

Managing Diabetes



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Diabetes Mellitus

Diabetes Mellitus (commonly known as diabetes) is a type of disorder by which the level of glucose (sugar) in the blood is abnormally high because the body does not produce enough insulin (a hormone that controls the amount of sugar in blood) to move the glucose into the cells. The resulting high levels of glucose in the blood and the inadequate amount of glucose in the cells together produce the symptoms and complications of diabetes.

Diabetes in Singapore

According to the National Health Survey 2010, one out of 5 people aged 50 – 59 has diabetes and one out of 3 people aged 60 – 69 has diabetes.

Types of Diabetes

There are two main types of diabetes - Type 1 diabetes and Type 2 diabetes.

Type 1 Diabetes

Type 1 diabetes (used to be known as juvenile-onset diabetes or insulin-dependent diabetes) affects about 5 – 10% of all people with diabetes. Most people who have type 1 diabetes develop the disease before age 30.

In Type 1 diabetes, the pancreas stops producing insulin. The illness and symptoms develop quickly (over the span of days or weeks) because the level of insulin in the bloodstream becomes too low.

Type 2 Diabetes

Type 2 diabetes (used to be known as adult-onset diabetes, or non-insulin-dependent diabetes) affects about 90% of all people with diabetes. Most people who have Type 2 diabetes develop the disease after age 40. Generally it occurs in people who are overweight or obese and but it also tends to run in the family.

In Type 2 diabetes, the pancreas continues to produce insulin. However, the body develops resistance to the effects of insulin such that there is not enough insulin to meet the body's needs. The symptoms generally do not develop as quickly as in Type 1 diabetes and may often be vague at first.

Who is likely to develop Diabetes Mellitus?

Certain risk factors increase the chance of developing diabetes.

You are at a higher risk if you:

- have a first-degree relative with type 2 diabetes (first degree relative can be parents, siblings, or children).
- lead an inactive lifestyle.
- have a body mass index (BMI) greater than 23.0 kg/m²; the risk is even higher if your BMI is greater than 30.0 kg/m² (obese).

- have impaired glucose tolerance (IGT) (blood glucose level is higher than normal but not high enough to be diagnosed as diabetes).
- have impaired fasting glycaemia (IFG) (inability to regulate glucose effectively)
- have hypertension (blood pressure of 140/90 mmHg or higher).
- have coronary heart disease.
- have hypercholesterolemia (HDL cholesterol less than 1.0 mmol/L, and/or triglyceride level more than 2.30 mmol/L).
- have polycystic ovary disease.
- have diabetes or impaired glucose tolerance during pregnancy.
- have given birth to a child that weighs over 4 kg.



Signs & Symptoms

The two types of diabetes have very similar symptoms.

- Abnormal thirst
- Excessive hunger
- Excessive urine
- Dry skin
- Weight loss
- Fatigue
- Poor healing of cuts or wounds

These symptoms appear as a result of excessive glucose in the blood or 'hyperglycemia'.

For people with Type 1 diabetes, the symptoms often begin abruptly and dramatically. On the other hand, for people with Type 2 diabetes, the symptoms may be subtle or they may not have any symptoms for years or decades before they are diagnosed.

Complications of Diabetes

Most complications are the result of damages to blood vessels and nerves. A high sugar level over a long period of time causes narrowing of blood vessels. The narrowing reduces blood flow to many parts of the body, leading to some of the following complications:

- Cardiovascular problems such as stroke and heart attacks
 - 1 out of 3 people with diabetes in Singapore suffer from heart related diseases
 - Stroke occurs in 6.6% of people with diabetes as compared to only 1.8% without diabetes
- Kidney problems which may ultimately develop into kidney failure
 - 2 out of 5 people with diabetes in Singapore require kidney dialysis
- Eye problems (retinopathy) which may ultimately affect vision
 - 1 out of 5 people with diabetes in Singapore is in danger of losing their sight
- Peripheral neuropathy or nerve damage in legs, feet, arms and hand, resulting in numbness, tingling sensation, sharp pain, loss of balance and coordination
- Foot problems, which start out as blisters and sores, but if left untreated can lead to infection and gangrene
 - Over 700 amputations are performed annually in Singapore due to diabetes
- Erectile dysfunction or impotency

Managing Diabetes

Although diabetes cannot be cured, it can be controlled. When the blood glucose is brought down close to normal, symptoms and complications of diabetes can be prevented. Therefore, it is important to stay positive and focused on the treatment.

Treatment Goals

The goal of diabetes treatment is to keep blood sugar levels within the normal range as much as possible.

You should reduce any other 'risk factors' that may increase your risk of developing complications. In particular, lower your blood pressure if it is high, and keep your blood cholesterol low. If you smoke, consider quitting as smoking is considered a high risk factor for complications.

Detect any complications as early as possible. Treatment can prevent or delay some complications from worsening.



Lifestyle modifications

This is essential for everyone with type 2 diabetes, regardless of whether medications have been prescribed.

1. Regular Exercise

Regardless of your weight, exercise will help you maintain a healthy blood glucose level. It also helps maintain your blood pressure and blood cholesterol at a healthy level.

Do at least 150 minutes of moderate-intensity aerobic exercises or 75 minutes of vigorous-intensity exercises per week. Each session should be at least 10 minutes in duration.

Types of Exercises:

- **Moderate-intensity aerobic exercises**
Causes a slight increase in breathing and heart rate, so you are still able to talk but not sing.
Eg. brisk walking, badminton, dancing, low impact aerobics and table tennis
- **Vigorous-intensity aerobic exercises**
Causes heavy breathing and an increase in heart rate, so you can say no more than a few words without pausing for a breath
Eg. jogging, soccer, fast bike riding, high impact aerobics, netball, basketball and singles tennis

Precautions:

- If you have not exercised for some time, consult your family doctor before starting any exercise program.
- Use a glucometer to make sure that your blood glucose is between 5.5 to 13.8mmol/L before exercise. Check your blood glucose after exercise as well.
- Trembling, giddiness and confusion during exercise are symptoms of low blood glucose.
- Wear comfortable clothes and proper sport shoes
- For about 3-4 times a week, start out with low-intensity exercises like walking for 10-15 minutes, then gradually increase the duration up to 60 minutes.

2. Weight Control

Maintain a healthy weight and a healthy Body Mass Index (BMI) of between 18.5kg/m² and 22.9kg/m². Losing the excess weight will help your body absorb the glucose in your blood better, which in turn lowers your blood glucose level.

Your BMI can be calculated by the following formula:

$$\text{BMI} = \frac{\text{Your Weight (kg)}}{\text{Height (metres)} \times \text{Height (metres)}}$$

A slow, gradual weight loss rather than rapid weight loss is recommended. Weight loss should not exceed 1 kg per week.

3. Maintain a Balanced and Healthy Diet

While it is true that carbohydrates are responsible for the amount of blood glucose in our body, it is unhealthy to avoid carbohydrates altogether. It is important to eat a well balanced diet that contains a variety of foods:

- Increase your consumption of wholegrain and fibre e.g. brown rice, oat, wholemeal or wholegrain bread and biscuits.
- Aim to eat the recommended 2 servings of fruits and 2 servings of vegetables daily.
- Spread out the amount of carbohydrates you eat throughout the day. Eat small, frequent but regular meals.
- Learn to read nutritional labels.
- Look out for 'the healthier choice symbol' on food packaging
- Avoid trans-fat such as factory-made cakes, pastries and biscuits
- Use low-fat cooking methods, such as broiling, steaming and grilling
- Substitute saturated cooking oil, such as palm oil, for healthier options such as sunflower oil, soybean oil, corn oil, olive oil or canola oil
- Experiment with herbs and spices to reduce your intake of salt and sauces

Talk to a pharmacist or dietitian to get more information about planning a balanced and healthy diet.

4. Quit Smoking

Nicotine increases the risk of both Macrovascular and Microvascular complications in individuals with diabetes. Macrovascular complications include coronary artery disease, peripheral arterial disease, and stroke, and Microvascular complications include diabetic nephropathy, neuropathy, and retinopathy.

Diabetic smokers are 3 times more likely to die of diseases such as heart attacks and stroke.

5. Avoid Alcohol

While moderate amounts of alcohol can cause your blood sugar to rise, excessive amounts of alcohol can actually decrease your blood sugar level, sometimes causing it to drop to dangerously low levels.

Alcohol also interferes with oral diabetic medications.



Medication for Diabetes

Medication is required for Type 2 Diabetes patients if regular exercise and a healthy diet are not effective in controlling blood glucose levels.

Depending on your blood glucose level and health conditions, your doctor may prescribe one or more anti-diabetic medications. Some drugs may cause hypoglycemia (low blood glucose) and you may be required to have a meal immediately after taking the tablets to lower the risk. Other side effects such as nausea, vomiting and flatulence may be expected with different oral drugs and you should inform your doctor about your symptoms on the next visit.

Long-term control of diabetes is crucial to reduce the risk of complications. Treatment and medications should not be stopped or adjusted without consulting your doctor. If you experience unpleasant side effects, you should inform your doctor on the next visit instead of adjusting the medications yourself. Return for your follow-up appointments on time and ensure that you have enough medications to last until your next appointment. Missing any doses will affect the control of your diabetes.

Some medications that you may be prescribed are Metformin, Sulphonylureas, Acarbose, Glitazones, Gliptins (DPP-4 inhibitors), Exenatide and Insulin. Consult your pharmacists or doctor for more information about your medications.



About Hypoglycemia

Hypoglycaemia occurs when the level of glucose is too low, usually under 4 mmol/L. It can be caused by:

- Drugs taken to control diabetes
- Delayed or missed meal
- Some severe diseases
- Reactions to carbohydrates, etc

Symptoms of hypoglycemia include: trembling, sweating, anxiety, blurred vision, tingling lips, paleness, mood change, weakness or confusion.

Hypoglycemia can be treated by:

- Taking a sugary drink or some sweets
- Half a glass of fruit juice or non-diet cola (120-180ml)
- 2 teaspoons of sugar or honey
- 3 cubes of sugar

Repeat if there is no improvement after 10 minutes. This can be done up to 3 times.

Call an ambulance if symptoms persist.

Self Care

Foot Care

Diabetics are at a higher risk of foot problems, which in serious cases can lead to amputations. Therefore, it is important to know how to care for your feet.

- Wash your feet with soap and water daily.
- Dry them fully after washing, especially between the toes.
- Toe nails should be kept short and trimmed straight across to avoid ingrown nails.
- Apply moisturizers on your feet to prevent dryness and cracking of skin.
- Examine your feet daily for sores, cuts and blisters. Use a mirror to check the underside of your foot.
- If you have any corns or wounds that are not healing well, see your doctor as soon as possible and avoid self-medication with over-the-counter products.
- It is important to get well-fitted comfortable shoes to prevent any injuries to your feet.
- Check the inside of your shoes regularly to ensure there are no sharp edges.
- Socks should be clean with loose fitting elastic tops.

Self-monitoring of blood glucose (SMBG)

SMBG is an important part of taking control of your diabetes and can greatly help in achieving your treatment goals.

How often should you perform SMBG?

- For patients with type 1 diabetes, monitoring 3-4 times a day is recommended depending on your needs and goals. Some patients may even need to perform SMBG at 2 am or 3 am if hypoglycemic symptoms such as nervousness, tremulousness, giddiness or sweatiness are present at night.
- For insulin-treated type 2 diabetic patients, testing 2 or 3 times a day, 2 to 3 days a week is appropriate, depending on blood glucose targets.

The frequency of monitoring may need to be increased if there are changes in your daily routine, alterations of treatment regimens or concurrent illnesses.



How to choose the right blood glucose meter?

With so many choices out there, here are some factors you should consider before buying:

- The amount of blood required for blood glucose testing. Blood sample size ranges from 0.3 (amount that would fit on the head of a pin) to 4.0 microlitres.
- Size of the meter and test strip. Small meters are more portable, but are also more difficult to use.
- Size of the meter display, especially if you have vision problems.
- Size and type of test strips. Check if the test strips are too small, or if you would prefer using a meter that uses cartridges instead of individual strips.
- The speed that the meter takes to complete the test
- The number of test results the meter can store in its memory
- The cost of the meter and test strips
- Availability of alternate site testing, allowing you to take blood samples from alternate sites such as the forearm
- Availability of smart functions
 - Some meters have sophisticated data management systems that can track diet and exercise
 - Some meters allow you to upload your blood glucose readings to your computer. Check with the manufacturer for compatibility with your computer before purchase.

Your pharmacist can show you the proper way to use the meter and help you choose the right blood glucose meter that meets your needs and lifestyle preferences.

Conclusion

- Adopt a healthy lifestyle such as proper nutrition and regular exercise
- Know your medications and take them correctly
- Establish goals and action plans together with your doctor and pharmacist
- Check your blood glucose regularly at home as advised by your doctor or pharmacist
- Go for regular monitoring and follow-ups

**Control Diabetes,
don't let it control you!**

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