

DIABETES MELLITUS CHRONIC KIDNEY DISEASE



DIABETES MELLITUS

Diabetes mellitus is a group of metabolic disorders that affects various organs and tissues. It is characterized by increased levels of blood glucose (hyperglycemia). It is a serious chronic disease that lasts a lifetime.

Metabolism is the process which involves chemical reactions in our body. This includes digestion and the transport of substances into and between different cells to provide our body with the energy from the food we eat.

Food is made up of proteins, carbohydrates, and fats. Each time we eat, the digestive system will break down the food groups into amino acids (from proteins), sugars (from carbohydrates) and fatty acids (from fats), which give our body the energy we need to function properly. Our body can use this energy straight away or store it.

A metabolic disorder happens when the normal process of metabolism is disrupted by abnormal chemical reactions in our body.

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WHAT HAPPENS IN DIABETES

In diabetes, the body does not produce enough insulin or does not respond to the insulin produced to control the amount of sugar (glucose) in the blood.

THERE ARE 2 TYPES OF DIABETES:

Type 1 Diabetes (5-10%) – usually first presents in children or young adults. In type 1 diabetes the body destroys the cells that produce insulin. People with type 1 diabetes will always need insulin injections to survive.

Type 2 Diabetes (90-95%) – occurs mostly in adults and obese people. Type 2 diabetes happens when the body does not produce enough insulin or the body is resistant to insulin. Initially it can be treated with proper diet and regular exercise. If blood sugar levels are not well controlled with diet and exercise alone, the doctor will order tablets (hypoglycaemics) to be taken. In some cases, insulin injections may also be needed to keep the blood sugar levels within a safe range.

Type 2 diabetes may be preventable as it is often brought on by being overweight, due to unhealthy eating habits and lack of exercise.

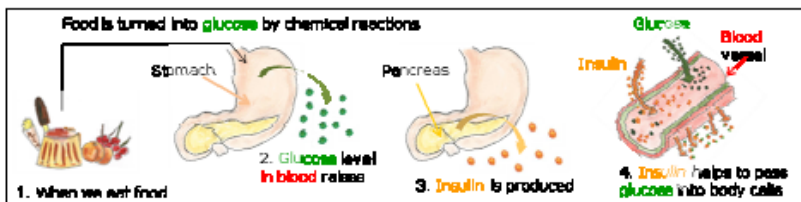
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WHAT IS INSULIN?

Insulin is a hormone produced and secreted by the pancreas in our body. It lowers the sugar level in our blood.

HOW DOES INSULIN CONTROL BLOOD SUGAR LEVEL IN THE BODY?

Every time we eat carbohydrates (e.g. fruits, breads, potatoes, pasta, rice) the sugar level in our blood rises. The pancreas then produces insulin to move the sugar from the blood into the cells. The cells use the sugar for energy or store it for use later. All organs in our body need energy to work properly.



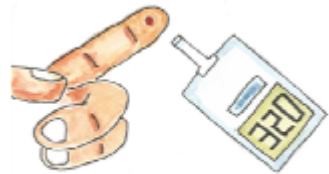
How insulin controls blood sugar (glucose) level

People who have diabetes do not make enough insulin or do not respond to the insulin they make, so sugar remains high in their blood because it cannot be moved into the cells.

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HOW IS BLOOD SUGAR LEVEL MEASURED?

It is measured by laboratory blood tests, which may require fasting (not eating or drinking for 8 hours prior to the test). Blood sugar level is measured as millimoles of glucose in a litre of blood (mmol/L) or as milligrams in a deciliter of blood (mg/dl). Also patients may have finger prick tests, which many patients are taught to do at home.



Finger prick Test

WHAT IS THE NORMAL RANGE FOR FASTING BLOOD SUGAR LEVELS?

Healthy adults have fasting blood sugar levels of 3.9-5.5mmol/L (or 70-110mg/dl).

IS DIABETES COMMON?

Yes. Diabetes affects 2-6% of the general population and increases with age, especially people over 65 years. It is, like high blood pressure, one of the biggest health and social problems in the world.

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HOW DO YOU KNOW IF YOU HAVE DIABETES?

The typical symptoms (signs and feeling) of diabetes, especially in type 1 diabetes:

- Excessive tiredness
- Unexpected weight loss
- Passing a lot of urine, more than 2500ml in 24 hours (polyuria)
- Excess thirst (polydipsia)
- Blurred vision
- Slow healing of sores and wounds
- Sugar in urine (glycosuria) – this is the result of 'spillage' of sugar into the urine due to high sugar levels in the blood.

OTHERS LESS COMMON SYMPTOMS:

- Absence of menstruation in women and onset of impotence in men.
- Abdominal pain.
- Tingling or numbness in hands and feet, dry skin.
- Weakness.
- Irritability or mood swings.
- Nausea and vomiting.
- Bad breath.

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HOW IS DIABETES DIAGNOSED?

To diagnose diabetes, your doctor will:

- Check you for symptoms
- Order a fasting blood sugar level test: diabetes is confirmed if blood sugar level is more than 7.0mmol/L (or 126mg/dl)
- A blood glucose tolerance test can also be ordered. This involves first obtaining a fasting blood sample from you and then giving you 75g of glucose to take by mouth, and 2 hours later, another blood sample will be obtained. Diabetes is confirmed if blood sugar level is more than 11.1mmol/L (or 200mg/dl).

WHY IS DIABETES HARMFUL?

A persistently high blood sugar level can cause serious problems in many parts of the body. Research shows that adults with diabetes are at an increased risk of developing kidney disease (diabetic nephropathy). Furthermore, poorly controlled diabetes increases the risk of kidney disease ending up in kidney failure (loss of kidney function). High blood pressure which is particularly common in type 2 diabetes also adds to this risk. Diabetes becomes difficult to control once kidney disease is established. Treatment will need to be readjusted to avoid problems.

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HOW DOES DIABETES AFFECT YOUR KIDNEYS?

Like uncontrolled high blood pressure, poorly controlled blood sugar can also damage the blood vessels in your kidneys. As a result, your kidneys will fail to filter your blood as well as they used to. This damage usually takes place gradually, over many years. As more and more kidney tissue is damaged, your kidneys will finally stop working and unable to keep you healthy. At this point (CKD Stage 5), you will then need dialysis or a kidney transplant. Not everyone with diabetic kidney disease ends up in kidney failure. You can prevent kidney disease from getting worse by following a healthy lifestyle and the right treatment.

HOW DO YOU KNOW IF YOUR DIABETES IS UNDER GOOD CONTROL?

- Having a blood glucose level between 3.9 to 7.2mmol/L (or 70 to 130mg/dl) during the day before eating
- Having a blood glucose level at 6.1 to 8.3mmol/L (or 110 to 150mg/dl) at bedtime
- Having HbA1c at 6.5-7%, unless you are on some medicines or insulin where an acceptable target will be set for you.

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WHAT IS HbA1c?

HbA1c stands for glycated haemoglobin. It is a specific test used to assess blood sugar level from the previous 2-3 months. Haemoglobin molecules make up the red blood cells in the blood. When sugar (glucose) is passed into the blood, it sticks to the haemoglobin molecules and forms a glycated haemoglobin molecule (HbA1c). So, the more sugar found in the blood the more glycated haemoglobin will be present.

HOW CAN YOU REDUCE THE RISK OF DEVELOPING DIABETIC KIDNEY DISEASE?

To reduce the risk of your kidneys being damaged, you should:

- Keep your blood sugar well controlled (HbA1c at 6.5 - max. 7%).
- Keep your blood pressure preferably \leq 130/80mmHg.

An early sign of kidney damage is the presence of protein in your urine test.

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BESIDES KIDNEY DAMAGE; ARE THERE OTHER COMPLICATIONS OF DIABETES?

Yes, this is because blood vessels are damaged in other parts of the body as well as the kidneys.

These complications are:

- **Peripheral neuropathy** - nerves are damaged and cannot send messages from the brain and spinal cord to the muscles, skin and other parts of the body. This will cause numbness and a tingling sensation in the toes or fingers. It may extend to the feet or hands and cause burning, freezing and throbbing pain.
- **Peripheral vascular disease** - arteries that supply blood to the arms and legs have become totally or partially blocked as a result of hardening of the arteries (atherosclerosis). If it happens to the leg, it causes pain while walking (intermittent claudication).
- **Autonomic neuropathy** - nerves that deal with body functions (e.g. blood pressure, heart rate, sweating, bowel and bladder emptying, and digestion) are damaged. This will result in, for example, a sudden drop in blood pressure when standing (dizziness) and gastric upset (diarrhoea or constipation).
- **Cardiovascular disease** - blood vessels that supply the heart muscle or brain can also be affected, causing increased risk of chest pain, heart attack, heart failure or stroke.
- **Retinopathy** - visual impairment and possible blindness.
- Impotence in men and menstrual disruption in women.

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TO REDUCE THE RISK OF THESE COMPLICATIONS FROM HAPPENING; YOU NEED TO HAVE A TIGHT CONTROL OF YOUR:

- Blood sugar level - HbA1c at 6.5% or other target identified by the diabetes team with you.
- Blood pressure – preferably $\leq 130/80$ mmHg, and LDL-cholesterol level (also known as bad cholesterol) – below 100 mg/dl ≤ 70 mg/dl. (See “Healthy Lifestyle”)

WHAT CAN YOU DO TO KEEP YOUR BLOOD SUGAR LEVEL UNDER GOOD CONTROL?

To help control your blood sugar at a good level you need to:

- Check your blood sugar level regularly at home as indicated by your doctor or nurse
- Take the medicines and insulin injections (if needed) as ordered by your doctor
- Follow a balanced diet and get exercise as recommended by your doctor, nurse or dietician
- Do not smoke.

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CAN HERBAL PLANTS LOWER BLOOD SUGAR LEVELS?

Many common herbs or plants are claimed to be useful in lowering blood sugar levels for people with type 2 diabetes. These herbal remedies may interact with diabetes medicines, resulting in dangerously low blood sugar levels and increase the risk of other diabetes complications. Therefore, it is very important that you talk to your doctor or nurse if you have intention to use herbal plants.

IS IT SAFE TO BECOME PREGNANT WITH DIABETES AND KIDNEY DISEASE?

Having both diabetes and kidney disease is serious. If you plan to become pregnant, talk to your doctor beforehand because careful planning is important. If you become pregnant, you will be looked after by a specialist in high-risk pregnancy and a specialist in kidney disease to make sure you have a safe pregnancy and a healthy baby.

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WHERE CAN YOU GET MORE INFORMATION ABOUT DIABETES?

You can get more information from national diabetes organisations and/or associations.

Example of reliable websites:

- <http://www.diabetes.org.uk>
- <http://www.patient.co.uk/health/type-2-diabetes>
- <http://www.diabetes.org/>

KEY POINTS TO REMEMBER

- Adults with diabetes are at an increased risk of developing kidney disease
- The risk of having diabetic kidney disease can be reduced through good control of your diabetes (HbA1c at 6.5-7% or less)
- A healthy lifestyle and medicines (tablets/insulin) can help to control your blood sugar level in order to delay the progression of kidney disease
- Keep your blood pressure and cholesterol levels under good control to reduce the risk of having other complications
- Once kidney disease is established diabetes becomes difficult to control.
- Herbal remedies may interact with diabetes medicines (including insulin), resulting in dangerously low blood sugar
- If you intend to get pregnant, talk to your doctor or nurse to plan and prepare for a safe pregnancy and a healthy baby.

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