention</p> <p>Monitoring of haemodynamic status</p>	Not addressed	<p>Therapeutic prevention includes the use of ACE inhibitors</p> <p>Monitoring of haemodynamic status (refer to 3.4.1.3.7)</p>
Uricaemia	<p>Monitor uric acid if certain conditions are present</p> <p>Take a comprehensive history of increased uric acid</p>	Not addressed	<p>Monitor uric acid in the case of:</p> <ul style="list-style-type: none"> ▪ Increased levels of triglycerides ▪ Hypercholesterolaemia ▪ BMI >30 kg/m² ▪ Hypertension <p>Comprehensive history of</p>

			<p>increased uric acid should be taken</p> <p>Involvement of the general practitioner (refer to 3.4.1.3.8)</p>
<p>Oxidative stress</p>	<p>Vitamin C and E supplementation</p> <p>Dietary advice to increase antioxidant intake</p>	<p>Not addressed</p>	<p>Vitamin E supplementation</p> <p>Dietary advice to increase antioxidant intake naturally by including the following:</p> <ul style="list-style-type: none"> ▪ Carotenes ▪ Pycnogenol ▪ Resveratrol ▪ Lycopene ▪ Bioflavonoids ▪ Alpha lipoic acid <p>Increased awareness of oxidative stress in patients on haemodialysis (refer to 3.4.1.3.9)</p>

5.3 LIMITATIONS OF THE STUDY

Although the study participants, as part of their normal working day, had to deal with a wide range of health risk management scenarios, they did not specialise in cardiovascular health risk management per se. In other words, the participants were not cardiovascular specialists, which, within the context of this study, could be regarded as a limitation. However, this group of participants was the only group of health risk managers working in the field of study who were accessible to the researcher. Within health risk management, their lack of specialist knowledge regarding cardiovascular health risk management places a question mark over their level of training.

Because of the limited context of the empirical phase of the study, generalisations cannot be made to the larger population.

5.4 RECOMMENDATIONS

5.4.1 RECOMMENDATIONS FOR NURSING PRACTICE

- ◆ The nurse's role within cardiovascular health risk management should be further explored and expanded.
- ◆ Cardiovascular health risk management was explored in this study context but, in a country such as South Africa where the incidence of HIV/AIDS and other chronic diseases is high, health risk management should be researched in the broadest sense of the word.
- ◆ Within the hospital setting, the role of the nurse should be expanded to include health risk management in order to keep patients out of hospitals.
- ◆ According to Fraser (1999:18), with reference to the role of the nurse, there is little emphasis on secondary stroke prevention. However, this role can be developed with the introduction of support schemes for patients at discharge and public awareness programmes of stroke risk. If patients recognise their increased risk of stroke, they will be more motivated to follow stroke preventative strategies.

5.4.2 RECOMMENDATIONS FOR FURTHER RESEARCH

- ◆ This study was conducted in a limited context and the role of the nurse as facilitator of a cardiovascular health risk programme could be explored in a wider geographical context.
- ◆ After implementing the changes to, improvements in and expansions of the role of the nurse, as recommended in Table 5.1, the topic could be researched again in order to determine the experiences of the nurses in a re-engineered programme.
- ◆ The needs of patients involved in a cardiovascular health risk management programme could be determined and adjustments incorporated into a re-engineered programme.
- ◆ The study could be replicated to determine the role of the nurse in other nursing specialist fields within health risk management, such as the health risk management of HIV/AIDS and other chronic diseases in very young populations with manageable risk factors.
- ◆ Qualitative studies on the core competencies of nurses working in this field can be conducted in order to make further recommendations for their role in health risk management.
- ◆ Comparative studies could be done in order to determine their role globally and to indicate the specific needs of the South African context.

5.4.3 RECOMMENDATIONS FOR NURSING EDUCATION

The concept of health risk management (and not only health promotion) should be incorporated into all nursing curricula from the most basic to the most specialised level.

5.5 SUMMARY OF FINDINGS RELATED TO THE NURSING ROLE IN CARDIOVASCULAR HEALTH RISK MANAGEMENT

5.5.1 INTRODUCTORY REMARKS

The researcher's interest in the study subject originated from her experience in the cardiac critical care environment. The researcher became interested in managing cardiovascular risk factors as it prevents hospitalisation in cardiac critical care units, as well as invasive interventions and surgery. The researcher believed that the management and risk reduction

of modifiable cardiovascular risk factors would not only have medical but also financial, emotional and psychological implications for individual patients.

The researcher therefore identified the need to investigate the coordination of a cardiovascular risk management programme that is effective in helping patients recognise salient symptoms, improve quality of life and change risk behaviours, thereby delaying complications in their condition. Possible areas for change to, improvement in and expansion of the role of the nurse in a cardiovascular risk management programme with emphasis on the reduction of risk factors that lead to CHD were then described.

Preventative counselling is a complex process. The incorporation of several theoretical perspectives, techniques and behavioural change strategies into the curricula of the clinical nurse specialist could lead to the implementation of successful cardiovascular risk prevention and management programmes. Acquisition of the necessary skills would assist the healthcare provider and members of the multidisciplinary team in delivering effective risk management and preventative care programmes, potentially impacting on the mortality and morbidity associated with cardiovascular disease.

Barriers to cardiovascular disease prevention were identified, and include the lack of skills and motivation of healthcare providers as well as a lack of interest or motivation showed by the patient. These barriers can be eliminated through effective communication and counselling skills. Skills and attributes required of healthcare providers as identified by Burke and Fair (2003:257) are discussed as they have consequences for the nursing role in cardiovascular health risk management.

5.5.2 SKILLS AND ATTRIBUTES

5.5.2.1 EXPERTISE AND KNOWLEDGE

Experts in cardiovascular risk prevention and management should possess advanced knowledge in this field and extensive expertise in risk factor counselling. Knowledge that is absolutely essential includes knowledge of cardiovascular disease risk factors and the prevention, modification and reduction thereof (refer to data obtained from literature).

5.5.2.2 COMMUNICATION SKILLS

It is imperative to use simple, non-technical language that patients can understand and that will enhance effective communication between/with the patient and members of the multidisciplinary team. The necessary information in an appropriate format at an appropriate time is conducive to their receiving the intended message and changing their behaviour. This finding is supported by Haynes (1976, as cited in Burke & Fair, 2003:258) who reported that strategies to improve adherence to prevention or therapeutic regimens were most successful when patient education was followed up by the implementation of behavioural change strategies. Patient education (knowledge transference) alone was only 64 per cent successful. Behavioural change strategies had an 85 per cent success rate, but combining educational and behavioural strategies had an 88 per cent success rate. The healthcare provider should communicate in a manner that would facilitate open communication – the patient should feel free to express him/herself openly and ask questions. In a patient-centred model, the patient's point of view is actively sought.

5.5.2.3 RELATIONSHIP-BUILDING SKILLS

To be able to build a therapeutic relationship with patients, the nurse should reflect positive feelings through demeanour and behaviour, promoting a sense of worth and a feeling of security in the patient. Furthermore, a trusting relationship is fostered by friendliness, confidence and attentiveness. Burke and Fair (2003:259) support this by stating that the qualities of a therapeutic relationship include empathetic understanding, genuineness, unconditional positive regard, intimacy and reciprocity, respect and mutual trust. Patients need to know that they are respected and taken seriously, even if they disagree with the proposed behavioural change or perspective. Patients are more likely to openly discuss their feelings regarding the problems and barriers they encounter in making lifestyle changes if they perceive their relationship with the healthcare provider as a trust relationship.

5.5.2.4 FLEXIBILITY

Flexibility is the ability to determine realistic means of achieving goals set. The healthcare provider/facilitator should assist the patient to readjust goals if necessary. Flexibility also means accepting that the patient may not be ready to make changes and supporting the patient in developing a readiness to consider behavioural alternatives.

5.5.2.5 ABILITY TO BRING ABOUT BEHAVIOURAL CHANGE

Research findings show that the ability to bring about behavioural change is multifaceted and includes the skill to conduct patient education, comprehensive assessment skills, the skill to utilise behavioural strategies, the ability to effectively set goals, the skill to involve support systems, as well as the motivational interviewing and problem-solving skills.

According to Hurley and Shea (1992, cited by Meetoo, 2004:16), the nurse can promote behavioural change through the basic skill of patient education. Education has long been recognised as the cornerstone of self-care management. Because many risk factors that cause atherosclerosis are modifiable, educating patients and facilitating behaviour modification in order to prevent and/or manage these risks are nurses' priorities. However, patients' beliefs and values influence how they will alter behaviour and the risks leading to cardiovascular disease should be taken into consideration. According to the Change Model of Prochaska and D'Clemente (1984), set out in Meetoo (2004:16), the patient often negotiates the following stages before behavioural change is effected:

- Pre-contemplation stage – the individual is not yet interested in changing behaviour.
- Contemplation stage – the individual starts thinking about change.
- Preparation stage – the individual prepares for change.
- Active stage – the individual is actively attempting to change.
- Conscious stage – the individual makes a conscious effort to maintain a healthier lifestyle.

Effecting behaviour change is an essential skill. To accomplish this, the nurse needs to obtain information by conducting a comprehensive patient assessment, including the following:

- Social and occupational background and current lifestyle;
- Patient's perspective on his/her condition and recommended treatment strategy;
- Patient's priorities and motivation for seeking treatment advice and changing behaviour;
- Patient's readiness to make a change;
- Previous attempts at modification of habits or risk factors and past experience with counselling for risk reduction;
- Best approach of the multidisciplinary team for jointly developing a therapeutic plan;
- Feasibility of the risk reduction and health promotion plan; and
- Availability of resources.

Skills needed to facilitate behavioural strategies are based on the principles of learning and behavioural change theories, which provide the foundation for strategies to change behaviour. When targeting behavioural change, self-monitoring is a key strategy in increasing the patient's awareness of behaviour. While self-monitoring may actually effect a change to behaviour, its use for increasing awareness is the primary objective (Burke & Fair, 2003:260).

When bringing about behavioural change, clear goal setting leads to higher performance compared to no or vague goals. Goals per se do not enable patients to change their behaviours but, if they are committed, goal setting can motivate patients to accomplish the required behavioural change. The selected goals should be realistic and achievable. Once a goal is set, regular feedback regarding goal attainment is important to instil a sense of learning and mastery. Achieving success with short-term goals enhances self-esteem and self-realisation, and performance satisfaction.

Social support is a positive influence that significant others can have on an individual's behaviour in following the recommended preventative plan (Burke & Fair, 2003:261). It can be useful for the nurse to involve a patient's significant others in the counselling or development of the plan for behavioural change, especially if they are part of the change process, for example of dietary changes.

Motivational interviewing is a patient-centred counselling approach to assisting patients in examining and resolving ambivalent feelings about behavioural change. In the clinical setting, brief motivational interviewing involves the following tasks: setting an agenda, assessing the patient's level of motivation and confidence, taking decisions, setting targets and exchanging information (Burke & Fair, 2003:261). Despite these negotiation strategies, the healthcare provider cannot impose motivation on the patient. The principle is that the patient should be self-motivated to change behaviour. On a micro-level, patients and their families need information, motivation and guidance in order to self-manage patients' conditions. Mash and Allen (2004:21) confirm that this can be accomplished by brief motivational interviewing.

Readiness to change, another behavioural strategy, is based on Prochaska's Transtheoretical Model (1983, as cited by Burke & Fair, 2003:261), which is an integrative framework for understanding how people adopt and maintain behavioural change. The

theory has received empirical support across behavioural domains, particularly in exercising- and smoking-related behaviours.

5.5.2.6 SENSITIVITY IN CONSIDERING THE PATIENT'S ATTITUDES, BELIEFS AND ENVIRONMENT

It is important to know patients' attitudes and beliefs concerning treatment and the causes of their disease. Their beliefs about treatment may influence their willingness to engage in or adhere to preventative care. It is suggested that health beliefs should be examined in the context of the specific health behaviour and for the specific population and setting. The nurse practitioner should be sensitive about this.

According to Burke and Fair (2003:262), beliefs are influenced by religion and culture. Health beliefs predict behaviour, and modification of behaviour is related to whether the individual has experienced the adversities of the behaviour and is willing to adjust his/her beliefs accordingly. The Health Belief Model considers one's belief in the efficacy of an action to reduce the perceived health threat. However, in order to bring about change in behaviour, the potential barriers, such as cost, risks, and complexity of the risk reduction and management programme, should not outweigh the perceived benefits.

Environmental factors, such as having a partner that also smokes, play a large role in behavioural change. These factors should be assessed and addressed, particularly in interventions targeting changes in dietary or smoking behaviour. Culture, as an aspect that influences beliefs (in this case, health beliefs), cannot be underestimated in the South African context.

5.5.3 THE NURSE'S SPECIFIC ROLE IN CARDIOVASCULAR RISK MANAGEMENT

Primary cardiovascular disease intervention seeks to control risk factors before the occurrence of an adverse event such as a myocardial infarction or stroke. The contribution of nurses to illness prevention and health promotion is indispensable. This has been validated by several studies that investigated the benefits of nurse-led clinics in cardiovascular risk management and other fields of health management. According to McPherson *et al.* (2002:552-3), clinical trials by Campbell *et al.* (1998) in Scotland and observational studies by Baillargeon *et al.* (2001) in Canada have shown that nurse-led programmes can impact on cardiovascular risk reduction in patients with cardiovascular disease.

Similar results were attained by an American community-based practice study investigating cardiac risk factors such as hypertension, dyslipidaemia and tobacco use (McPherson *et al.*, 2002:552-3). An important strength of this intervention study was that the nurse was well integrated into the practice team in patient consultation as well as daily informal consultations with other staff members. In all of the above studies, positive health changes were attributed to the nurse's role in monitoring health status, facilitating referrals for new or continued problems, encouraging behavioural changes and emphasising compliance with medical regimens.

Because of their access to both individuals and larger populations, nurses are in a unique position to promote health. The control of cardiovascular risk factors requires a multifaceted approach that not only includes health promotion programmes but also emphasises case findings such as the early identification of individuals at risk. Nurses should develop and evaluate programmes that are effective in **screening** individuals for risk factors such as hypertension. These programmes should also be effective in screening young populations, such as school children, for risk factors as many lifestyle behaviours that increase the risk for developing cardiovascular disease are established early in life (Wimbush & Peters, 2000:149).

The nurse has an important role in **raising awareness** of risk for cardiovascular disease and also in assisting people to make the necessary lifestyle changes to minimise the risk of developing the disease (Foxton *et al.*, 2004:54).

A study called ASSIST, described by Moher *et al.* (2001) and referred to by Riley (2003:ii33-4), investigated methods of promoting secondary prevention of IHD in primary healthcare and showed more effective management of cardiovascular risk factors by nurses compared to management of risk factors by general practitioners. Another study of nurse-led cardiovascular management, conducted in Glasgow, found a significant improvement in modifiable risk factors, anxiety, depression and quality of life (Riley, 2003:ii34).

Several key issues and attributes, which were fundamental to the improvement of cardiovascular risk management globally, were identified in a variety of nursing strategies. These key issues are the following:

- Encouragement and support.
- Counselling and lifestyle advice.
- Information regarding treatment regimens.

- Family support.
 - Measurement and monitoring of risk factors.
 - Taking time to listen.
- (Riley, 2003:ii34.)

The operational role of the professional nurse should include (Champagne *et al.*, 2002:27):

- Conducting comprehensive cardiovascular risk factor assessments;
- Coordinating a risk prevention programme;
- Risk stratification and triage of individuals identified as high risk;
- Establishing goals and clinical outcomes according to evidence-based risk reduction interventions and the utilisation of clinical practice guidelines;
- Implementing lifestyle interventions, including medical interventions, pharmacotherapy and multidisciplinary input;
- Providing strategies to enhance patient compliance to treatment regimens;
- Providing patient and family education;
- Facilitating and coordinating referrals to multidisciplinary resources, such as the physician, dietician, physical trainer, psychologist and biokineticist;
- Facilitating and coordinating referrals to community resources, such as physical training facilities, diabetic associations or smoking cessation organisations;
- Surveillance of safety of, and efficacy and adherence to the risk reduction programme;
- Measurement of medical/clinical outcomes as well as patient satisfaction; and
- Systematic follow-up with therapy modifications as indicated for the individual or as needed.

Studies of cardiovascular disease interventions by nurses have also demonstrated greater effectiveness in *secondary prevention*. In patients who have already experienced a cardiac event, interventions such as smoking cessation, increased physical activity and improved diet and medication control can significantly reduce the likelihood of further cardiac events and improve long-term survival. The challenge is to implement low-cost cardiovascular prevention strategies in primary care. Drug treatments and counselling strategies necessary to improve cardiac risk factors are well established, but implementing these strategies in a primary care setting to prevent cardiovascular disease is the greater challenge. Given the prevalence of cardiovascular disease in the population, it is essential to incorporate strategies into primary practice in order to help patients control their risk factors and a nurse-led programme may be the most effective method to achieve this goal (McPherson *et al.*, 2002:544-54).

A single strategy has few benefits, but if the above strategies, key issues and different roles were combined and coordinated by an expert nurse practitioner, they could facilitate and motivate behavioural change in limiting cardiovascular risk factors.

In support of the above, a model by Joubert (2005) suggests a holistic approach to risk management for the prevention of cardiovascular disease, with the nurse playing a cardinal role in both primary and secondary risk management and the prevention of cardiovascular disease. Nurses' involvement in both primary and secondary prevention and risk management has also been validated by Campbell *et al.* (1998:447-51) who investigated secondary prevention of CHD in a nurse-led primary healthcare clinic. The specialist nurse coordinated prevention strategies in this study.

All health-related components of secondary prevention, such as blood pressure and lipid management, improved. Behavioural change had considerable benefits to patients with cardiovascular disease in this study and significant improvements were made to their physical activity and dietary habits. According to Campbell *et al.* (1998:450), secondary risk management and prevention in a nurse-led clinic can have the same effect as an age reduction of seventeen years.

Nurses involved in cardiovascular health promotion and risk prevention have to be very knowledgeable and skilful. The nurse's knowledge of the patient's condition, and whether or not the patient perceives his/her illness as serious, influences the patient's perception of the nurse as a professional, knowledgeable and safe practitioner. The researcher would suggest that the clinical nurse intending to specialise in cardiovascular health promotion and risk prevention should obtain knowledge of and working experience in cardiac care in general and be trained as a critical care nurse specialist in order to be able to successfully fulfil this facet of the role.

In a study by Allison *et al.* (2000:134,136), the efficiency of a nurse-led assessment and risk management programme for patients with unstable angina was evaluated by comparing the results of the programme to those obtained when care was given by physicians as usual (this included only a follow-up visit). The nurse-led assessment and management programme included the evaluation and management of risk factors such as diabetes, smoking, hyperlipidaemia, hypertension, a sedentary lifestyle, obesity, psychological distress and social isolation. Intervention strategies included instituting pharmacological lipid management, appropriate referrals, exercise programmes, dietary guidelines and smoking

cessation. Any abnormalities were reported to the patient's primary care physician and further evaluation or therapy was requested. Patients managed by a nurse interventionist had significant improvements in cardiovascular outcomes.

In educative-developmental nursing care, the patient has the primary responsibility for personal health, with the nurse functioning in a consultative capacity, promoting health and well-being. This broadened perspective on adding value to healthcare through educative-developmental nursing is becoming the state of the art (Pender, 1996:3,10).

5.6 REFLECTION ON THE STUDY

As critical care nurse and educator, the researcher personally felt as if she were embarking on terrain outside her field of critical care nursing and technology. But after numerous clinical accompaniment sessions with students in the cardiac critical care unit, the question of which preventative strategies could be followed to assist patients to manage modifiable cardiovascular risks was raised. The researcher then realised that risk management is an integral part of critical care nursing. It is often only visible in the cardiac rehabilitation phase or secondary prevention and management of cardiac risk factors. The knowledgeable nurse can guide the high-risk patient in becoming a low-cost patient, by encouraging him/her to embark on a well facilitated primary risk management programme and take responsibility for his/her own risk reduction. The researcher found in this study that the role of the nurse can be changed, improved and expanded in several areas of cardiovascular risk management.

In the South African context, the professional nurse should think in broader terms than the traditional role that has dictated his/her functionality and actions for many years. This transition may require a paradigm shift from a traditionally-based orientation of nursing management only, which focuses on specialised knowledge and analytic skills, to becoming transformational leaders that are global, 'out-of-the-box' thinkers, and are culturally literate and innovative, especially in the changing South African context. While remaining within the scope of practice, he/she has a responsibility to deliver a more comprehensive service in a country which is becoming depleted of professional nurses. In order to compensate for this increasing scarcity of professional nurses in South Africa, the roles and functions of nurses could be combined within the health risk management arena. For example, the role of the nurse in cardiovascular risk management can be amalgamated with those in HIV/AIDS and chronic disease management.

Adopting this new role can make the knowledgeable professional nurse a more independent practitioner. Benchmarking risk factors, especially the emerging cardiovascular risk factors and their management globally, opened up a window to the researcher in the field of cardiovascular risk management efficacy which she will pursue.

5.7 CONCLUSION

In 1997, the American Hospital Association launched a national cardiovascular health improvement fellowship (Halm & Denker, 2003:101-2) with the aim to improve the health of all the communities across the country, as mirrored in the successful Healthy Communities Fellowship. A clinical nurse specialist participated as a cardiovascular fellow, designing a primary prevention practice innovation to reduce heart disease in women. A new set of skills was developed, making a paradigm shift from the curative to the preventative focus. This transition required a move away from being traditional management-orientated leaders (with their focus on specialised knowledge, analytic skills and conflict resolution) to becoming transformation-orientated leaders who are lateral thinkers, culturally literate, innovative, collaborative and participative, and integrators of stakeholders in cardiovascular health improvement initiatives.

The core group of stakeholders developed the mission and key goals for the primary prevention programme. The main objective of this preventative cardiology programme was to provide primary prevention as opposed to secondary prevention, thus proposing to:

- Identify women at risk for heart disease;
- Educate and counsel patients regarding well established cardiovascular risk factors (such as smoking, hypertension, hyperlipidaemia, obesity, diabetes, sedentary lifestyle, stress and oestrogen loss at menopause);
- Assist women in participating in development plans for healthy lifestyle changes;
- Offer follow-up visits at regular intervals to assess their progress in risk factor modification; and
- Monitor the outcomes of risk factor changes, such as weight reduction, smoking cessation, exercise programme involvement and essentially the success and effectiveness of the primary prevention programme.

In this study, the clinical nurse specialist collaborated with other healthcare providers within the multidisciplinary team. They combined expertise and services in assessing patients and

developing and evaluating programmes. The outcomes of the clinical nurse specialist's influence on the *patient sphere* were evident in the significant reduction in cardiovascular risk through lifestyle and medical management. In the *nursing personnel sphere*, the clinical nurse specialist enabled staff to utilise knowledge obtained to educate patients regarding the importance of cardiovascular risk modification. In the *organisation/network sphere*, the clinical nurse specialist was able to implement a primary prevention programme with a common vision and readily identifiable practice outcomes (Halm & Denker, 2003:109).

A cardiovascular risk reduction and management programme can be designed as a best-practice model of care, in that it reflects state-of-the-art cardiovascular risk reduction outcomes. As Karen Forbes (1992, cited by Halm & Denker, 2003:109) stated in an editorial, ***“although advanced practice nurses are taught to care for ill patients, they must strongly work to prevent people from becoming ill in the first place”***. By using their expertise and specialist knowledge, and in partnership with other members of the multidisciplinary team, clinical nurse specialists can affect healthcare outcomes across the care continuum, from prevention to diagnosis and disease management. The ability to influence is the hallmark of effective clinical nurse specialist practice and is directly related to core competencies, professional attributes and skills in the realms of leadership, collaboration and consultation (Halm & Denker, 2003:109).

Based on the results of this study, similar considerations apply in the South African context regarding the clinical nurse specialist in the field of risk and health management. Pointers of concern are the escalating in-hospital and medical costs across the board in healthcare. As mentioned in Chapter 1, the smaller portion of the population of enrollees (15%) requires up to 85 per cent of the available money for healthcare services. By the correct use of the clinical nurse specialist within cardiovascular risk management, the high-risk patient can become a low-cost entity and thus reduce the 85 per cent of healthcare costs incurred by high-risk-high-cost patients. Health services nationally will benefit enormously from this preventative strategy. The unique role of the nurse as clinical nurse specialist, and in particular, as facilitator of a cardiovascular risk management programme, would be of great benefit to the nursing profession and to the South African healthcare system in general.

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ANNEXURE A

**LETTER OF APPROVAL FROM TWG HEALTH RISK
MANAGEMENT**



TWG HEALTH RISK MANAGEMENT

Reg No : 2003/009100/07

6 January 2005

Dear Ms Sypkens,

Your request to conduct research in TWG Health Risk Management (Pty) Ltd towards obtaining your Master's degree, pertains.

It is quite possible for you to conduct your research in our company and we will assist you in any possible way that we can to support you in obtaining data required for your project, as well as the integration thereof in your study..

You may have access to our database with the understanding that:

1. all information dealt with and accumulated by you during the period of your research will be strictly confidential,
2. the data used for your research project remains the property of TWG Health Risk Management;
3. individual persons participating in the project will do so at their own free will and that it is your responsibility to ascertain that they be fully informed on the extent and purpose of your research,
4. the research project will not require or include any personal details of the individual participants and TWG will remain the sole facilitating entity in st acquiring such information.

I look forward to assisting you in your academic endeavours.

Kind Regards,

Dr. Jacqui Joubert
Chief Operations Officer

**ANNEXURE B PARTICIPANT INFORMATION LETTER AND
INFORMED CONSENT**

PARTICIPANT INFORMATION LETTER AND INFORMED CONSENT

TITLE: THE ROLE OF THE NURSE IN A CARDIOVASCULAR RISK MANAGEMENT PROGRAMME

INTRODUCTION

You are invited to volunteer for this research study. This information letter is to help you decide if you would like to participate. You should fully understand what is involved in this study. If you have any questions, which are not fully explained, do not hesitate to ask the researcher.

WHAT ARE THE AIM AND OBJECTIVES OF THE STUDY?

The *aim* of this study is to explore the role of the nurse in cardiovascular risk management programmes and to describe how this role can be extended in order to make optimal use of them in such programmes. The *objectives are* to conduct an extensive literature review of cardiovascular health risk management in order to analyse the role the nurse could fulfil in a health risk management programme, to explore the role of the nurses currently involved in cardiovascular health risk management and to make recommendations for changes to, and improvements in and expansion of, the role of the nurse in such a programme.

WHAT IS EXPECTED OF ME DURING THIS STUDY?

You will be requested to take part in a semi-structured interview, which should take between twenty to forty minutes. The interview will be tape-recorded and the data processed and analysed. Your contribution to this study will be kept confidential and you will remain anonymous.

HAS THE STUDY RECEIVED ETHICAL APPROVAL?

The study protocol was submitted to the Research Ethics Committee of the University of Pretoria, Faculty of Health Sciences, and has been accepted.

WHAT ARE MY RIGHTS AS A PARTICIPANT IN THIS STUDY?

Your participation in this study is entirely voluntary and you can refuse to participate or withdraw at any time without stating any reason.

SOURCE OF ADDITIONAL INFORMATION

If you have any questions during the study, please do not hesitate to approach the researcher.

RESEARCHER: Ms WD Sypkens: 082 554 8620

SUPERVISOR: Dr ADH Botha: 082 821 7148

CONFIDENTIALITY

All information obtained during the course of this study will be strictly confidential. Data that may be reported in scientific journals will not include any information that can identify you or your employer as a participant in this study.

INFORMED CONSENT

I hereby confirm that the researcher, Ms WD Sypkens, has informed me about the nature and scope of this study. I have received and read, and understand, the above participant information letter and the informed consent document regarding the study.

I am aware that the results of the study, including personal details like gender, will be processed **anonymously** into a study report.

I may, at any stage, without prejudice, withdraw my consent and participation in the study. I have had sufficient opportunity to ask questions and am willing to participate in the study.

Participant's Name: (Please Print)

Participant's Signature: Date

I, Ms WD Sypkens, herewith confirm that the above participant has been fully informed about the nature and course of this study, and the risks involved.

Researcher's Name: (Please Print)

Researcher's Signature Date

Witness's Name: (Please Print)

Witness's Signature: Date



ANNEXURE C

PROBING QUESTIONS

PROBING QUESTIONS USED IN THIS STUDY

Probing questions used in this study were as follows:

- In your opinion, what are the most important attributes (behaviours) that the professional nurse should display when initially interacting with a patient in a risk management programme?
- What skills and knowledge do you believe are vital for a nurse to have in a risk management programme in general?
- Should a cardiovascular risk management programme form part of a general risk management programme, would it make a difference?
- From your own experience, what do you perceive to be the role of the professional nurse in a cardiovascular risk management programme?
- What type of lifestyle counselling or risk reduction strategies do you employ in general in risk management programmes?
- What type of lifestyle counselling or risk reduction strategies would you employ for a cardiovascular risk programme specifically?
- What patient education do you provide when consulting individuals regarding cardiovascular risk management?
- Under which circumstances do you consider it important to refer patients to other members of the multidisciplinary team?
- Is there any expertise of the multidisciplinary team that you involve in your cardiovascular risk management programme?
- Describe the process that you utilise to follow-up on a patient's adherence to the cardiovascular risk management programme.
- How would you develop a new cardiovascular management/risk reduction programme? What do you think should be included in such a programme?

ANNEXURE D

**TRANSCRIBED UNSTRUCTURED GUIDED
INTERVIEW**

TRANSCRIBED UNSTRUCTURED GUIDED INTERVIEW

PARTICIPANT A

1. In your opinion, what are the most important attributes (behaviours) that the professional nurse should display when initially interacting with a patient in a risk management programme?

To be comfortable with patient, friendly, helpful and to share your knowledge with them

2. What skills and knowledge do you believe are vital for a nurse to have in a risk management programme in general?

You have to openly share your knowledge on the level of the patient. The nurse must be qualified in the basics of educating and transferring knowledge to the patient, you know, to let him see it as an experience.

3. Should a cardiovascular risk management programme form part of a general risk management programme, would it make a difference?

Yes, specialised knowledge is needed. If you cannot answer the patient, ask the specialist.

4. *From your own experience, what do you perceive to be the role of the professional nurse in a cardiovascular risk management programme?*

She is mainly the person who works (with) and explains things to the patient. She coordinates everything.....other just play some part or role and the doctor also talks too "high" for the patient.

5. *What type of lifestyle counselling or risk reduction strategies do you employ in general in risk management programmes?*

Well, certain lifestyle changes are necessary, such as smoking (cessation), exercise and a balanced diet....a diet low in fats.

6. *What type of lifestyle counselling or risk reduction strategies would you employ for a cardiovascular risk programme specifically?*

Well, all the basic ones that I mentioned just now as well as cholesterol, blood pressure, diabetes mellitus and all his risk factors.

7. *What patient education do you provide when consulting individuals regarding cardiovascular risk management?*

A background anatomy and the risk factorsand why they have led to the diagnosis as seen by the tests. Then lifestyle and future planning of follow-up visits, such as blood pressure, exercise programmes, so that the patient can become independent.....I wean him from rehab'.....

8. *Under which circumstances do you consider it important to refer patients to other members of the multidisciplinary team?*

If they smoke we can refer them to their general practitioner for meds or a “stop smoking “ group. Overweight people, I refer to the dietician if there is something specific to handle.

9. *Is there any expertise of the multidisciplinary team that you involve in your cardiovascular risk management programme?*

Yes, the dietician, doctors, psychologist....even if we don't have a psychologist involved full-time here.....I do the stress management myself when necessary. We don't refer patients to people outside the rehab unit.

10. *Describe the process that you utilise to follow-up on a patient's adherence to the cardiovascular risk management programme?*

I don't have a specific process, but the patients have a weekly appointment on a group basis....the patients support each other as a group.....you know, like group cohesion. The nurse is the coordinator.

11. *How would you develop a new cardiovascular management/risk reduction programme? What do you think should be included in such a programme?*

To control progress, follow-up appointments... Other tests that can be done to monitor the patient are cholesterol, diabetes mellitus and blood pressure tests.....an ECG machine will be nice to have. Also determining if the patient is overweight and how fit the person is. Emotional aspect is very important for me ... for the patient to have an open platform, to ask questions and get information and to specifically find out from patients how they are doing or coping.

ANNEXURE E

ADDENDUM TO TABLE 5.1

ADDENDUM TO TABLE 5.1: AREAS FOR CHANGE, IMPROVEMENT OR EXPANSION OF THE ROLE OF THE NURSE

	NURSING ROLES IDENTIFIED FROM THE LITERATURE STUDY (PHASE 1 OF STUDY)	DATA FROM PHASE 2 OF STUDY	AREAS FOR CHANGE, IMPROVEMENT OR EXPANSION OF THE ROLE OF THE NURSE
RISK FACTOR (TOPIC) DISCUSSED	SPECIFIC NURSING ROLES IDENTIFIED		
MODIFIABLE CARDIOVASCULAR RISK FACTORS			
Dyslipidaemia	Monitoring of blood lipid level and specific recommendations for accuracy of lipid measurement	Cholesterol monitoring and control tests are briefly addressed in section: <i>4.3.3.3 Role of the nurse in risk reduction strategies (lifestyle changes and counselling):</i> (subcategory: Cholesterol control); and <i>4.3.3.5 Follow-up and monitoring role</i> (subcategories: Control process – Monitor cholesterol; Follow-up: Follow-up with doctor and Progress and improvement or deterioration).	Specific goals (benchmarked against the recommended levels) need to be set for the patient to reach and maintain recommended lipid levels: Total cholesterol level <5 mmol/L LDL <3.4 mmol/L HDL >1.2 mmol/L Triglycerides <1.5 mmol/L

	Assessment of the individual's current dietary pattern	Not discussed or mentioned in relation to the management of dyslipidaemia	Assessment of the patient's dietary pattern in order to intervene successfully and motivate him/her to adopt a healthier lifestyle
	Dietary recommendations	Briefly mentioned in section: 4.3.3.2 <i>Patient education</i> (subcategory: Providing information on general and cardiovascular risk factors: Cholesterol control); and 4.3.3.3 <i>Role of the nurse in risk reduction strategies (lifestyle changes and counselling)</i> : (subcategory: Nutrition)	Recommendations regarding diet and nutritional composition, including: reduction in fat intake (<30% of calorie intake), carbohydrate and protein adaptations and increased consumption of fruit, vegetables and fibre

	<p>Knowledge and behaviour skills concerning dietary modifications</p>	<p>Not addressed</p>	<p>Educational strategies should be aimed at helping the patient learn skills and internalise knowledge with a view to effect dietary changes. Involvement of the multidisciplinary team expert, e.g. dietician and/or psychologist</p>
	<p>Weight reduction through:</p> <ul style="list-style-type: none"> ➤ Increased physical activity ➤ Dietary modifications ➤ Behavioural change 	<p>Weight reduction not addressed as management strategy for dyslipidaemia per se Regular exercise was advised/mentioned in section: 4.3.3.2 <i>Patient education</i> (sub-categories: Cholesterol control; Information regarding warning signs of disease episodes); and 4.3.3.6 <i>Ensuring a dynamic programme</i> (subcategory: Family support/involvement).</p>	<p>A specific weight reduction programme needs to be incorporated into risk management where necessary. All three dimensions mentioned in the literature study should be included (see second column). Weight reduction strategies are discussed in detail under the management of obesity.</p>

	Pharmacological management	Not addressed	Nurses should advise the patient regarding pharmacotherapy (lipid reducing drugs and their side effects)
Cigarette smoking	<p>Initiate smoking cessation through behavioural modifications</p> <p>Definite smoking cessation guidelines and an intervention programme were discussed.</p> <p><i>A Clinical Practice Guideline was suggested to aid patients to prevent relapse.</i></p>	<p>Smoking cessation was briefly addressed in section:</p> <p>4.3.3.2 <i>Patient education</i> (subcategory: Providing information on general and cardiovascular risk factors: Smoking cessation)</p> <p>[No definite behavioural modifications, guidelines or smoking cessation programmes were elicited.]</p> <p>4.3.3.3 <i>The role of the nurse in risk reduction strategies (lifestyle changes and counselling)</i>: (subcategory: Smoking cessation)</p> <p>4.3.3.4 <i>Multidisciplinary team interactions</i> (subcategory: Refer to</p>	<p>Nurses should be trained in counselling and in applying behavioural modification guidelines so as to effect smoking cessation.</p> <p>Involvement of the multi-disciplinary team members, e.g. general practitioner and or psychologist</p>

		general practitioner and/or cardiologist)	
Hypertension	Risk management in collaboration with the multidisciplinary team	Risk management and the involvement of members of the multidisciplinary team were not addressed.	Risks should be managed in collaboration with the multidisciplinary team by advocating: <ul style="list-style-type: none"> ✓ Adequate exercises ✓ Weight loss ✓ Alcohol reduction ✓ Dietary adaptations

	<p>Comprehensive assessment of hypertension:</p> <ul style="list-style-type: none"> ▪ Blood pressure assessment ▪ History taking ▪ Physical examination ▪ Urine analysis ▪ Biochemistry ▪ 12-lead ECG 	<p>Only regular blood pressure assessment was briefly addressed in section:</p> <p>4.3.3.2 <i>Patient education</i> (sub-categories: Providing information on warning signs of disease episodes; Providing information on general and cardiovascular risk factors: Blood pressure control)</p> <p>4.3.3.3 <i>The role of the nurse in risk reduction strategies (lifestyle changes and counselling)</i>: (sub-category: Blood pressure control)</p> <p>4.3.3.5 <i>Follow-up and monitoring role</i> (subcategories: Control process: Monitor blood pressure; Follow-up: Follow-up with doctor and Progress and improvement or deterioration)</p>	<p>Comprehensive assessment of the patient with hypertension should include:</p> <ul style="list-style-type: none"> ✓ History taking ✓ Physical examination and interpretation of findings ✓ Accurate assessment of blood pressure ✓ Urine analysis and interpretation ✓ Biochemistry and interpretation ✓ 12-lead ECG and interpretation
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	<p>Patient education regarding all aspects of hypertension management, including</p> <ul style="list-style-type: none"> ▪ Lifestyle modification/stress management ▪ Physical activity ▪ Smoking cessation ▪ Reducing alcohol intake ▪ Dietary modifications ▪ Adherence to treatment regimen ▪ Anti-hypertensive drug therapy 	<p>Not addressed</p>	<p>Nurses should receive training to be able to educate the patient regarding:</p> <ul style="list-style-type: none"> ✓ Stress management and lifestyle changes that impact on hypertension ✓ Physical activity and exercise programmes that reduce hypertension ✓ Smoking cessation ✓ Avoiding/reducing alcohol intake ✓ Dietary modifications aimed at weight loss and sodium restriction to reduce high blood pressure ✓ Adherence to treatment regimens, especially anti-hypertensive pharmacotherapy.
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Overweight and obesity	Baseline assessment	Not addressed	Comprehensive baseline assessment, including BMI, waist circumference, cardiovascular risk profile and an assessment of the non-cardiovascular conditions.
	Determining overweight/obese patient's absolute risk	Not addressed	Determine the overweight/obese patient's absolute risk according to the Framingham calculation.
	Determining the relative risk	Not addressed	Determine the relative risk based on being overweight/obese and abdominal obesity criteria.

	<p>Assisting the patient to achieve a healthy body mass by gradual weight reduction through:</p> <ul style="list-style-type: none"> ✓ Physical exercise and activity ✓ Dietary adaptations ✓ Behavioural change and strategies 	<p>Weight reduction briefly addressed in section:</p> <p>4.3.3.2 <i>Patient education</i> (subcategory: Providing information on general and cardiovascular risk factors: Exercise, Nutrition/diet & Weight reduction)</p> <p>4.3.3.3 <i>The role of the nurse in risk reduction strategies</i> (subcategory: Weight reduction)</p> <p>4.3.3.4 <i>Multidisciplinary team interactions</i> (subcategory: Refer patients to other members of the multidisciplinary team: Dietician; Physical trainer/biokineticist/physiotherapist)</p> <p>4.3.3.5 <i>Follow-up and monitoring role</i> (Monitor overweight/diet/healthy eating/exercise; Monitors adaptation to lifestyle changes; Progress and improvement or deterioration)</p> <p>4.3.3.6. <i>Ensuring a dynamic program</i> (sub-category- Involvement of professional team)</p>	<p>Nurses should assist patients in achieving:</p> <ul style="list-style-type: none"> ✓ A healthy body mass striving for a BMI <25 kg/m² and a waist circumference < 94 cm (men) and <80 cm (women) ✓ Gradual weight reduction (0.5 -1 kg/week) by: <ul style="list-style-type: none"> ▪ Counselling patients in behavioural change and strategies ▪ Involving members of the multidisciplinary team, e.g. dietician and/or psychologist ▪ Giving dietary advice on: <ul style="list-style-type: none"> ➢ Calorie intake ➢ Reduction in fat intake ➢ Carbohydrate modifications ➢ Consumption of fruit, vegetables and fibre ▪ Promoting regular exercises (20-30 min 5 times a week)
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	Pharmacotherapy	Not addressed	Nurses should explain the value of pharmacotherapy (use of anti-obesity agents) in conjunction with lifestyle modification. This should be limited to patients with a BMI >30 kg/m ² and in whom co-morbidities are absent.
Hyperglycaemia/Diabetes mellitus	Glycaemic control and diet	<p>Briefly addressed in section:</p> <p>4.3.3.3 <i>The role of the nurse in risk reduction strategies (lifestyle changes and counselling)</i>: (sub-category: Glycaemic control)</p> <p>4.3.3.6 <i>Ensuring a dynamic programme</i> (subcategory: Family support/ involvement)</p>	<p>Glycaemic control and diet:</p> <ul style="list-style-type: none"> ◆ Glycaemic control: HbA_{1c} < 7% ◆ Ensure a fasting blood glucose < 6.5 mmol/L ◆ Hypoglycaemic therapy (oral agents/insulin) ◆ Exercise programme to support glycaemic control ◆ Involvement of the multidisciplinary team, e.g. dietician, physical trainer, doctor

	<p>Weight control:</p> <ul style="list-style-type: none"> ✓ Diet ✓ Regular exercise 	<p>Briefly addressed in section:</p> <p>4.3.3.3 <i>The role of the nurse in risk reduction strategies (lifestyle changes and counselling):</i> (subcategories: Drinking/alcohol use; Glycaemic control)</p>	<p>Weight control should be aimed at achieving a BMI < 25 kg/m² and a waist circumference of <94 cm (men) and <80 cm (women). The following three aspects are important:</p> <ul style="list-style-type: none"> ➤ Diet <ul style="list-style-type: none"> ✓ Low intake of saturated fat: <30% of calories ✓ Low calorie diet ✓ Decreased alcohol intake ➤ Regular exercises <ul style="list-style-type: none"> ✓ 30 min of aerobic exercises 4-5 times per week ➤ Involvement of the multidisciplinary team, e.g. dietician, physical trainer, doctor
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	<p>Lipid control and exercise</p>	<p>Briefly addressed in section: 4.3.3.5 <i>Follow-up and monitoring role</i> (subcategory: Control process: Monitor diabetes mellitus/glycaemic control /insulin resistance)</p>	<p>Lipid control to achieve desired blood values:</p> <ul style="list-style-type: none"> ➤ Total s-cholesterol < 5 mmol/L ➤ S-triglyceride < 2.3 mmol/L ➤ LDL-C < 3 mmol/L ➤ HDL-C > 0.9 mmol/L <p>Lipid control via the following interventions:</p> <ul style="list-style-type: none"> ➤ Diet <ul style="list-style-type: none"> ✓ Low intake of saturated fat: <30% of calories ➤ Regular exercise <ul style="list-style-type: none"> ✓ 30 min of aerobic exercises 4-5 times per week ➤ Hypolipidaemic therapy: statins
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	Blood pressure control	Not addressed in relation to hyperglycaemia or diabetes mellitus	<p>Blood pressure control:</p> <ul style="list-style-type: none"> - BP <130/80 mmHg - Antihypertensive therapy e.g. ACE inhibitor, beta-blocker, aspirin
	Foot care and neurological assessment	Not addressed	<p>Foot care and neurological assessment:</p> <ul style="list-style-type: none"> - Vascular, neurological, musculoskeletal, skin and soft tissue foot screening - Patient education regarding foot care

	<p>Summary of important lifestyle interventions for diabetics: "Do's and Don'ts" for diabetics</p>	<p>Briefly addressed in section: 4.3.3.3 <i>The role of the nurse in risk reduction strategies (lifestyle changes and counselling):</i> (subcategory: Medication/ treatment regimen compliance) 4.3.3.5 <i>Follow-up and monitoring role</i> (subcategories: Control process: Monitor diabetes mellitus/glycaemic control/insulin resistance; Monitors adaptation to lifestyle changes; Follow-up: Progress and improvement or deterioration)</p>	<p>Other important interventions:</p> <ul style="list-style-type: none"> - Smoking cessation - Patient education regarding: <ul style="list-style-type: none"> ✓ Regular blood glucose measurement/control ✓ Regular follow-up ✓ Hypoglycaemic therapy (oral agents/insulin) ✓ Adherence to glycaemic control guidelines/ programme
<p>Physical inactivity and lack of exercise</p>	<p>Physical fitness programme according to the "FITT" principle of 30 min or more, five days a week. Physical fitness programme, including: ✓ Warm-up period ✓ Cool-down period ✓ Barriers to regular exercise</p>	<p>Briefly addressed in section: 4.3.3.2 <i>Patient education</i> (subcategories: Providing information on general and cardiovascular risk factors: Exercise, Cholesterol control, Stress management; Providing information on warning signs of disease episodes)</p>	<p>Physical fitness programme according to the "FITT" principle (exercising 30 min or more five days a week), including a: ✓ Warm-up period: important for cardiac patients ✓ Cool-down period: important for cardiac patients</p>

	<p>4.3.3.3 <i>The role of the nurse in risk reduction strategies (lifestyle changes and counselling):</i> (subcategories: Physical activity/exercise; Medication/treatment regimen compliance)</p> <p>4.3.3.4 <i>Multidisciplinary team interactions</i> (subcategory: Refer patients to other members of the multidisciplinary team: Physical trainer/biokineticist/physiotherapist)</p> <p>4.3.3.5 <i>Follow-up and monitoring role</i> (subcategory: Control process: Monitor overweight/diet/ healthy eating/exercise)</p> <p>4.3.3.6 <i>Ensuring a dynamic programme</i> (subcategories: Family support/involvement; Involvement of professional team members)</p>	<p>Training to identify and minimise the barriers to regular exercise.</p> <p>Involvement of the multidisciplinary team, e.g. physical trainer, biokineticist</p>
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Psychological risk factors (listed below)	Assessment and identification of adverse effects of psychological risk factors	Not addressed	Nurses should be able to identify and assess patients with psychological risks displaying adverse manifestations, including: <ul style="list-style-type: none"> ➤ Physical symptoms ➤ Psycho-emotional symptoms ➤ Cognitive symptoms ➤ Behavioural manifestations
	Generic psychological risk factor reduction interventions Madan & Froelicher's psychological risk factor reduction interventions: <ul style="list-style-type: none"> ◆ Self-monitoring of negative reactions ◆ Decreasing psychological arousal 	Psychological risk factors not individually identified or addressed. Stress management briefly addressed in section: <p>4.3.3.2 <i>Patient education</i> (subcategory: Providing information on general and cardiovascular risk factors: Stress management)</p> <p>4.3.3.3 <i>The role of the nurse in risk</i></p>	<ul style="list-style-type: none"> ◆ Nurses should acquire knowledge and skills that would enable them to educate and motivate patients, and facilitate interventions. Knowledge/skills should be gained through learning or experience of: <ul style="list-style-type: none"> ✓ The motivation to change/modify behaviour

<ul style="list-style-type: none"> • Depression 	<p>Motivate patient to increase socialisation</p>	<p><i>reduction strategies (lifestyle changes and counselling):</i></p>	<ul style="list-style-type: none"> ✓ Behavioural change strategies
<ul style="list-style-type: none"> • Anxiety, hysteric or panic disorder 	<p>Motivate patient to increase involvement in activities</p>	<p>(subcategories: Stress management; Ensuring rest; Drinking/alcohol use; Physical activity/exercise; Spiritual considerations)</p>	<ul style="list-style-type: none"> - Health Belief Model - Stage of Change - Social cognitive theory - “Behaviour-intention” gap - Problem-solving skill
<ul style="list-style-type: none"> • Hostility, anger and Type A personality behaviour 	<p>Assist patient to:</p> <ul style="list-style-type: none"> ➤ Recognise internal hostility/anger; ➤ Be introspective and understand the effect of hostility/anger on body systems; ➤ Adopt acceptable expressions of feelings and behaviour; and ➤ Make use of appropriate interpersonal skills. <p>Emphasise benefits of exercising, relaxation training, and stress management</p>	<p>4.3.3.4 <i>Multidisciplinary team interactions</i> (subcategory: Liaise with patients, families, doctor and members of the multidisciplinary team; Refer to other members of the multidisciplinary team: Psychologist and stress management professionals; Professional for spiritual guidance; Physical trainer/biokineticist/physiotherapist; Occupational therapist; Social worker)</p>	<ul style="list-style-type: none"> ◆ Training is suggested in: <ul style="list-style-type: none"> ➤ Counselling ➤ Relaxation techniques ➤ Stress management techniques ➤ General stress management, including: <ul style="list-style-type: none"> ✓ Regular exercise (20-30 min/day 4-5 days/week) ✓ Maintenance of ideal body mass

<ul style="list-style-type: none"> • Lack of social support and resultant isolation 	<p>Encourage social interaction:</p> <ul style="list-style-type: none"> - Cardiac rehabilitation programme - Risk prevention clubs, e.g. smoking cessation club - Inclusion of family/friends/colleagues 	<p>4.3.3.5 <i>Follow-up and monitoring role</i> (subcategories: Monitors adaptation to lifestyle changes;</p>	
<ul style="list-style-type: none"> • Life events that make an acute impact 		<p>Follow-up: Follow-up with employer, Progress and improvement or deterioration, Monitoring emotional progress of patient; Patient independence)</p>	
<ul style="list-style-type: none"> • Psychosocial work features 		<p>4.3.3.6 <i>Ensuring a dynamic programme</i> (subcategories: Family support/involvement; Involvement of employer; Involvement of professional team members)</p>	<ul style="list-style-type: none"> ✓ Promoting a nutritious diet ✓ Managing cardiovascular risk factors ✓ Reducing excessive caffeine and alcohol consumption ✓ Balancing work, social and family life ✓ Sleep restoration <p>◆ The involvement of the following multidisciplinary team members is suggested:</p> <ul style="list-style-type: none"> ➤ Psychologist ➤ Physical trainer ➤ Doctor ➤ Social worker

<p>Excess intake of substances, e.g. alcohol, medications, drugs</p>	<ul style="list-style-type: none"> ◆ Comprehensive assessment of substance consumption ◆ Explanation of adverse effects on cardiovascular system ◆ Referrals to health professional or institution for appropriate management 	<p>Briefly discussed in section:</p> <p>4.3.3.2 <i>Patient education</i> (subcategory: Providing information on general and cardiovascular risk factors: Smoking cessation)</p> <p>4.3.3.3 <i>The role of the nurse in risk reduction strategies (lifestyle changes and counselling)</i>: (subcategories: Smoking cessation; Drinking/alcohol use)</p> <p>4.3.3.4 <i>Multidisciplinary team interactions</i> (subcategory: Refer to general practitioner and/or cardiologist)</p> <p>4.3.3.5 <i>Follow-up and monitoring role</i> (subcategory: Monitoring in order to refer to doctor)</p>	<ul style="list-style-type: none"> ◆ Nurses should be trained to assess substance consumption. ◆ They should know the adverse effects of excess consumption on the cardiovascular system and be able to describe these to patients. ◆ Nurses should know when to involve the multidisciplinary team, e.g. psychologist, social worker, doctor, occupational therapist, spiritual guidance professional. ◆ Nurses should know when to refer a patient to a health professional or an institution for appropriate management.
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Left ventricular hypertrophy	<ul style="list-style-type: none"> ✓ Early detection by means of diagnostic assessment ✓ Hypertension control ✓ Assessment for other cardiovascular risk factors 	Not addressed	<ul style="list-style-type: none"> ◆ Early detection by means of chest radiography, ECG and ambulatory blood pressure monitoring ◆ Hypertension control: ACE inhibitors ◆ Assessment for other cardiovascular risk factors impacting on ventricular remodelling, e.g. diabetes and obesity
EMERGING CARDIOVASCULAR RISK FACTORS			
Microalbuminuria	<p>Determine S-albumin in patient with hypertension or diabetes mellitus: > 45 g/L = microalbuminuria</p> <p>Proven benefits of following therapy:</p> <ul style="list-style-type: none"> ◆ ACE inhibitors ◆ Angiotensin 11 receptor antagonists 	Not addressed	<ul style="list-style-type: none"> ◆ Monitor S-albumin: < 45 g/L ◆ Assess correlating cardiovascular risk factors: <ul style="list-style-type: none"> ✓ Increased C-reactive protein ✓ Hypertension ✓ Hyperglycaemia ✓ Low HDL-C ✓ Metabolic syndrome ✓ Left ventricular

			hypertrophy ✓ Smoking ♦ Implement risk reduction strategies to minimise effects of correlating cardiovascular risk factors if present
C-reactive protein	Nurses are advised to assess C-reactive protein levels in patients presenting with co-morbid cardiovascular risk factors.	Not addressed	Encourage patient to: ✓ Stop smoking ✓ Maintain glycaemic control ✓ Exercise ✓ Adhere to statin therapy (if dyslipidaemia is present)
Fibrinogen	Low dose aspirin reduces increased levels of fibrinogen.	Not addressed	<ul style="list-style-type: none"> • Nurses should monitor fibrinogen levels in patients who present with multiple cardiovascular risks or in high-risk patients. • Nurses should involve the general practitioner who could prescribe a low dose aspirin daily

<p>Hyperhomocysteinuria</p>	<ul style="list-style-type: none"> • Elevated homocysteine is treated with folic acid and oral vitamin supplements. • Increased dietary consumption of foliate and Vitamin B₆ should be encouraged. 	<p>Not addressed</p>	<ul style="list-style-type: none"> • Homocysteine levels should be monitored if risk factors such as smoking, hypertension or hyperlipidaemia are present. • Accurate sample collection is important. • Treatment includes: <ul style="list-style-type: none"> ✓ Folic acid (400 mg) ✓ Vitamin B₆ (50 mg) ✓ Vitamin B₁₂ (50 mg) ✓ Antioxidants: Vitamin E (320 mg) • Increased dietary consumption of foliate and Vitamin B₆ should be encouraged.
<p>Hyper-Lp(a)</p>	<p>Monitor hyper-Lp(a) if other dyslipidaemic risk factors are present.</p>	<p>Not addressed</p>	<p>Monitor hyper-Lp(a) [Lp(a) > 30 g/L] if the following are present:</p> <ul style="list-style-type: none"> ➤ Severe hypercholesterolaemia; ➤ Dyslipidaemia,

			<p>especially where LDL-C is elevated; or</p> <ul style="list-style-type: none"> ➤ Familial hyperlipidaemia. <p>Manage dyslipidaemia as discussed above.</p>
Hypertriglyceridaemia	<p>Triglyceride concentration in blood should be reduced.</p> <p>Follow guidelines on managing dyslipidaemia and encourage additional consumption of:</p> <ul style="list-style-type: none"> ✓ Omega 3 & 6 fatty acids ✓ Raw vegetables, fruit and fibre 	Not addressed	<p>Triglyceride concentration should be reduced to <1.5 mmol/L.</p> <p>Nurses should follow guidelines on managing dyslipidaemia (discussed above) and encourage increased consumption of:</p> <ul style="list-style-type: none"> ✓ Omega 3 & 6 fatty acids ✓ Raw vegetables, fruit and fibre <p>S-triglyceride should be regularly monitored.</p>
Renin	<ul style="list-style-type: none"> ✓ If CHD is present, therapeutic prevention includes the use of ACE inhibitors. ✓ Monitoring of haemodynamic status 	Not addressed	<ul style="list-style-type: none"> ✓ If CHD is present, prevention includes the use of ACE inhibitors. ✓ Monitoring of haemodynamic status

<p>Uricaemia</p>	<p>Monitor uric acid levels in patient if other cardiovascular risk factors are present.</p> <p>History taking should include a comprehensive history of increased uric acid levels.</p>	<p>Not addressed</p>	<p>Monitor uric acid levels if the following conditions are present:</p> <ul style="list-style-type: none"> • Elevated triglyceride levels • Hypercholesterolaemia • BMI > 30 kg/m² • Hypertension <p>Patient history regarding increase in uric acid levels should be comprehensive.</p> <p>Involve the general practitioner.</p>
<p>Oxidative stress</p>	<ul style="list-style-type: none"> • Vitamin C and E supplementation • Dietary advice to increase antioxidant intake naturally 	<p>Not addressed</p>	<ul style="list-style-type: none"> • Vitamin E supplementation in high doses (100-400 IU/day) - beneficial to the prevention of CHD. • Dietary advice to increase antioxidant intake naturally by including the following: <ul style="list-style-type: none"> ✓ Carotenes found in carrots ✓ Pycnogenol found in grape seed ✓ Resveratrol found in the skin

			<p>of red and purple grapes</p> <ul style="list-style-type: none">✓ Lycopene found in tomatoes✓ Bioflavonoids found in the colour pigment of all fresh fruit and vegetables✓ Alpha lipoic acid found in spinach, broccoli, liver and red meat.• Increased awareness of oxidative stress in patients on haemodialysis.
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