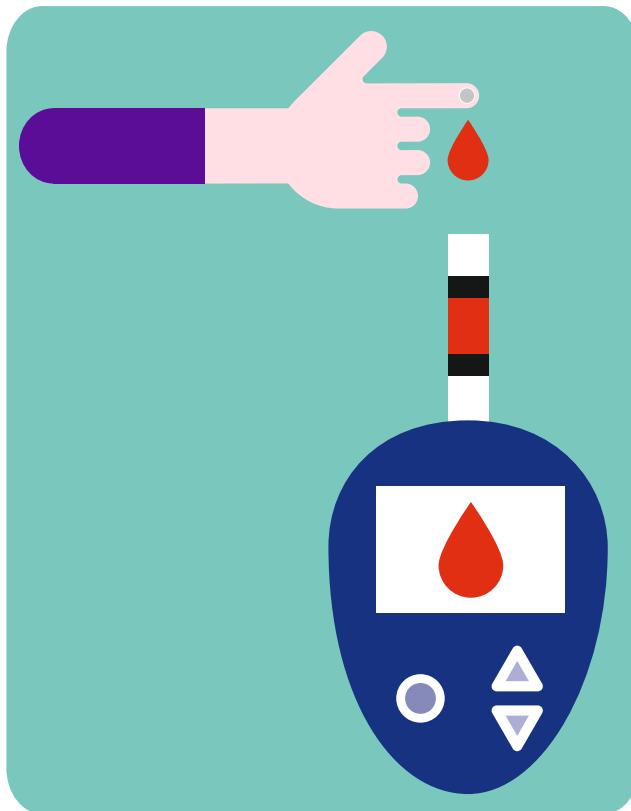


Diabetes



Developed by

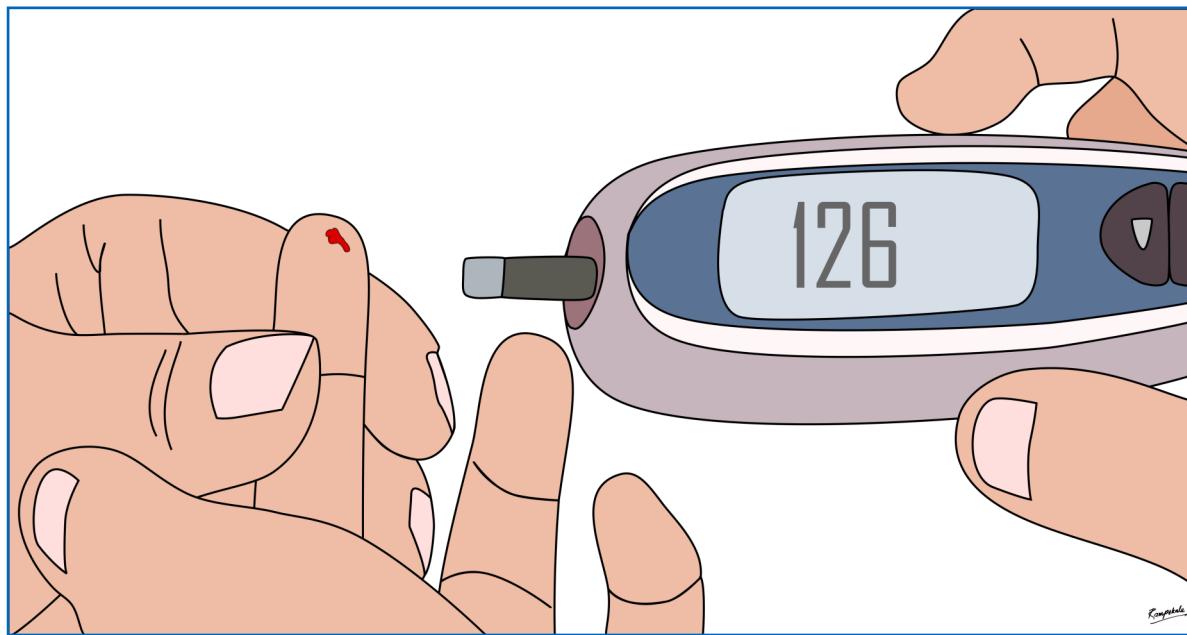
WHO Collaborating Centre for Capacity Building and Research in Community-based Noncommunicable Disease Prevention and Control

Centre for Community Medicine, All India Institute of Medical Sciences (AIIMS), New Delhi, India

What is diabetes?

Diabetes is a condition in which the level of sugar (glucose) in the blood stream is higher than normal values

Normal blood sugar for a person who has not eaten for 8–10 hours is 126 mg/dL (≥ 7.0 mmol/L).



FOR PATIENTS

What is diabetes?

- Diabetes is a condition in which the level of sugar (glucose) in the blood is high.
- The body produces insulin, a hormone secreted by the pancreas, which breaks down the sugar consumed in food.
- A reduction in the production and/or utilization of insulin causes diabetes.
- If left untreated or uncontrolled, diabetes can lead to serious problems, such as heart disease, stroke, blindness, kidney failure, among others. Some of these may be life threatening.



What is diabetes?

Diabetes is a condition in which the level of sugar (glucose) in the blood is higher than normal values.

Normal blood sugar for a person who has not eaten for 8–10 hours is 126 mg/dL (≥ 7.0 mmol/L).



FOR PATIENTS

FOR HEALTH CARE PROVIDER

Tests to check for the level of blood sugar in the blood

Blood sugar done at any time of the day is called **RPG (random plasma glucose)**:

Blood sugar in the blood stream after one has not eaten for 8–10 hours (overnight fasting) is also known as **FPG (fasting plasma glucose)**.
This is usually done first thing in the morning before breakfast.

Blood sugar tests commonly known as **glycated haemoglobin (HbA1C)**:
measures how well the blood sugar has been controlled over the past 3 months.

Tests for diabetes and normal values

Several tests can be done to estimate the blood sugar level. All these tests estimate the amount of sugar in a certain quantity of blood.

RPG (random plasma glucose): this is a blood test done at any time of the day to check the blood sugar level at that point in time. If the RPG value is ≥ 200 mg/ dL (11.1 mmol/L) of blood, it indicates that the person has diabetes. Further tests may be required for confirmation.

FPG (fasting plasma glucose): this tests the amount of sugar in the blood stream after one has not eaten for 8–10 hours (overnight fasting). This is usually done first thing in the morning before breakfast.

An FPG value ≥ 126 mg/dL (≥ 7.0 mmol/L) indicates that the person has diabetes.

Glycated haemoglobin (HbA1C): this test measures how well the blood sugar has been controlled over the past 3 months. If the HbA1C is $\geq 6.5\%$ (47.0 mmol/ mol), it indicates the presence of diabetes.

OGTT (oral glucose tolerance test): this is another type of test for diabetes. The blood sugar level is checked in the fasting state and then 2 hours after drinking a certain amount of glucose. It shows how the body processes glucose. If the 2-hour value is ≥ 200 mg/dL (11.1 mmol/L), it indicates the presence of diabetes.

Tests to check for the level of blood sugar in the blood

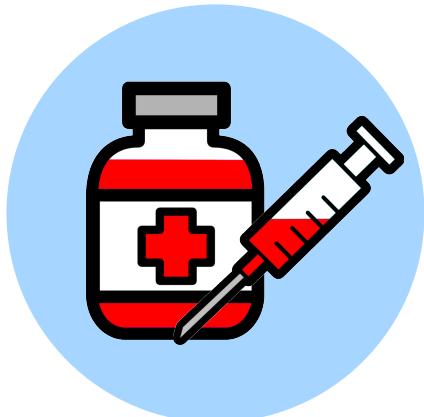
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Blood sugar tests commonly known as **Glycated haemoglobin (HbA1C):** measures how well the blood sugar has been controlled over the past 3 months.

FOR HEALTH CARE PROVIDER

What are the types of diabetes?



Type 1 diabetes

Body does not produce enough insulin



Type 2 diabetes

Body produces insulin but can't use it well



Gestational diabetes

A temporary condition in pregnancy

What are the types of diabetes?

Type 1 diabetes

- In this type 1 diabetes, the body completely stops producing insulin due to destruction of the insulin-producing pancreatic cells by the body's immune system.
- It was previously referred to as juvenile diabetes because it is usually diagnosed in **young adults or children**, or insulin-dependent diabetes, as insulin therapy is essential for survival and maintenance of good health.

Type 2 diabetes

- This is the more common form of diabetes, accounting for about 90% of cases.
- In type 2 diabetes, the pancreas either produces inadequate amounts of insulin, or the body is unable to use the available insulin properly.
- Type 2 diabetes usually occurs in **adults**, and is more common in people who are overweight or obese.
- Type 2 diabetes was previously known as maturity-onset or non-insulin dependent diabetes.

Gestational diabetes

- Gestational diabetes is a temporary type of diabetes that develops during pregnancy (gestation).
- A woman who had gestational diabetes in one pregnancy has a higher risk of developing gestational diabetes in future pregnancies.
- Although gestational diabetes reverts to normal after pregnancy, it increases the risk of type 2 diabetes in future.



What are the types of diabetes?



TYPE 1 DIABETES
Body does not produce
enough insulin



GESTATIONAL DIABETES
A temporary condition in
pregnancy



TYPE 2 DIABETES
Body produces insulin
but can't use it well

FOR PATIENTS

Who is at risk of developing type 2 diabetes



Overweight



Unhealthy diet



Old age



No physical activity



Have a family history
of diabetes

FOR PATIENTS

Who is at risk of developing type 2 diabetes

Family history: if one has a parent or sibling with type 2 diabetes, the risk of getting diabetes increases.

Age: the risk of type 2 diabetes increases with age, especially after the age of 40 years.

Race: people from certain racial backgrounds are found to have a higher risk of developing diabetes, although the reason is not known.

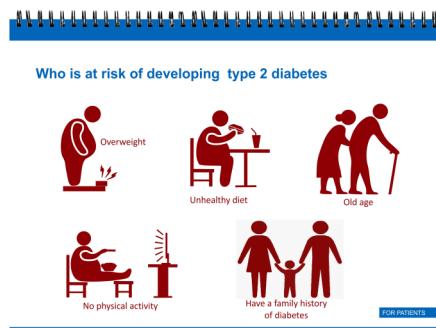
Overweight/obesity: being overweight is a primary risk factor for type 2 diabetes. The more fatty tissue one has, the more resistant the cells become to insulin. However, one does not have to be overweight to develop type 2 diabetes.

Inadequate physical activity: the less active one is, the more likely one is to develop type 2 diabetes.

Physical activity helps one control weight, use glucose as energy and increase the sensitivity of the cells to insulin.

Unhealthy diet: a diet rich in calories, saturated fats and sugar, and low in fibre can lead to an increase in body weight and thereby increase the risk for developing diabetes. Having high blood pressure or a high lipid level also puts a person at risk of developing diabetes.

Gestational diabetes: women who developed diabetes during pregnancy have a higher risk of developing type 2 diabetes. If the baby born to such a woman weighed more than 9 pounds (>4 kg), one is also at risk of developing type 2 diabetes in future



FOR HEALTH CARE PROVIDER

What are the common signs and symptoms of diabetes



Increased hunger



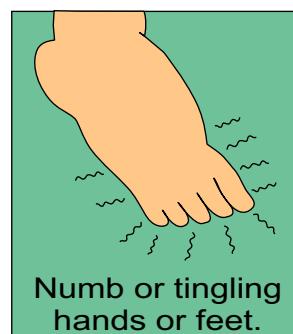
Extreme tiredness



Excessive thirst



Blurry vision



Loss of sensation in feet



Frequent urination

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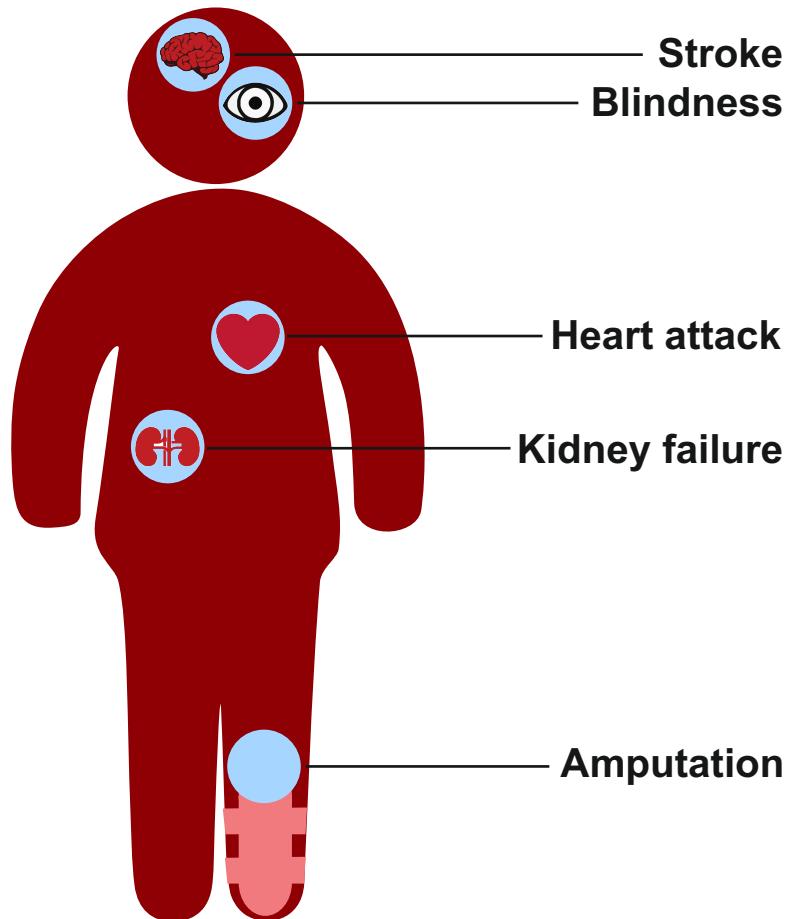
What are the common signs and symptoms of type 2 diabetes

If one has a few of the following symptoms, one may suspect diabetes:

- An affected person may become **easily tired** for no apparent reason.
- One may pass **urine more frequently** than before.
- Hunger may increase and the person may **eat more** than usual. There may be **weight loss** despite a good appetite.
- A person may become **overly thirsty** and tend to drink excessive amounts of water. This is because the body tries to compensate for the water lost through the urine.
- A high blood sugar level makes it hard for the body to fight infections. **Wounds do not heal easily**, there may be frequent infections of the skin, bladder or gums, and itching in the genital area.
- Diabetes can affect the eyes. High blood sugar levels can cause the lens to swell, and the **vision may become blurred or foggy**.
- There may be **numbness or tingling** in the hands and feet due to effects on the nerves.



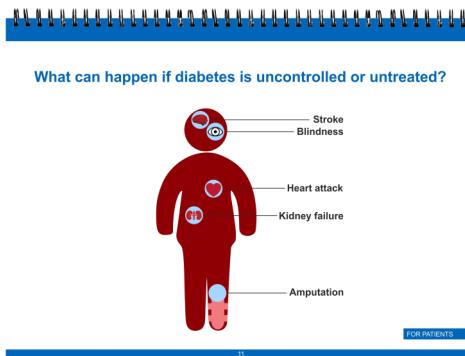
What can happen if diabetes is uncontrolled or untreated?



FOR PATIENTS

What are the complications (consequences) of diabetes?

- **Brain:** stroke
- **Heart:** myocardial infarction, angina
- **Blood vessels:** atherosclerosis, dyslipidemia
- **Kidneys:** chronic kidney disease, renal failure requiring dialysis
- **Eye:** retinopathy, blindness
- **Nerves:** neuropathy (loss of sensation, pain, tingling sensation)
- **Foot:** nerve damage increases the chance for foot ulcers, infection and eventual need for limb amputation
- **Sexual function:** erectile dysfunction



FOR HEALTH CARE PROVIDER

What are the treatment options for diabetes?

- Oral tablets



- Insulin injection



FOR PATIENTS

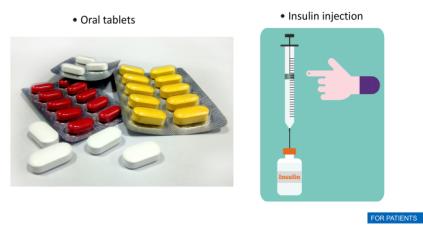
What are the types of treatment for diabetes

Various medicines can be used to treat diabetes.

- Treatment depends on the type of diabetes, complications, presence of other risk factors, coexisting active medical problem, age and general health at the time of diagnosis.
- Type 2 diabetes is usually treated with oral medicines but insulin injections may be prescribed if oral medications do not adequately control the blood sugar level.
- Apart from taking pills, injectable medicines may also be used.
- Insulin is currently not available in pill form, and hence it must be injected. There are also non-insulin medicines that are injectable.
- Insulin is mandatory for people with type 1 diabetes.



What are the treatment options for diabetes?



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FOR HEALTH CARE PROVIDER

How can you lead a healthy life with diabetes?

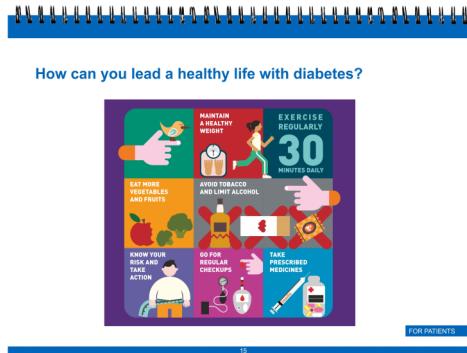


FOR PATIENTS

How can you lead a healthy life with diabetes?

Simple lifestyle changes can help in the preventing or delaying the onset of type 2 diabetes.

- Achieve and maintain a **healthy body weight**.
- **Be physically active** – at least 30 minutes of regular, moderate-intensity activity on most days.
More activity is required for weight control.
- **Eat a healthy diet** of between three and five servings of fruit and vegetables a day, and reduce the intake of sugar, salt and saturated fats.
- **Avoid tobacco use** and harmful use of alcohol.
- Manage **stress**.
- Test the **blood glucose** and glycated haemoglobin levels **regularly**.



FOR HEALTH CARE PROVIDER

Healthy diet for diabetics

- The diet for diabetic individuals is the same as for persons without diabetes.
- Make sure that the diet is healthy
- Maintain healthy eating habits to control the blood sugar level



FOR PATIENTS

Healthy diet for diabetics

The diet for diabetic individuals is the same as for persons without diabetes.

Diabetic people do not need a special diet. Make sure that the diet is healthy and maintain healthy eating habits to control the blood sugar level.

A healthy diet comprises complex carbohydrates (whole grain cereal) low in fat and has plenty of green leafy vegetables and fruits.

With proper planning, one can still enjoy a wide variety of favourite food.



Healthy diet for diabetics

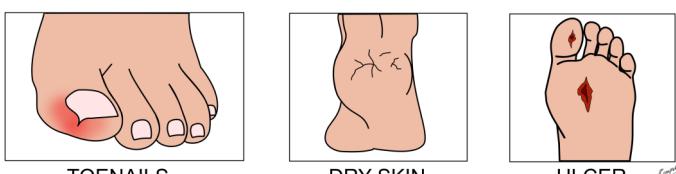
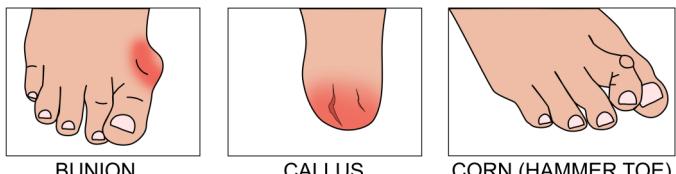
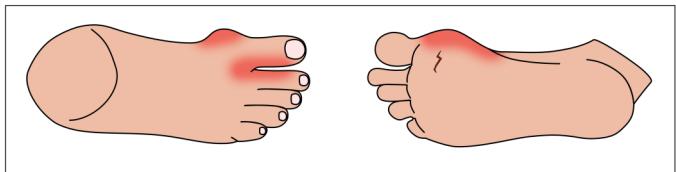
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FOR PATIENTS

Why do individuals with diabetes need to take special care of their feet

COMMON DIABETIC FOOT PROBLEMS



Individuals with diabetes can unknowingly injure their feet due to reduced sensation.

Check your feet everyday for cuts or ulcers



Cut your toenails straight

FOR PATIENTS

Why do individuals with diabetes need to take special care of their feet

- Foot problems are an important cause of complications in individuals with diabetes.
- Over the years, the blood circulation in the legs and feet may become poor and the nerves become less sensitive.
- Individuals with diabetes can unknowingly injure their feet due to reduced sensation.
- Patients at risk for developing problems of the feet are often more than 40 years or age, use some form of tobacco, have decreased sensation in and blood flow to the legs and feet, anatomical deformities or a history of foot ulcers or previous amputation.
- To prevent foot complications, individuals with diabetes should check regularly for various foot conditions, such as bleeding corns and calluses, blisters, ingrowing toenails, dry and cracked skin, redness, swelling, warmth, pain over the legs, slow healing of wounds, and loss of sensation.

Why do individuals with diabetes need to take special care of their feet

COMMON DIABETIC FOOT PROBLEMS

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BURSTON CALLUS CORN (HAMMER TOE)

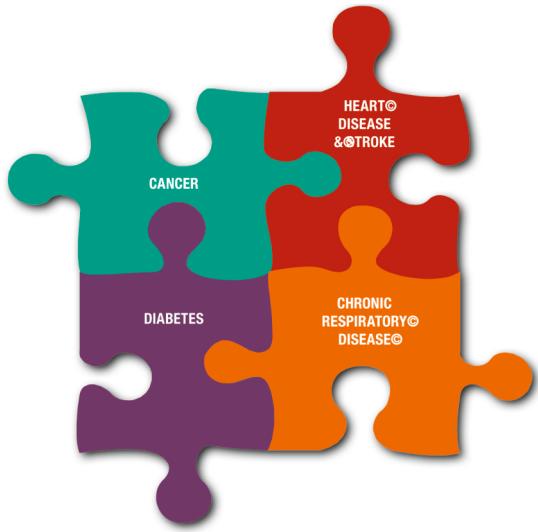
TOENAILS DRY SKIN ULCER

Check your feet everyday for cuts or ulcers

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FOR PATIENTS

FOR HEALTH CARE PROVIDER



**World Health
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Regional Office for South-East Asia