



Review Article

Raising awareness of cardiovascular diseases: A silent killer in South Africa

Mteto Qhayiya Fihla*

Walter Sisulu University, South Africa

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*Corresponding author: Mteto Qhayiya Fihla, Walter Sisulu University, South Africa,
E-mail: mtetoqhayiya@gmail.com

ORCID: <https://orcid.org/0000-0001-5789-4349>

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Abstract

Cardiovascular Disease (CVD) is the leading cause of death in Non-Communicable Diseases (NCDs) in the Republic of South Africa (RSA), surpassing all cancers combined. It is estimated that the disease is responsible for 215 deaths daily, with a 17.3% death rate. Common risk factors for the disease include hypertension, diabetes, hypercholesterolemia, overweight and obesity, smoking, and stress. Contrary to well-known diseases like HIV/AIDS and TB, CVD does not enjoy enough publicity and attention from the population. This indicates a lack of awareness and concern for the disease among the general people, resulting in the disease being a continued burden on the healthcare system of RSA. The objective of this study was to examine the aetiology and classifications of CVD, identify cardiovascular risk factors, and explore strategies for preventing and managing the condition.

Introduction

Cardiovascular Disease (CVD) is the leading cause of morbidity and mortality worldwide, responsible for 31% (17 million) deaths globally. More than half of deaths due to CVD occur prematurely (people younger than age 65), and the number is estimated to increase by 41% before 2031 [1]. The common causes of CVD are understood to be hypertension, overweight and obesity, diabetes, high cholesterol, tobacco use, and stress [2].

In the Republic of South Africa (RSA), CVD is the leading cause of death after TB and HIV/AIDS. This disease has the highest mortality rate compared to other Non-Communicable Diseases (NCD), surpassing all types of cancers combined [3]. It is estimated that CVD accounts for 17.3% of deaths in the country, meaning that almost 1 in 6 (215 daily) deaths are due to the disease [1].

Unlike some common and well-known diseases like HIV/

AIDS, TB, and Diabetes, CVD is an insufficiently sung public health concern in the country. This translates to poor health consciousness in relation to the disease from the general population, and hence continuing to be a burden to the health services of RSA. Through proper measures and health management from members of society, the disease may be, to some extent managed. Adequate health awareness and campaigns regarding this silent killer could help in drastically reducing the rate of mortality and pressure on public health services.

This paper aims to discuss the causes and types of CVD, cardiovascular risk factors, and prevention and management of the disease.

Aetiology and types of cardiovascular disease

Cardiovascular disease is a group of disorders occurring in the cardiovascular system, which consists of the heart and blood vessels [4]. Physiologically, the function of this system is to provide adequate circulation of blood from the heart to



the rest of the body through blood vessels, on the other hand, oxygenating blood through pulmonary circulation [5].

The manifestation of CVD is diverse and is dependent on the type of CVD in question. Mainly, there are four types of CVD namely; Coronary Heart Disease (CHD); stroke; Peripheral Arterial Disease (PAD); and Aortic Disease (AD) [6].

When the major blood vessels, coronary arteries, which supply the heart are blocked or interrupted due to atheroma (accumulation of fatty substances), this condition is referred to as CHD, and a few medical conditions can occur due to this disturbance [7]. A heart attack, which is a medical emergency, results from the complete blockage of the coronary artery. Chest pains (angina) result from the narrowing of blood supply to the heart muscles by the coronary artery [8]. Other CHD CVD include ischemic cardiomyopathy, silent ischemia, and coronary artery anomalies [9].

During PAD, also referred to as peripheral vascular disease (PVD), the blockage occurs in the arteries of the limbs, and the most common cases occur in the lower limbs [10]. The common indication of PAD is pain in the legs when walking, and this can be on either one or both the thighs, hips, or calves. The discomfort may present as cramps or heavy sensation in the leg muscles, worsening during leg exercises like walking and stair climbing [11].

In AD, the largest blood vessel in the human body, the aorta, experiences disorders like hypertension or injury [12]. The most prevalent type of AD is aortic aneurysm which is caused by the weakening and outward bulging of the aorta. This is indicated by severe pain in the chest, back, or abdominal region [13]. Other disorders include aortic dissection, aortic valve disease, aortitis, Marfan syndrome, and traumatic aortic injury.

When the blood supply is cut off in the brain, stroke occurs. This condition is a serious and life-threatening medical condition that requires urgent treatment [14]. Symptoms of stroke include; total paralysis or loss of sensation on one side of the body; a sudden severe headache; difficulties in understanding or using speech; and sudden loss or blurring vision [15].

Table 1 summarises the classes of CVD, the characteristics of each class, and various cardiovascular disorders that can result from different disturbances.

Cardiovascular disease risk factors

There are many risk factors of CVD and most risk factors are linked. This simply means that the occurrence of one risk factor may influence the development of other risk factors [16]. Common risk factors of CVD include hypertension, diabetes, hypercholesterolemia, overweight and obesity, smoking, and stress [2].

The burden of hypertension is greatly felt in RSA, with approximately 8.22 million having hypertension. It is the leading cause of stroke, accounting for 13,300 incidents of stroke and 14,000 events of ischaemic heart disease [17]. Moreover,

Table 1: Classes, characteristics, and examples of cardiovascular disorders.

Class	Characteristics	Cardiovascular Disorder
Aortic Disease	Disorders affecting the aorta.	Aortic Aneurysm Aortic Dissection Aortic Valve Disease Aortitis Marfan Syndrome Traumatic Aortic Injury
Coronary Heart Disease	Disruption or blockage of blood supply to the coronary arteries.	Angina Pectoris Coronary Artery Anomalies Ischemic Cardiomyopathy Myocardial Infarction Silent Ischemia
Peripheral Arterial Disease	Blockage or obstruction of blood supply to the lower limb.	Aortoiliac Disease Buerger's Disease Critical Limb Ischemia Lower or Upper Extremity Arterial Disease Mesenteric Artery Disease Popliteal Artery Entrapment Syndrome Renal Artery Stenosis
Stroke	Disturbance or blockage of blood supply to the brain leads to the damage or death of brain cells.	Cryptogenic Stroke Haemorrhagic Stroke Ischemic Stroke Transient Ischemic Attack

the majority of people are unaware that they are hypertensive, and only a third of diagnosed people are on therapy [1].

Research shows that hypertension plays a significant role in the development of congestive heart failure, heart attacks, heart failure, and renal insufficiency [18]. The mechanical strain on the heart and blood vessels appears to be the primary cause of the increased blood pressure's harmful effects on the cardiovascular system. The pathophysiology of hypertensive cardiovascular disease may involve humoral factors and vasoactive hormones such as prostaglandins, angiotensin, and catecholamines [19].

Hypertension causes tangential tension on the arterial and cardiac walls to rise, which in turn causes hypertensive heart disease, congestive heart failure, and hypertension vascular disease, which affects the kidneys, heart, and brain (Table 1) [20]. The hallmarks of hypertensive vascular disease are luminal constriction of the small arteries and arterioles and fibromuscular thickening of the intima and media. The condition affects both big and small arteries as well as arterioles [21].

Atherosclerosis, especially in the coronary and brain veins, is aggravated and accelerates because of the physical stress that hypertension places on the artery wall. Furthermore, it seems that high blood pressure makes both the major and small arteries more vulnerable to atherosclerosis [22]. Consequently, hypertensive patients are at risk for developing atherosclerotic and hypertensive vascular disease of the cerebral and coronary vessels, which can lead to occlusive disease of the big and small arteries, myocardial infarction, and stroke [18].

Hypertension in the arteries may have its roots in diseases of the arterial media, which start in childhood due to calcium build-up in the vessels. Adults with this type of hypertension



may experience arteriosclerotic hypertension, which can result in cardiovascular problems that are strikingly similar to those caused by essential hypertension [23].

Patients living with diabetes are also at risk of developing heart failure [2]. This is due to the damage of blood vessels and nerves controlling the heart caused by persistent high blood sugar. This leads to inadequate pumping of blood from the heart, subsequently motivating an accumulation of fluid in the lungs and swelling in the lower limbs [24].

With the interlink between CVD risk factors, the effects of diabetes lead to the development of other risk factors like hypertension and hypercholesterolemia. It is estimated that almost one in ten people are living with diabetes, with almost one in five people having impaired glucose control. Sadly, 50% of adults do not know they have diabetes [1].

Hypercholesterolemia, which is high blood cholesterol, leads to the narrowing and obstruction of blood vessels due to fatty deposits [25]. Over time, this makes it difficult for enough blood to flow through arteries to the rest of the body, and sometimes the deposits can suddenly break. The breaking of the deposits forms a clot that blocks blood flow to the coronary arteries, leading to heart attack, or block blood flow to the brain, leading to stroke [26].

The RSA has one of the highest recorded cases of overweight and obesity globally, and it is predicted that by 2025, 47.7% and 23.3% of females and males will be obese respectively [27]. In overweight and obesity, the total blood volume increases due to the excess adipose tissue. The result of this is an increase in stroke volume and hence the increase in cardiac output [28].

This increase in stroke volume and cardiac output is the body's attempt to satisfy the increased metabolic demand due to the excess adipose tissue [29]. In addition, the atherosclerotic process is accelerated leading to narrowing or complete blockage of the arteries supplying the heart and the brain [30].

Smoking causes an increase in the formation of plaque in the blood vessels. This is because the chemicals in cigarettes thicken the blood, forming clots in the arteries and veins [31]. When the blockage occurs in the coronary arteries, it may lead to heart disease and stroke in the case of the brain [32]. Furthermore, both the heart rate and myocardial contractility are increased as a result of the increase in cardiac output, stimulated by nicotine. The alterations aid in the cardiovascular risk in smokers [33].

Lastly, constant stress causes a response of persistent release of the hormone cortisol [34]. Long-term high levels of cortisol due to stress may increase blood pressure, blood sugar, cholesterol, and triglycerides [35]. This also leads to changes that promote the accumulation of plaque deposits in the arteries, leading to CVD [36].

Table 2 summarises cardiovascular risk factors and different CVDs that are linked with.

Table 2: Shows cardiovascular diseases linked to cardiovascular risk factors.

Cardiovascular Risk Factor	Cardiovascular Disease
Hypertension	Aortic Aneurysm Atrial Fibrillation Cerebrovascular Disease Congestive Heart Failure Coronary Artery Disease Peripheral Arterial Disease
Diabetes	Coronary Artery Disease Heart Failure Ischemic Heart Disease Peripheral Arterial Disease Stroke
Hypercholesteremia	Coronary Artery Disease Peripheral Artery Disease Stroke
Overweight and Obesity	Arterial Aneurysm Heart Failure Myocardial Infarction Stroke
Smoking	Abdominal Aortic Aneurysm Atherosclerosis Coronary Heart Disease Peripheral Arterial Disease Stroke
Stress	Myocardial Infarction Stroke

Prevention and management of cardiovascular disease

As stated above, the majority of CVDs are linked, meaning that one risk factor may indicate the occurrence of the others [16]. A typical example of this is that overweight and obese individuals are more likely to develop hypertension, diabetes, and hypercholesterolemia. Given this, it means that in order to reduce CVD risk, the whole lifestyle has to be adjusted to minimise the risk [37]. In particular, the following must be considered; diet, exercise and weight management, alcohol consumption, medication, and smoking patterns [38].

A diet low in fat and high in fibre that includes whole grains, fresh fruits, and vegetables is always recommended to maintain a healthy body [39]. The amount of salt per day should not include more than one teaspoon as too much salt will elevate the blood pressure. Foods in high saturated fats are to be avoided as they increase cholesterol levels [40].

Weight management is also crucial in preventing CVD [37]. This can be done through both exercise and a calorie-controlled diet. It is recommended that adults engage in 30 minutes of moderate-intensity aerobic exercise daily for at least 5 days a week [41]. These exercises include cycling, running, swimming, and hill-climbing [42]. Although these minimum requirements may be difficult for other individuals, it is always recommended that beginners take small steps in achieving the targets.

For people who drink alcohol, men are advised not to consume more than 4 units, and women not to consume more than 3 units of alcohol per day. One unit of alcohol is approximately equivalent to 500 ml of regular larger, 125 ml of regular wine, or 25 ml of spirits. It is equally imperative to check the percentage proof on alcohol labels because some



may contain a higher volume of alcohol than the average unit [43]. If anyone is finding it difficult to moderate their drinking behaviour, they should seek health professional assistance.

Unfortunately, smoking has no benefits to the human body, hence smokers are strongly recommended to quit as soon as possible [44]. Reduction of smoking portions is one of the most effective ways to prevent smoking [45], however, if challenges arise, smokers should go for counselling or visit a medical practitioner.

Patients with a high risk of developing CVD may be prescribed medication by a general practitioner to help reduce the risk [46]. The following medication may be used to lower the risk; statins to lower blood cholesterol levels; low-dose aspirin to prevent blood clots; and blood pressure tablets to lower high blood pressure [47-49].

Conclusion and relevance

Knowing and understanding the risks and prevention measures associated with CVD might prove to be helpful in terms of battling this global health concern in RSA. The fact that living a healthy lifestyle and adjusting habits are at the centre of development against CVD, makes the solution accessible to the majority of the population. Through this, people would have more control of their health and massive pressure would be alleviated from the country's health care system as only uncontrollable cases would reach the attention of health professionals and facilities.

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