

THE HEART AND STROKE FOUNDATION SOUTH AFRICA

HEART DISEASE IN SOUTH AFRICA

MEDIA DATA DOCUMENT

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1 MORTALITY CAUSED BY HEART DISEASE

EXPLANATIONS AND DEFINITIONS

Cardiovascular disease

Cardiovascular disease (CVD) refers to any disease of the heart and blood vessels. The most common ones are diseases of the heart muscle, strokes, heart attacks, heart failure and heart disease caused by high blood pressure.

Heart attack

A heart attack is also known as a myocardial infarction (MI). When the diseased roughened arteries of the heart become too narrow or a clot forms, blood flow to the heart muscle is restricted. The heart muscle is left without oxygen, causing death of segment of the muscle and leaving the heart unable to pump sufficient blood to the rest of the body. This is characterised by a sudden severe chest pain that may spread down one or both arms and to the neck.

Heart failure

Heart failure is caused by the inability of the heart to pump blood efficiently around the body. This occurs because of damage to the heart muscle as a result of various diseases. The circulation becomes slow causing excess fluid to be retained in the body.

Stroke

A stroke, also known as a cerebrovascular accident (CVA), occurs when the blood flow to the brain is interrupted. This could either happen when a blood vessel to the brain ruptures, causing bleeding, or becomes blocked by a blood clot. The affected brain cells then start to die because of a lack of oxygen and other nutrients. The severity of a stroke varies from a passing weakness or tingling in a limb to a profound paralysis, coma or death.

KEY POINTS

- Between 1997 and 2004, 195 people died per day because of some form of heart and blood vessel disease (CVD) in South Africa (Note 1.1).
- About 33 people die per day because of a heart attack, while about 60 die per day because of stroke (Note 1.1).
- For every woman that dies of a heart attack, two men die.
- About 37 people die per day because of heart failure (Note 1.1).
- Despite the high death rates caused by AIDS in South Africa, actuarial projections suggest that the rate of chronic diseases, including heart disease, is also going to increase by 2010. The models suggest that chronic disease death will increase from 565 deaths per day in 2000 to 666 deaths per day in 2010 (Note 1.1).
- More than half the deaths caused by chronic diseases, including heart disease, occur before the age of 65 years. These are premature deaths which affect the workforce and have a major impact on the economy of the country (Notes 1.2, 1.3).

- Premature deaths caused by heart and blood vessel diseases (CVD) in people of working age (35-64 years) are expected to increase by 41% between 2000 and 2030. The negative economic impact of this will be enormous (Note 1.4).
- The highest death rates for heart and blood vessel diseases in South Africa are found in Indian people, followed by the coloured people, while the white and black African people have the lowest rates (Note 1.5).
- Although the white and black African people have similar rates for these diseases, their patterns differ considerably. White people mainly reflect a pattern of death caused by heart attacks, while the black African people reflect that of death caused by stroke, and diseases of the heart muscle and high blood pressure (Note 1.5).

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2 MORBIDITY CAUSED BY HEART DISEASE

EXPLANATIONS AND DEFINITIONS

Angina

Angina is chest pain or discomfort that occurs when the heart muscle does not get enough blood. This may feel like pressure or a crushing pain in the chest, which may also occur in the shoulders, arms, neck, jaw, or back. Angina is a symptom usually aggravated by exercise and is caused when insufficient blood reaches the heart muscle. This occurs when plaque builds up in the arteries of the heart. These changes that occur in the arteries of the heart are known as atherosclerosis.

Atherosclerosis

Atherosclerosis is the hardening and narrowing of the arteries, and is caused by the slow build up of plaque on the inside of walls of the arteries. Atherosclerosis is a slow, progressive disease that may start in childhood, and can eventually impede the blood flow through the arteries of the brain, heart, kidneys, and the arms and legs. In the worse case scenario the blood flow to these organs can be blocked off.

Cardiomyopathy

Cardiomyopathy refers to diseases of the heart muscle. In cardiomyopathy, the heart muscle becomes enlarged or abnormally thick or rigid resulting in the inability of the heart to function as an effective pump for blood to the body.

Coronary artery disease

Coronary artery disease occurs when the arteries that supply blood to the heart muscle (the coronary arteries) become hardened and narrowed. The arteries harden and narrow because of build up of fatty deposits (atheroma) in the cells lining the wall of the coronary arteries. This build up is known as atherosclerosis. As these fatty deposits build up gradually, the insides of the coronary arteries get narrower and less blood can flow through them. Eventually, blood flow to the heart muscle is reduced, and, because blood carries much-needed oxygen, the heart muscle is not able to receive the amount of oxygen it needs. This process leads to ischaemic heart disease, which causes damage to the heart muscle.

Morbidity

Morbidity refers to people who have a disease or condition but have not yet died of this.

Prevalence

Prevalence refers to the percentage of people in the population who have a condition at any point in time.

Rheumatic heart disease

Rheumatic heart disease is a condition in which permanent damage to heart valves between the chambers of the heart occurs. The heart valve is damaged by a disease process called rheumatic fever that begins with a throat infection caused by streptococcus bacteria. These malfunctioning heart valves eventually places stress on the heart muscle and a person may require an operation to replace the diseased heart valve.

KEY POINTS

- The prevalence and treatment status of common heart conditions, such as ischaemic heart disease, heart failure, rheumatic heart disease, and diseases of the heart muscle, the heart valves and heart disease caused by high blood pressure is unknown in South Africa. However, the available data suggest that these conditions are poorly managed (notes 2.1-2.6).
- A plan has recently been launched to control rheumatic fever and rheumatic heart disease in Africa (note 2.7).
- No data exist on the number of heart attacks or strokes that South Africans suffer from daily. However, there is a rule of thumb suggesting that for one death caused by a heart attack or stroke three persons will survive such an event, this suggests that ± 130 heart attacks and ± 240 strokes occur daily in South Africa.

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3 LIFE-COURSE PERSPECTIVE ON HEART DISEASE AND ABSOLUTE RISK ASSESSMENT FOR HEART DISEASE

EXPLANATIONS AND DEFINITIONS

Life course of chronic diseases

Although most heart attacks, heart failure and other chronic diseases usually only occur in middle-aged and older people, the influences of risk factors can start before birth and will have an impact throughout life. Therefore, the processes for prevention and management of heart disease must start early and be present throughout life.

Scheme to illustrate the life-course perspective on heart disease and other chronic diseases

THE LIFE-LONG IMPACT OF HEART AND OTHER CHRONIC DISEASES AND THEIR RISK FACTORS					
PREVENTION WHOLE POPULATION		PREVENTION WHOLE POPULATION		DIAGNOSES, COST-EFFECTIVE MANAGEMENT HIGH RISK PATIENTS	DIAGNOSES, COST-EFFECTIVE MANAGEMENT HIGH RISK PATIENTS
BEFORE BIRTH ➤ Genes ➤ In the womb	UNHEALTHY LIFESTYLE ➤ Unhealthy diet ➤ Tobacco use ➤ Lack of aerobic exercise ➤ Stress	MODIFIABLE RISK FACTORS ➤ Obesity ➤ Hypertension ➤ Tobacco addiction ➤ Diabetes ➤ High blood cholesterol and other fats	MORBIDITY DAMAGE TO ORGANS Arteries Heart Brain Kidneys Lungs Eyes Legs	MORTALITY - Heart attack - Heart failure - Stroke - Kidney failure - Cancer - Chronic lung disease	
ENVIRONMENT ➤ Poverty ➤ Cultural ➤ Political					

The impact of many risk factors on the magnitude of risk for heart disease

In people who have many risk factors, the chance of suffering a heart attack grows exponentially with each additional risk factor. This principle can be illustrated by considering a person with three risk factors. The chance of suffering a heart attack does not increase by $3+3+3$ equalling 9, but increases by $3 \times 3 \times 3$ equalling 27, thus the risk increases exponentially with multiple risk factors.

The absolute risk for heart disease in the presence of more than one risk factor

To assess the true level of risk for a heart attack in any person, the impact of all the risk factors present in that person needs to be assessed. Such absolute risk assessment considers the multiplication effect of risk factors to identify those who are at highest risk for getting a heart attack. This implies that the risk for a heart attack in a person with modest levels of many risk factors can be higher than that in a person who has only one risk factor at a very high level.

KEY POINTS

- The known risk factors for a heart attack are present in all South Africans and have been shown to occur in the black population groups as well. (notes 3.1, 3.2).
- Effective prevention of heart disease should start early in life (even before birth) and should continue throughout a person's life (notes 3.3-3.7).
- Effective prevention of heart attacks should target the whole population. Every opportunity via the media and every regulation are needed to support people to adopt and maintain a healthy lifestyle throughout their lifespan (notes 3.3-3.7).
- People should also be informed about the early signs and symptoms of risk factors and heart disease to enable them to seek the necessary help to diagnose their conditions. When treatment is started early, serious long-term complications can be prevented (notes 3.3-3.7).
- Seventy five percent of cardiovascular events (heart attack or stroke) occur in 5%-10% of people who have suffered a previous event or in persons who have many risk factors (notes 3.8, 3.9).
- People should be motivated to ask for an absolute heart attack risk assessment. An absolute risk assessment approach moves away from treating only one risk factor at a time. This involves promoting a healthy lifestyle and addressing all the risk factors present in a person. This approach can have an enormous impact on heart disease in a population and is very cost-effective (notes 3.10-3.15).
- To assess the absolute risk for a heart attack, a person's age, gender, smoking status, blood pressure level, diabetes status and total blood cholesterol level should be considered (notes 3.10-3.15).
- The calculations of absolute risk for heart attacks using the risk factors mentioned in the Scheme above are now available and can easily be done at a clinic or doctor's practice (notes 3.10-3.15).

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4 PHYSICAL ACTIVITY

EXPLANATIONS AND DEFINITIONS

Osteoporosis

Osteoporosis is a disease that thins and weakens the bones to the point that they become fragile and break easily. This condition is caused by the loss of calcium and is mostly seen in post-menopausal women.

A random sample in a survey or study

A random sample is a group of subjects (a sample) chosen in a statistically correct manner from a larger group (a population). The statistics calculated from the data collected in the random sample usually represents that found in the population as a whole.

Sedentary lifestyle

A sedentary lifestyle refers to one where minimal physical activity (exercise) is present. There are no health benefits because of this lack of regular physical activity.

KEY POINTS

- Most South Africans are couch potatoes, i.e. they follow a sedentary lifestyle.
- Evidence is very strong that a sedentary lifestyle causes heart disease along with its risk factors (overweight and obesity, high blood pressure, diabetes and abnormal blood fats, such as high blood cholesterol) (notes 4.1-4.7).
- A sedentary lifestyle is also associated with breast cancer, colon cancer, osteoporosis, stress, anxiety, depression and ageing less healthily (notes 4.1-4.7).
- In South Africa in 2003, 62% of men and 48% of women 15 years or older followed a sedentary lifestyle (notes 4.8, 4.9).
- In 2003, 33% of South African adolescent boys and 42% of girls had a sedentary lifestyle (note 4.10).
- Viewing TV for more than 3 hours per day was recorded by 22% of boys and 27% of girls. These inactive children were also overweight when compared to their active counterparts (note 4.10).
- It is estimated that 3% of men and 4% of women aged 30 years or older who die, die as a result lack of physical activity (notes 4.11)..
- Consequently in 2000 20 men and 26 women, 30 years or older, died per day because of a lack of regular physical activity (notes 4.11).
- There is strong evidence that a moderate amount of regular physical exercise provides health benefits and protects against the ravages of a sedentary lifestyle (notes 4.1-4.7).
- Pooled data of many studies showed that populations that were involved in physical activity had about half the amount of heart attacks and angina compared to inactive populations (notes 4.1-4.7).
- Recommendations for health benefits suggest all adults should do at least 30 minutes or more of moderate intensity physical activity on most days. This either

should happen in a single session or 'accumulated' in multiple bouts, each lasting at least 10 minutes a time (note 4.12).

- Sixty minutes of daily physical activity may be required to prevent weight gain (note 4.12).
- Brisk walking, swimming, dancing or participating in non-competitive sports is regarded as moderate physical activity.
- In 2004, at the Fifty Seventh World Health Assembly, member countries endorsed the World Health Organization (WHO) Global Strategy on Diet, Physical Activity and Health calling on all countries to promote physical activity (notes 4.12, 4.13).
- The youth fitness and wellness charter was launched in October 2004 (note 4.8).
- A guide for population-based approaches to increase levels of physical activity was published by the WHO, which includes a request to member states to celebrate a "Move for Health Day" on 10 May of each year (note 4.13).
- "Vuka South Africa – move for your health" was launched in May 2005 (note 4.14).

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- 4.12 After a number of previous requests by the World Health Assembly meeting in 2000 and 2002 the final resolution was taken in May 2004:
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5 STRESS AS A RISK FACTOR FOR HEART DISEASE

EXPLANATIONS AND DEFINITIONS

Depression

Depression is feeling sad, blue or down and includes losing interest in things, feeling tired all the time, gaining or losing weight, trouble falling asleep, trouble concentrating, and thinking of death or feeling worthless.

Feeling in control

This is the self-perceived ability to control life circumstances.

High general stress

High general stress is self-reported regular and/or ongoing levels of stress at work and/or at home.

KEY POINTS

- There is very little international data and no specific South African data published on the association between stress or depression and heart disease. However, the available data suggest that stress may be related to heart attacks (note 5.1).
- Data from 52 countries showed that those who had had their first heart attack reported suffering of high general stress and depression 55% more frequently than people of the same age and gender who had not had a heart attack (notes 5.2-5.6).

- Similar data showed that those who felt most in control of their own lives had 32% fewer first heart attacks than those who felt least in control of their own lives (notes 5.2-5.6).

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6 NUTRITION AND HEART DISEASE

EXPLANATIONS AND DEFINITIONS

Cholesterol in food

Cholesterol in food is frequently confused with cholesterol in the blood. Foods that are high in cholesterol include fatty red meat, eggs and animal fats such as butter and cream. Consuming plenty of food with high levels of saturated fat and trans fatty acids along with foods high in cholesterol results in an increase of cholesterol in the blood, which increases the risk for a heart attack.

The prudent diet

This is the diet recommended to promote heart health, and involves having a varied eating pattern, while reducing total fat intake, particularly saturated fats from animal products. This can be attained by limiting the intake of (fatty) red meat and giving preference to fish, chicken, low-fat dairy products and legumes as sources of protein. The prudent diet advocates consuming more unrefined carbohydrates, such as whole grain products, plus focusing on more fruits and vegetables for sufficient vitamins, minerals (such as potassium) and fibre. Low-fat dairy products are essential for sufficient calcium intake. Salt and alcohol intake should be moderate.

Types of fatty acids

Fatty acids are part of all fats and oils in food and in the body. Some fatty acids promote heart health if consumed in limited amounts while others have a detrimental effect by increasing blood cholesterol levels. The detrimental fatty acids are those in high concentrations in hard animal fats, such as fat in meat, butter and cream and are known as saturated fatty acids. With the discovery that saturated fats have adverse effects on blood fats, people turned to plant oils as a safe replacement for the saturated animal fats. More recently, it has also been found that harder fats (such as some brick margarine) contain *trans* fatty acids which are formed during the process of partial hydrogenation (hardening) of the vegetable fats. *Trans* fats also raise cholesterol levels and hence should be avoided. It is important to note that tub (softer) margarines are manufactured in such a way that they contain virtually no *trans* fatty acids. The healthier fats that tend to reduce blood cholesterol levels are found mostly in plant oils such as sunflower, canola and olive oils. These are called polyunsaturated or monounsaturated fatty acids.

KEY POINTS

- In South Africa, nutritional surveys have shown that people living in cities frequently consume a diet, which is higher in fat, refined carbohydrates and added sugar. This diet may be regarded less healthy *when* compared to that of people living in rural areas and who follow a more traditional diet (notes 6.1-6.4).
- The following undesirable trends have often been found in these diets:
 1. A poor intake of fruit and vegetables.
 2. A high intake of plant and animal fat, including that of high *trans* fatty acids.
 3. Insufficient intake of milk and other dairy products.
 4. Overall increases in the calorie/kilojoule intake, which lead to increasing overweight or obesity.
 5. A high and increasing alcohol intake.
 6. A low fibre intake because of a low intake of fruit, vegetables and legumes (notes 6.1-6.4).
- The daily kilocalorie (kcal) intake per person in South Africa has increased from 2600 kcal per day in 1962 to 2900 kcal per day in 2001 (notes 6.5-6.7).
- The daily intake of vegetable oils per person nearly doubled from 25 g in 1962 to 42 g in 2001 (notes 6.5-6.7).
- The daily intake of protein increased from 68 g in 1962 to 79 g per day in 2001 (notes 6.5-6.7).
- Fruit and vegetable intake was 185 g/day in 1962 and 220 g/day in 2001. The amount consumed in 2001 was far below the recommended amount of 400 g/day; the latter is equivalent to five portions of fruit or vegetables per day (notes 6.5-6.7).
- South Africans generally consume more salt (sodium) than the recommended maximum of 5 g salt/day. A high salt and low potassium and calcium intake have also been found to contribute to high blood pressure. Potassium intake has been found to be below the recommended dietary intake, mainly because of an overall low intake of fruits and vegetables (notes 6.8-6.10).

- Apart from table salt and flavour enhancers, bread and cereals are the major contributors to total sodium intake from processed food in South Africans. Bread provides the greatest contribution to total dietary sodium intake (note 6.11).
- Other important food sources of salt and fat include meat products (boerewors, meat pies, ham, polony, viennas, salami, biltong and other sausages) as well as soup powders and brick margarine (note 6.11).
- The practice of adding flavour enhancers or soup powders to staple foods, such as maize meal, during preparation is common and adds to the high salt intake (note 6.11).
- The salt content of bread in South Africa has remained higher than in many other countries. It has been noted that 3 - 4 slices of bread with 30 g of margarine provide 2.3 g salt – more than a third of the maximum recommended daily intake of salt.
- South Africans and the food industry are not doing enough to reduce salt in their diet or to increase potassium intake. A reduction in salt intake and an increase in potassium have beneficial effects for reducing the risk of CVD (note 6.12, 6.13).

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7 TOBACCO CONTROL IN SOUTH AFRICA

EXPLANATIONS AND DEFINITIONS

Nicotine

Nicotine is the major addictive substance in tobacco products and the most addictive substance known to man.

Passive smoking

Passive smoking is the inhaling of tobacco smoke where other people are smoking, usually in an enclosed space.

Smokeless tobacco products

These are tobacco products that are not smoked but used in any other form, e.g. chewing tobacco or snuff.

Tobacco-related death rate

This rate is the number of people per 100 000 in the population, who die per year because of tobacco use.

KEY POINTS

- Nicotine is the most addictive substance known to man.
- Smoking cigarettes or any other tobacco products is lethal and will kill half the people before the age of 60 years if they start smoking at a young age and continue throughout their adult life (notes 7.1-7.3).
- There is no safe level of exposure to tobacco products; the use of smokeless tobacco or passive smoking exposes a person to the risk of similar diseases as those who smoke tobacco (notes 7.1-7.3).
- Tobacco users die of various diseases before their time, but most die because of CVD (stroke and heart attack) followed by chronic lung diseases, such as chronic bronchitis and emphysema as well as lung cancer (notes 7.1-7.3).
- Twelve percent of men and 4% of women, aged 30 years or older who died in 2000, died as a result of tobacco related diseases. (note 7.4).

- For men, 30 years or older in 2000, the highest tobacco-related death rate was found in coloureds (417/100 000), followed by Africans (279/100 000) and Indians (276/100 000), with the lowest rate in the whites (215/100 000) (note 7.4).
- For women, 30 years or older in 2000, the tobacco-related death rate was much lower than for men. The highest rate was also found in coloureds (200/100 000), followed by whites (104/100 000), Africans (36/100 000) and Indians (34/100 000) (note 7.4).
- Lung cancer rates followed the pattern of smoking rates in populations by about 10 years. Currently the highest lung cancer rates in South Africa are found in coloured men and women, reflecting their high smoking rates (note 7.5).
- As Western countries instituted strong tobacco control policies that resulted in declining smoking rates, tobacco companies progressively targeted developing countries to expand their markets (note 7.6).
- The global threat to health caused by tobacco use prompted 168 of the World Health Organization's member states to adopt the WHO Framework Convention on Tobacco Control on 21st May 2003. The South African Government ratified its commitment to the treaty on the 16th June 2003 and by June 2007, 147 other countries had followed suit (note 7.7).
- In South Africa, the first 'Tobacco Products Control Act of 1993' was signed, which initiated many steps towards effective tobacco control policies. The 'Tobacco Products Control Amendment Act of 1999' signed by President Nelson Mandela, created one of the most effective tobacco control policies in the world. Further amendments have been enacted in 2007 to ensure optimal tobacco control in the country (notes 7.8, 7.9).
- The impact of the tobacco control policies was dramatic. In South Africans, 15 years and older, the smoking prevalence decreased from 32% in 1993 to 24% in 2003 (notes 7.10-7.11).
- The largest reduction in smoking between 1993 and 2003 occurred in men, African and coloured people, as well as in those with limited education and a low income (notes 7.10-7.11).
- The lowest rates of quitting occurred in women, white people, those with a secondary education level and households with a high income (notes 7.10-7.11).
- Of particular concern is the high prevalence of smoking (46%) among pregnant coloured women. Not only do these women have low birth-weight babies, but they also suffer many complications of pregnancy that can be life threatening to both mother and baby (note 7.12).
- Although South Africa has proven the benefit of comprehensive tobacco control policies, there are still major challenges to reduce tobacco use in the country. Implementation of the regulations of the tobacco control laws needs to be improved, and those groups, such as coloured pregnant women, with high smoking rates need particular attention.

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8 OVERWEIGHT AND OBESITY

EXPLANATIONS AND DEFINITIONS

Body mass index (BMI)

This index reflects a person's weight in terms of his/her height. This is defined as the weight in kilogram divided by height in meters squared (kg/m^2).

Obese

A person is obese when his/her BMI is $30 \text{ kg}/\text{m}^2$ or higher.

Overweight

A person is overweight when his/her BMI is between $25 \text{ kg}/\text{m}^2$ and below $30 \text{ kg}/\text{m}^2$.

KEY POINTS

- Overweight and obesity are simply caused by consuming more kilojoules than the body needs, while simultaneously doing insufficient physical exercise to burn the extra kilojoules. The excess kilojoules are then stored as fat in the body.
- Overweight and obesity are specific risk factors for developing hypertension, diabetes and heart disease. There is also a strong indication that obesity is associated with osteoarthritis and a number of cancers (note 8.1).
- The International Statistical Classification of Diseases (ICD) has specified obesity as a disease in its own right (note 8.1).
- In 1998, 56% of women and 29% of men, aged 15 years or older in South Africa, were overweight or obese. These high rates had not changed by 2003 (notes 8.2, 8.3).
- For men the obesity rate was the highest in whites (18%), followed by Indians and coloureds (8%) and then by Africans (6%) (note 8.2).
- For women the differences among the groups were much smaller with the highest rates in Africans (32%), followed by coloureds (26%), whites (23%) and then Indians (21%) (note 8.2).
- Urban people had higher weights than people who were living outside the cities (note 8.2).
- Some of the poorer South African provinces had high prevalence rates for overweight and/or obesity, with the lowest rate observed in Limpopo (44% of women and 22% of men) (notes 8.2, 8.3).
- Very few African women (16%) considered themselves overweight, while 59% were overweight or obese. In contrast, 54% of white women thought they were overweight, while 49% were in fact overweight or obese (note 8.2).
- In a national survey in children 1-8 years 17% were overweight and 5% were obese in 1999. However, in a deep rural community in Limpopo among children aged 3-10 years, only 2.5% of boys and 4.3% of girls were overweight (note 8.4 and 8.5).
- It is estimated that of all deaths in people 30 years or older, a high BMI contributed to 4% of the total male and 10% of the total female deaths in 2000 (note 8.6).

- Consequently, it is estimated that in people 30 years or older, 32 men and 68 women died per day because of the impact of a high BMI (note 8.6).
- In men 30 years or older, most deaths caused by a high BMI occurred in the age group 45-59 years and then declined with increasing age. In women, deaths caused by a high BMI peaked in the age group 60-69 years and continued to take a high toll in the older age groups (note 8.6).
- Losing weight is challenging, but possible with reduced kilojoule intake, regular physical exercise and an understanding and management of the underlying emotional and cultural factors that contribute to overeating.
- The current fad of recommending surgery to address obesity for large numbers of South Africans is something that meets with great disapproval. This is a very risky procedure. Therefore, it should only be considered for morbidly obese people in exceptional circumstances.

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9 EARLY LIFE ORIGINS OF HEART DISEASE IN SOUTH AFRICA

EXPLANATIONS AND DEFINITIONS

Catch-up growth

Catch-up growth refers to low birth-weight babies that grow fast after birth and therefore tend to become overweight as young children.

Foetal origins of adult disease (Barker hypothesis)

This phenomenon suggests that babies with low birth weight tend to develop risk factors, such as overweight, high blood pressure and abnormal blood glucose

metabolism early in life. They will develop chronic diseases, including heart disease, more often than babies with a normal birth weight do when they become adults.

Stunted children

Stunting develops when children do not receive sufficient, nutritious food while they are growing up. Therefore, they do not reach their full potential height and end up being shorter than other children of the same age. This is an indicator of long standing under nutrition

KEY POINTS

- Low birth-weight babies are not only at risk of developing complications soon after birth, but tend to develop risk factors for heart disease at an early age (notes 9.1-9.3).
- Mothers who consume insufficient food during pregnancy tend to have low birth-weight babies. This occurs frequently in the poorer sectors of society and in developing countries (notes 9.1-9.3).
- Low birth weight is also caused by smoking during pregnancy. This occurs frequently in the coloured community in South Africa (notes 9.4, 9.5).
- Children born in Soweto and Johannesburg in 1990, who participated in the Birth-to-Twenty (BTT) study, were found to have higher blood pressures at age 5 years if they had a low birth weight (note 9.6).
- Children, participating in the same BTT study, who had low birth weight had abnormal glucose metabolism at age 7 years, suggesting they were prone to developing diabetes in later life (note 9.7).
- Children presenting with catch-up growth had the most risk factors for heart disease compared to those with normal birth weight and normal growth patterns after birth (note 9.6).
- It was also found that the children participating in the BTT study who had a low birth weight and remained small by the age of one, had weaker bones at age 10 years than 10-year-old children with a normal birth weight and growth at one year (note 9.8).
- In a national survey in 2800 children, 20% of the children were stunted and more overweight than children who had reached their full potential height. Stunting in adolescent girls aged 10-15 years from the Northwest province was associated with increased fat stores (notes 9.9, 9.10).
- In Cape Town young adults aged 20 years who had low birth weights, had higher blood pressures than those with normal birth weights at the same age (note 9.11).
- Women can prevent bearing low birth-weight babies by following a well-balanced diet and avoiding smoking during pregnancy. This can contribute towards preventing heart disease and other chronic diseases in the next generation (note 9.12).

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10 HIGH BLOOD PRESURE

EXPLANATIONS AND DEFINITIONS

Blood pressure

Blood pressure (BP) is the force of the blood pushing against the walls of the arteries. Blood pressure is at its highest when the heart muscle contracts, pumping the blood to all parts of the body. This is called systolic blood pressure (SBP). When the heart is at rest, between beats, the BP drops. This lower pressure is called the diastolic blood pressure (DBP). The blood flow does not stop when the heart muscle is relaxed. Blood pressure is expressed as these two numbers, the SBP and DBP. Both are important. Usually they are written as SBP/DBP e.g. 120/80 mmHg (measured in millimetres of mercury, a unit for measuring pressure). Blood pressure is measured with a variety of equipment, such as mercury Baumanometers or electronic BP monitors.

Hypertension (High BP)

High blood pressure, known as hypertension, is a BP reading of 140/90 mmHg or higher. A person has hypertension if either of the numbers is above the cut-off point. Once high BP develops, it usually lasts a lifetime. The good news is that it can be controlled by following a healthy lifestyle and using appropriate medication.

Hypertension is controlled when treatment reduces the BP to below 140/90 mmHg. High BP is a silent killer because it usually has no symptoms. Some people may not know they have hypertension until they have trouble with their heart, brain, or kidneys. When hypertension is not treated, it may cause:

1. the heart muscle to weaken, which may lead to heart failure,
2. small bulges (aneurysms) to form in arteries. Common locations are the main artery from the heart (aorta); arteries in the brain, legs, and intestines; and the artery leading to the spleen,
3. arteries to the kidney to narrow which may cause kidney failure,
4. arteries throughout the body develop atherosclerosis or they can weaken, especially those in the heart, brain, kidneys, and legs. This can cause a heart attack, stroke or kidney failure.
5. blood vessels in the eyes to burst or bleed, which may cause changes in vision and result in blindness.

KEY POINTS

- People cannot feel when they have hypertension/high blood pressure. The BP needs to be measured at a clinic, pharmacy or in a doctor's surgery with the necessary equipment.
- Hypertension occurs more frequently in older people and is more common in people who are overweight or obese, or in those who use too much salt (sodium) and too little potassium (in fruit and vegetables). People who use a lot of alcohol also tend to have higher blood pressures (notes 10.1, 10.2).
- About a quarter of all South Africans, 15 years and older, suffer from hypertension. Overall, there are no marked differences between the rates of hypertension among the different population groups (note 10.3).
- The rural black Africans had significantly less hypertension than the urban black African people (note 10.4).
- South Africans with tertiary education had less hypertension than those with 12 years or less education (note 10.4).
- People with a family history of hypertension or stroke were more likely to have hypertension than those without such a history. This suggests that hypertension in some way may be inherited (note 10.4).
- About 6 million South Africans 15 years and older suffer from hypertension, of whom millions were not diagnosed and even more inadequately treated. Of all these people only 26% of men and 51% of women knew that they had hypertension (note 10.3).
- Only 21% of men and 36% of women were taking drugs to reduce their BP, while only 10% of men and 18% of women had their BP levels sufficiently reduced to the level that would eliminate the risk to their hearts, brain and kidneys (note 10.3).

- It has been estimated that in 2000, 8% of deaths in men and 11% of deaths of women 30 years and older were caused by a high BP (note 10.4).
- Much of the damage caused by hypertension can be prevented if diagnosed early and treated adequately. This will reduce costs to patients, the health services and the economy (notes 10.1, 10.2).
- An effective approach to the management of hypertension involves, in addition to taking medication the promotion of a healthy lifestyle for all South Africans. The prevention of hypertension should include eating more fruit and vegetables and less salty food, using less alcohol, and achieving and maintaining normal body weight. Regular exercise and no smoking will also be beneficial (notes 10.1, 10.2).

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11 DIABETES

EXPLANATIONS AND DEFINITIONS

Diabetes mellitus

A disease where the body stops making the hormone insulin. Insulin carries the sugar, glucose from the blood into the cells where it is used for energy. As a result the glucose levels in the blood rises and can cause damage to arteries to many organs in the body, such as the kidneys, heart, brain, eyes and the nerves. Untreated diabetes therefore results in kidney failure, heart attack, stroke, blindness and amputations, particularly of the legs.

Glucose intolerance

This condition usually precedes the development of diabetes and is diagnosed when a person's blood sugar increases more than normal after a glucose tolerance test, but is lower than in a person with diabetes.

Glucose tolerance test

This is one of the tests to diagnose diabetes. It involves drinking a strong glucose solution after over-night fasting and then measuring one's blood sugar over a 2-hour period.

Hyperglycaemia

Hyperglycaemia refers to a high blood glucose level.

Types 1 and 2 diabetes

Two major types of diabetes mellitus are known:

Type 1 is characterised by the abrupt onset of symptoms which usually start at a young age. A lack of insulin production by the beta cells of the pancreas. Currently, type 1 diabetes can be treated only with insulin, with careful monitoring of blood glucose levels using blood-testing monitors.

Type 2 normally starts in the middle age and carries a high risk for heart disease.

KEY POINTS

- The risk for developing type 2 diabetes increases with age. It also increases in people who are overweight or obese, who follow a sedentary lifestyle and in Africans who have been living in the city for a long time (notes 11.1, 11.2).
- Because of the increase in risk factors, diabetes rates in developing populations are also increasing. This is a global phenomenon and is expected to continue (notes 11.1, 11.2).
- Diabetes rates vary among the South African population groups. In 2000, in people older than 30 years, the highest rate was recorded in Indians, where 18% of men and 16% of women had diabetes. The rates found in the coloured and white groups were the same, with 5% of men and 7% of women having diabetes and for the African population those living in rural areas had a rate of 3% and those in the cities a 6% rates (note 11.3).
- It has been estimated that there are about 1.5 million South Africans with diabetes. (note 11.3).
- In 2000, diabetes caused 3% of deaths in men and 6% of deaths in women 30 years and older (note 11.3).
- Diabetes is the most common cause of leg amputations and blindness in South Africans. It also contributes to kidney failure that requires dialyses and transplants (note 11.3).
- Many people with diabetes are undiagnosed or treated inadequately, and consequently have many complications. Early diagnosis and good diabetes care can prevent many of these severe complications (notes 11.4-11.6).
- The following symptoms could possibly be present in people with diabetes:
 - Abnormal thirst and/or hunger
 - Frequent passing of urine, particularly at night
 - Blurred vision

- Tingling or numbness of feet and hands
 - Frequent infections
 - Slow healing of cuts and other wounds.
- Recently the Diabetes Strategy for Africa was launched, which calls upon governments, non-government organisations and the industry to implement this integrated approach to reduce the burden of diabetes in Africa (note 11.7).
 - Key elements of the strategy include supporting the patients:
 - to follow a healthy lifestyle with physical activity, a healthy diet and no smoking,
 - by teaching them to monitor their blood glucose levels,
 - to use their medication correctly, particularly if they need to inject themselves with insulin,
 - to look after their feet adequately to ensure that ulcers are prevented or treated early,
 - to make sure that their eyes are regularly checked, and
 - to encourage them to recognize and act appropriately on signs of having too high or too low blood glucose levels (note 11.7).

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12 HIGH BLOOD CHOLESTEROL

EXPLANATIONS AND DEFINITIONS

Hyperlipidaemia

Hyperlipidaemia is a high concentration of all the different blood fats (also called lipids) in the blood.

Hypercholesterolaemia

Hypercholesterolaemia is a high level of cholesterol in the blood and a major risk factor for heart disease, which leads to atherosclerosis, heart attacks and strokes.

The cholesterol is in different forms in the blood. The most important ones are low-density lipoprotein (LDL) known as the 'bad' cholesterol and high-density lipoprotein (HDL), which is the 'good' blood cholesterol. A high level of LDL cholesterol increases the risk of heart disease. Therefore, the lower your LDL cholesterol is, the lower your risk of heart attack and stroke will be. Higher HDL levels are better and give some protection against heart disease. Whereas a low HDL cholesterol puts you at higher risk for heart disease.

Familial hypercholesterolaemia

Familial hypercholesterolaemia (FH) is a rare genetic disorder, characterised by very high LDL cholesterol and early CVD, which runs in families.

Achilles tendon

A tendon is a band of tissue that connects a muscle to a bone. The Achilles tendon is the longest tendon in the body and runs down the back of the lower leg, connecting the calf muscle to the heel bone.

KEY POINTS

- Everybody has cholesterol present in the blood and all parts of the body. It is only when the level gets too high that the risk for heart attacks increase. Usually those with total blood cholesterol levels of 5 mmol/L or higher are said to have hypercholesterolaemia (notes 12.1, 12.2).
- For most people high blood cholesterol is caused by following an unhealthy lifestyle, such as eating too much fat or oily food. These are particularly saturated animal fats (hard fats like butter, fatty meat and greasy fast foods) or *trans* fatty acids in some hard margarines and some processed foods. High levels of cholesterol-rich food, such as eggs and red meat can also cause blood cholesterol to rise. Eating too little fibre also contributes to high blood cholesterol (notes 12.1, 12.2).
- Blood cholesterol levels increase with age, especially in people who follow a typical western lifestyle. Therefore, a doctor should check cholesterol levels in middle-age persons (note 12.3).

- Blood cholesterol levels vary considerably among the different South African population groups. Africans, 30 years or older, have the lowest rates of high blood cholesterol above 5 mmol/L (i.e., 24% of men and 32% of women) (note 12.3).
- White men (90%) and women (88%) have the highest blood cholesterol levels, while coloured men (82%) and women (80%) and Indian men (87%) and women (77%) 30 years or older also have high levels (note 12.3).
- About 5 million South African adults had high blood cholesterol levels in 2000 (note 12.3).
- It is estimated that 4% of men and 5% of women, 30 years and older, die because of the impact of high blood cholesterol (note 12.3).
- HDL cholesterol can be increased by doing regular physical exercise, stopping smoking, achieving normal body weight and using modest amounts of alcohol (for women 1-2 tots and men 2-3 tots per day (note 12.4).
- In a survey among about 13 000 patients at general practitioners' practices, only 28% had a total blood cholesterol level below 5 mmol/L. Poor control of total blood cholesterol was found among those who had had a heart attack or angina (notes 12.5, 12.6).
- People who have suffered a heart attack and have high blood cholesterol can benefit the most if these levels are treated effectively, as this can prevent an additional heart attack (notes 12.5, 12.6).
- High blood cholesterol can be treated effectively with the medications called statins, which have been shown to be life saving by reducing blood cholesterol levels considerably and thus preventing heart attacks and other atherosclerosis-related conditions (notes 12.7, 12.8).
- The rare inherited condition, familial hypercholesterolaemia, particularly occurs in the Afrikaans-speaking white community of South Africa at a ratio of 1:72. This is the result of the concentration of the specific gene in a small group of settlers in the country over many generations (note 12.9).
- Familial hypercholesterolaemia is a serious condition in people who tend to suffer heart attacks at a much younger age than usually (note 12.10).
- Be suspicious of suffering from FH if a close family member has a heart attack before the age of 55 years. Family members, who have thickened uneven Achilles tendons or nodules in the tendons on the back of their hands, could also be at risk. If this is the case, it is important to have one's blood cholesterol level checked by a doctor as soon as possible (note 12.7).
- A healthy lifestyle involving a healthy eating plan and regular physical activity is an essential part of managing high blood cholesterol levels (note 12.1).

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13 ECONOMIC IMPACT OF HEART DISEASE AND COST-EFFECTIVE TREATMENT

EXPLANATIONS AND DEFINITIONS

Economic impact of heart disease

The cost of heart disease to a country is twofold. Firstly, there is the direct cost of the increased health care attributable to a person having heart disease, and secondly, there are indirect costs because a person with heart disease cannot be optimally productive at work or is absent from work because of the illness or premature death.

The direct cost of heart disease

This includes the cost of screening people for heart disease or its risk factors, actual cost of drugs, costs of the clinic or doctor's visits and the laboratory tests done to monitor the patient, as well as travelling costs.

Cost-effective treatment

Cost-effective treatment is a treatment that is not only effective in healing or controlling a disease but also costs less to society than the cost of the disease if it is not treated. For example, it costs less to provide effective medication to a person,

who has had a heart attack, with high blood cholesterol than it costs not treating this person. Not treating this person will lead to suffering serious heart disease that will cost more than the medication would have cost.

Generic medication

When a new drug comes to the market it usually occurs while the patent for the chemical agent is still in force. These brand named drugs are usually quite expensive in order to cover the development costs of the new drug. The duration of the patents is limited and after this period the drug can be made by any company and is usually then sold at much lower prices. These generic drugs marketed without brand names even though they are chemically identical to brand-name drugs and meet the standards for safety, purity and effectiveness.

KEY POINTS

- In 1991, the cost of CVD was between R4.135 and R5.035 billion, which did not include the costs of rehabilitation and follow-up. This expenditure reflects 2%-3% of gross domestic product (GDP) or roughly 25% of all health-care expenditure (notes 13.1-13.3).
- South Africa is already losing more people in the work-force age group (35-64 years) because of CVD compared to countries such as the USA and Portugal. These premature deaths have a major economic impact on the economy of the country (note 13.4).
- Projections are that cardiovascular deaths will increase by 41% in this age group between 2000 and 2030 (note 13.4).
- Estimates are that in 2000, the cost of cardiovascular disability payments in South Africa equalled US\$ 70 million (note 13.4).
- The drug costs for CVD and its risk factors vary widely among different countries. These costs are usually much less if generic medications of commonly used drugs are available (note 13.2).
- The most cost-effective interventions to reduce CVD are those which target the population as a whole and include education through the mass media to promote a healthy diet, regular physical activity, along with legislation targeting tobacco control and the reduction of salt in commercial food products (note 13.2).
- When treating individual patients the most cost-effective approach is the absolute risk approach where the total cardiovascular risk is determined by considering the impact of all the risk factors present in a patient (see Section 3) (note 13.2).
- There is good evidence that it is cost-effective to combine a number of effective medications into one single tablet. This idea of a 'polypill' containing low doses of multiple drugs has generated much interest, with proponents arguing that, given the high prevalence of CVD risk factors and the effectiveness of pharmacologic interventions, such a drug combination would reduce CVD mortality by 88% (notes 13.2, 13.5-13.8).
- The 'polypill' would be particularly cost-effective in developing countries as patients take single-pill combinations more religiously than several tablets at a time. This approach would also reduce the supply and transport costs (note 13.6).

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