• Risk of a stroke: Damaged and weakened blood vessels of the brain, or clots that are formed in the arteries of the brain, obstruct blood flow, potentially causing a stroke.

**CHOLESTEROL**
Cholesterol is an important waxy substance that originates from the liver and diet in humans and animals, which forms a structural part of many hormones and cells. An excess of bad cholesterol (LDL and triglycerides) and a lack of good cholesterol (HDL) may, however, lead to heart disease in the following ways:

• **Hardening of the arteries:** Too much LDL cholesterol in your body can accumulate in your arteries, clogging them and making them less flexible.

• **Increased risk of heart failure:** Due to the hardened arteries, the heart has to work harder to pump blood through the body.

• **Heart attack:** The build-up of plaque in the coronary arteries can disrupt the flow of oxygen-rich blood to the heart muscle.

• A piece of plaque can also block blood flow to the brain, or dislodge and form a clot, leading to a stroke.

**IMPACT OF STRESS**
• Increased blood sugar levels and insulin resistance
• Weight gain
• An impaired immune system
• Indigestion
• Elevated blood pressure
• Abnormal cholesterol levels

**MANAGING METABOLIC SYNDROME**
Metabolic Syndrome is managed through targeting the leading causes:

• Appropriate and aggressive therapy is essential for reducing the risk of cardiovascular disease.

• Lifestyle changes should be implemented – exercise, healthy diet, no smoking, low alcohol intake and stress management.

• Prescribed medication should aid in combatting insulin resistance, obesity, hypertension and abnormal cholesterol levels.

*Ideally, treatment should address all the components of the syndrome!*

**Please Note:** This is an educational information leaflet only and should not be used for diagnosis. For more information on Metabolic Syndrome, consult your healthcare professional.

**References:**
4. JRS Cardiovascular Disease, March 2016, Thang S Han, Mike EJ Lean, A clinical perspective of obesity, metabolic syndrome and cardiovascular disease.
8. JRS Cardiovascular Disease, 2016, Thang S Hang and Mike EJ Lean, A clinical perspective of obesity, metabolic syndrome and cardiovascular disease.
10. PLOS One, August 2015, Miroslaw Janczura, Grazyna Bochenek, Roman Nowobilski, Jerzy Dropiński, Katarzyna Kotula-Horowit, Bartosz Laskowicz, Andrej Stanisir, Teresa Domagała, The Relationship of Metabolic Syndrome with Stress, Coronary Heart Disease and Pulmonary Function - An Occupational Cohort-Based Study.
**WHAT IS METABOLIC SYNDROME?**

Metabolic syndrome, otherwise known as syndrome x, occurs when a number of conditions happen simultaneously, increasing your risk of heart disease, stroke and diabetes. These are:

- High blood pressure
- High blood sugar levels or insulin resistance
- Body fat accumulating around the waist
- Irregular cholesterol levels

**WHY IS METABOLIC SYNDROME DANGEROUS?**

According to a recent statement by the World Health Organisation (WHO), heart disease and strokes are identified as leading causes of fatalities in South Africa.

**HOW IS METABOLIC SYNDROME DIAGNOSED?**

The SEMDSA (Society for Endocrinology, Metabolism and Diabetes of South Africa) 2017 guidelines have outlined the below as indicators of metabolic syndrome:

<table>
<thead>
<tr>
<th>Component</th>
<th>Measure Categorical cut points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waist circumference</td>
<td>Men ≥ 102 cm</td>
</tr>
<tr>
<td></td>
<td>Women ≥ 88 cm</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>≥ 1.7 mmol/l</td>
</tr>
<tr>
<td>HDL Cholesterol</td>
<td>Men &lt; 1.0 mmol/l</td>
</tr>
<tr>
<td></td>
<td>Women &lt; 1.2 mmol/l</td>
</tr>
<tr>
<td>Blood Pressure (BP)</td>
<td>Systolic ≥ 130 mmHg and/or</td>
</tr>
<tr>
<td></td>
<td>Diastolic ≥ 85 mmHg</td>
</tr>
<tr>
<td>Fasting Glucose</td>
<td>≥ 5.6 mmol/l</td>
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</table>

Diagnosis is any 3 of the 5 features above. Drug treatment specifically targeted at any one of the criteria makes that criterion positive even if the measured variable falls below the cut-off.

**WHAT ARE THE CONTRIBUTING FACTORS?**

- Inactivity
- Obesity
- High intake of sugar and refined carbohydrates
- Stress
- Smoking
- Excessive alcohol consumption

**INSULIN RESISTANCE**

Insulin resistance (IR) occurs when the body's cells do not respond to insulin, which is a hormone that transports glucose from the bloodstream to the cells for energy. Certain levels of insulin are necessary to keep blood sugar levels within the normal range. However, soaring insulin levels may trigger:

- **Weight gain**: The levels of insulin, which is a messenger that instructs the body to store fat, increase dramatically.
- **Insulin resistance is the precursor to type II diabetes**, whereby the beta cells of the pancreas can no longer produce enough insulin to overcome insulin resistance, spiking blood sugar levels.

**HYPERTENSION**

Classification of Blood Pressure (BP) for adults according to the South African hypertension practice guideline 2014. BP should be categorised into the highest level of BP whether systolic or diastolic.

<table>
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<td>Isolated systolic</td>
<td>≥ 140</td>
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The consequences of elevated blood pressure include:

- **Risk of heart disease**: The coronary arteries leading to the heart become progressively narrow from a build-up of plaque (fat, cholesterol and other substances). When the blood flow of the heart muscle is interrupted, it is deprived of oxygen and nutrients, causing a **heart attack**.

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