NATIONAL DIABETES REFERENCE MATERIALS

Content page

Content page

INTRODUCTION

You can lead a fulfilling life even with diabetes!

Start by understanding the disease, leading a healthier lifestyle, and looking after your condition proactively






You can lead a fulfilling life even with diabetes!

- **Eat sensibly** – choose wisely, eat enough
- If required, take your medication or insulin appropriately; seek medical advice if you feel ill

Enjoy your life with activities like

- Brisk walking in the park or neighbourhood
- Physical sports with friends (e.g., badminton)
- Gardening
- Caring for grandchildren
- Hobbies requiring good vision and fine motor skills
- Fun and active hobbies with friends

BE AWARE

About Diabetes

What is diabetes?

Diabetes is a condition where your body cannot manage sugar properly, resulting in too much sugar in your blood.

Diabetes is a common and serious condition in Singapore!

1 in 3
Singaporeans is at risk of developing diabetes

Close to 1 in 10
Singaporeans has diabetes

2 in 3
individuals with newly diagnosed kidney failure have diabetes

1 in 3
individuals diagnosed with diabetes continues to have high blood sugar levels

1 in 3
individuals with diabetes does not know he or she has it

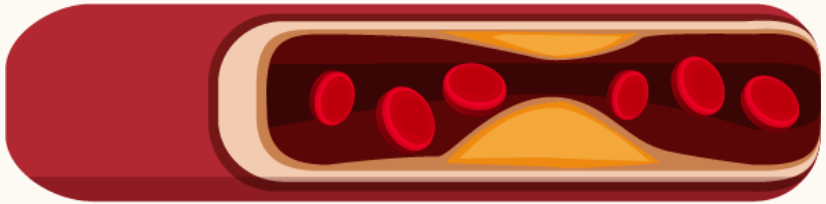
1 in 3
individuals with diabetes has eye disease

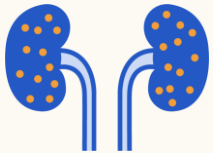
Every day,
about **4** individuals with diabetes **undergo amputations due to complications**

Diabetes can cause complications for your body

High blood sugar | **High blood pressure** | **High blood cholesterol**

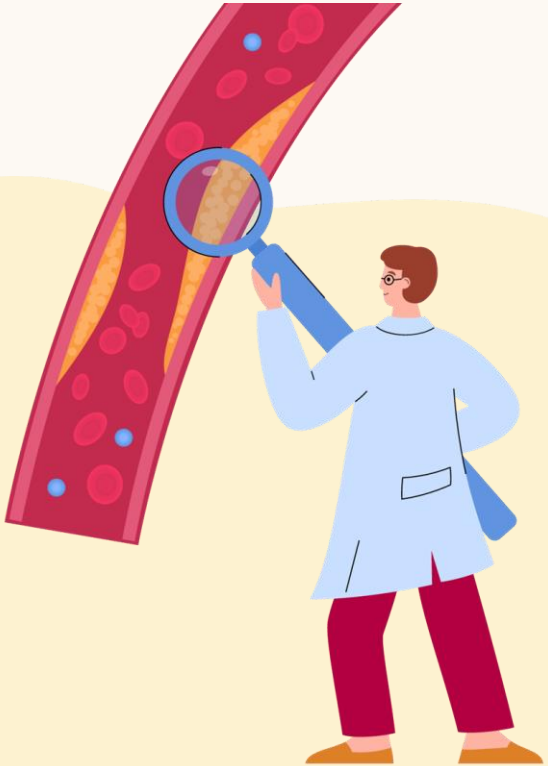
Blood vessel damage



Brain	Eyes	Teeth	Heart	Kidneys	Feet
					
Stroke	Blindness	Tooth decay, gum disease	Heart attack	Kidney failure	Ulcer, Amputation

Diabetes can cause complications for your body

- High blood sugar, high blood pressure and high blood cholesterol will **damage blood vessels**
- **You may not know of the damage** until you screen for these complications



Small blood vessel (microvascular) damage

- Nerve damage (neuropathy)
  - ↳ Loss of feeling in the feet
  - ↳ Increased risk of foot ulcers and infections
- Eye disease (retinopathy)
- Reduced kidney function (nephropathy)

Large blood vessel (macrovascular) damage

- Stroke (cerebrovascular disease)
- Heart disease (cardiovascular disease)
- Circulatory problems (peripheral vascular disease)

Types of diabetes mellitus

Type 1 diabetes

- This occurs when the **pancreas does not produce enough insulin** for normal body function.
- This may be due to an **autoimmune condition** whereby the body's immune system attacks and destroys the beta cells of the pancreas, making it unable to produce insulin.
- Not caused by diet and lifestyle.
- While it typically develops in children or early adulthood, it can also happen to people of other ages.

Type 2 diabetes

- Most common form of diabetes.
- Usually occurs when the **body's cells do not respond well or are resistant to the body's own insulin.**
- Commonly associated **with being overweight** and having **excessive body fat** (under the skin and around the internal organs).
- Typically develops in older adults (risk increases for those above 40 years).

Gestational diabetes

- Some women develop higher blood sugar levels **during pregnancy**, which usually normalise after delivery.
- Increased risk of developing diabetes later on in life.
- Visit https://go.gov.sg/parenthub-gdm-p5 to find out more about Gestational Diabetes.

Symptoms

It can be difficult to distinguish Type 1 from Type 2 diabetes.
They share many similar symptoms, and the differences are slight.

Symptoms that may be common to both*

- Need to urinate often (especially at night)
- Feels thirsty often
- Losing weight without trying
- Often hungry
- Blurred vision
- Numbness or tingling in hands/feet
- Gets tired easily, or lacks energy
- Dry skin
- Sores/wounds that take a long time to heal
- Prone to infections (commonly involving skin, urine or lungs)

*May not be experienced by all

How Type 1 and Type 2 diabetes present

Type 1 diabetes

Fast onset, often over a few days.
When symptoms are ignored, it can lead to serious complications such as Diabetic Ketoacidosis (DKA), when acids known as ketones build up in the bloodstream.

Type 2 diabetes

May not have obvious symptoms or **the symptoms can be easily missed.** If ignored, they can lead to serious complications such as Hyperosmolar Hyperglycaemic Syndrome (HHS), when blood sugar is dangerously high and the body becomes severely dehydrated.

What is pre-diabetes?

- Pre-diabetes is when your blood sugar levels are **higher than normal but not high enough to be diagnosed with diabetes.**
- Having pre-diabetes puts you at an **increased risk of Type 2 diabetes.**
- Making lifestyle changes, such as healthy eating, **can delay the progression to diabetes or reverse pre-diabetes.**
- People with pre-diabetes usually have no symptoms. **The only way to diagnose if you have pre-diabetes is through blood tests.**

BE AWARE

How Diabetes Develops

Risk factors for developing pre-diabetes and Type 2 diabetes

Family member(s)
known to have diabetes

History of diabetes
during pregnancy

40 years of age and above

Body Mass Index (BMI) of 23.0 kg/m² or higher

Inactive (sedentary) lifestyle

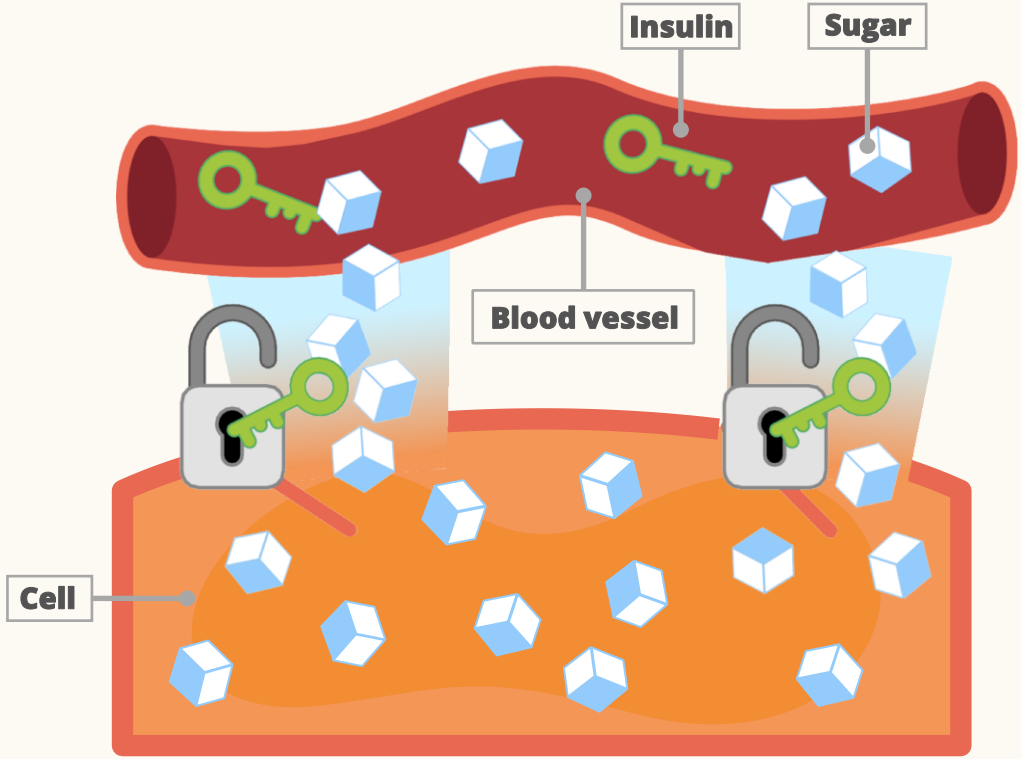
Unhealthy eating habits

How insulin works in a healthy person

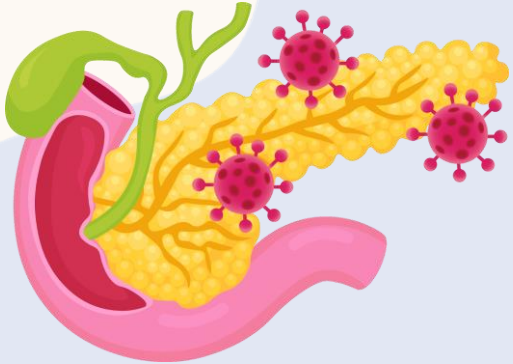
Insulin is a hormone that helps control the blood sugar level in your body.

It is produced by beta cells in one of our organs called the pancreas (insulin factory).

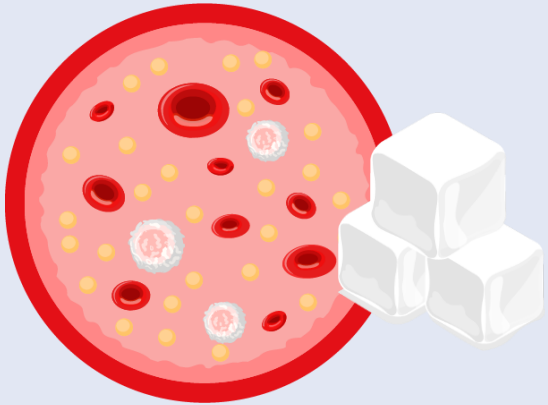
Insulin moves sugar (glucose) into the cells, which is then used to **generate energy** and maintain normal body functions.



How Type 1 diabetes develops

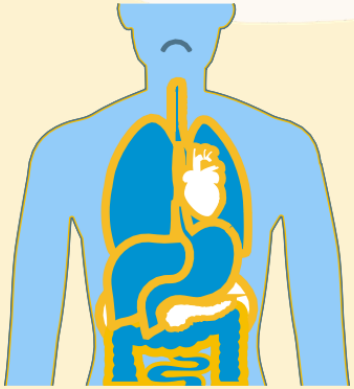


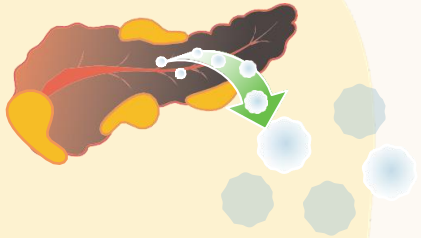
- Body's immune system **destroys the insulin-producing beta cells of the pancreas** (insulin factory). The body is **unable to produce sufficient insulin.**



- Without insulin, the body is unable to move glucose from the bloodstream into the body cells to use for energy. **As a result, blood sugar levels remain high.**

How Type 2 diabetes develops

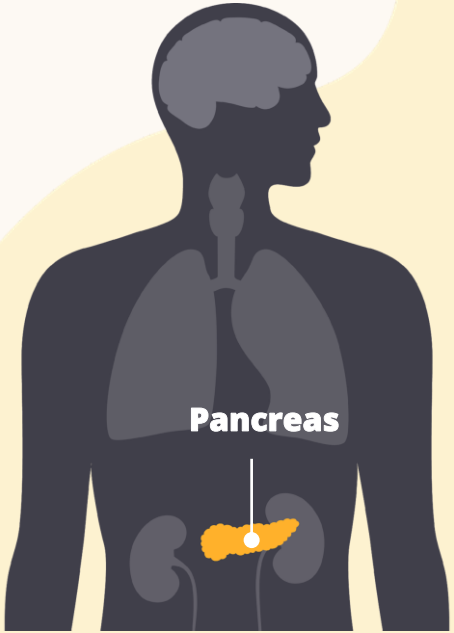


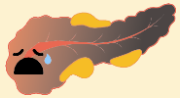


- **Frequent intake of sugar and refined carbohydrates** causes blood sugar levels to rise, forcing the pancreas (insulin factory) to work harder to produce more insulin to control blood sugar levels.
- **As the body does not require this excess sugar for energy, it is converted and stored as fat.** If there is excess fat in the body, the body cells do not respond well to insulin. **More insulin is needed to move sugar from the bloodstream into body cells, further stressing the pancreas.**
- Over time, **the overworked pancreas becomes damaged and produces less insulin,** making it harder to keep blood sugar levels normal.

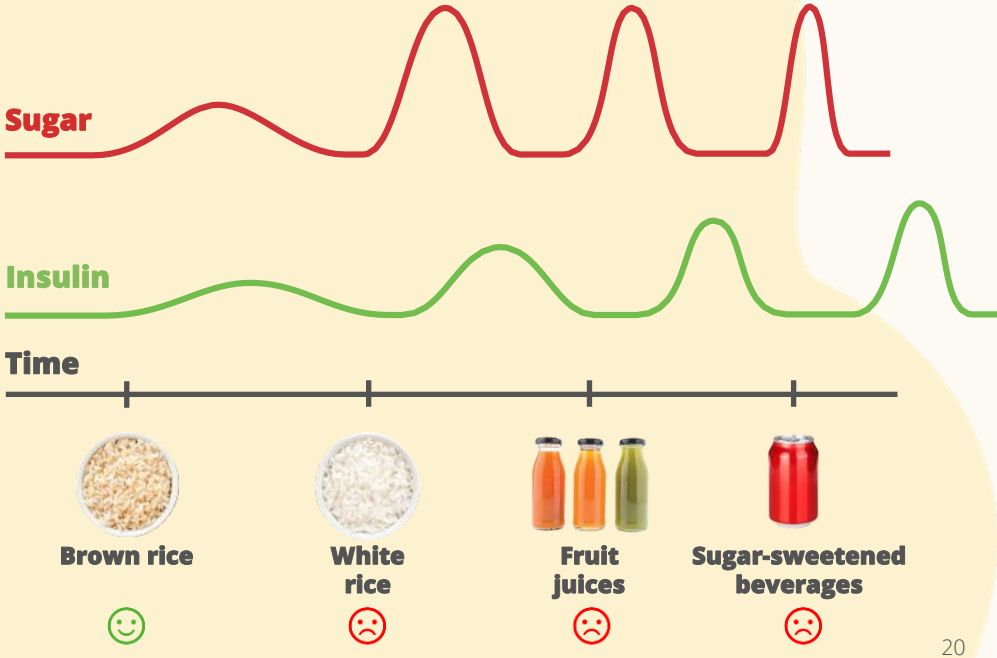
High blood sugar levels cause your pancreas (insulin factory) to work harder

Eating food high in sugar causes blood sugar levels to rise,
forcing the pancreas to produce more insulin to control blood sugar level.

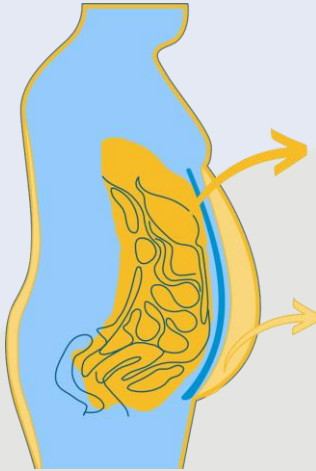




Overworked pancreas



Excess (unused) sugar in your body is stored as fat

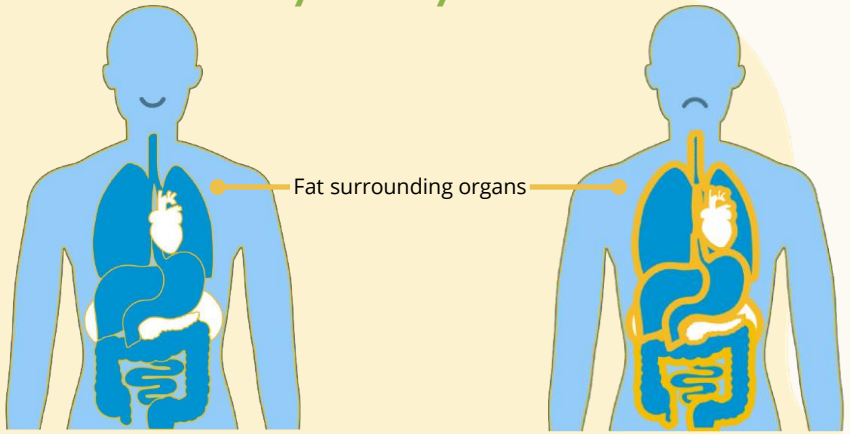


Where is the fat stored?

Fat surrounding the organs and muscles (this is not visible to us)

Fat under the skin (this is visible to us)

There may be excess fat in your body even if you look thin



Healthy
Less internal fat

TOFI (Thin Outside, Fat Inside)
More internal fat even though the person appears to have less fat under the skin. **If you are TOFI, you are also at risk of diabetes.**

*You are likely to have excess internal fat if you have **an apple-shaped body**.*

Excess internal fat can cause problems

Internal fat

Fat surrounding internal organs, and those which enters organs and muscles, can lead to inflammation and damage of body cells.

Consequences of excess fat in the body

- Insulin resistance, high blood pressure, high LDL-cholesterol, low HDL-cholesterol and high triglycerides.
- Excess internal fat can cause damage to the pancreas and other organs.

BE AWARE

What can I do to manage diabetes?

Myths and Facts

Myths	Facts
Individuals with diabetes should **never consume sugar**	With good diabetes control and knowing your personal requirements, **you may be able to include some sugars into your daily eating plan.**
Individuals with diabetes **cannot exercise**	**You can safely exercise as long as you can keep a close watch on your blood sugar levels.** If you are on insulin and oral tablets like sulphonylureas, adjust your dose if necessary, and pack some snacks to consume in the event of hypoglycaemia (low blood sugar).
Individuals with diabetes can be **cured by taking insulin**	**Taking insulin helps you manage the condition, but it will not make the disease go away.**

What can you do?

For both Type 1 and Type 2 diabetes

- Know your targets for glucose control and weight
- Follow a healthy diet plan
- Exercise regularly
- Take your prescribed medications in a timely and regular manner
- Prioritise your emotional and mental well-being

For Type 1 diabetes and Type 2 diabetes requiring insulin treatment

- Take insulin **injections** as prescribed by your doctor
- Monitor blood sugar as advised by your healthcare team

BE AWARE

Tips for those with Type 1 diabetes

Carbohydrate counting

When you have Type 1 diabetes, you need to give yourself insulin doses that correspond to the amount of carbohydrates you consume.

Carbohydrate counting helps you adjust your insulin doses based on the amount of food and drinks you consume.

What are carbohydrates?

Carbohydrates are a type of nutrient found in foods and drinks

When your body digests food and drinks that contain carbohydrates, they are broken down into glucose, which is your body's preferred source of energy.

Link between carbohydrates and insulin

When you consume big amounts of carbohydrates, your blood sugar level will be high and a greater amount of insulin is required to bring your glucose level back down to normal level.

Speak to your care team on a treatment plan personalised to your needs.

Know what to do when you fall sick

- Seek medical attention immediately if you cannot eat/ drink/ take your medication or insulin, or if you are feeling increasingly drowsy or confused.
- Keep eating or drinking. If you have difficulty taking normal meals, take snacks or drinks in small frequent portions throughout the day.
- If you are experiencing low glucose levels (below 4 mmol/L or your target range), follow the 15-15 rule: take 15g of fast-acting sugars, re-check in 15 minutes and repeat if still low.

Know what to do when you fall sick

Learn the signs of diabetic ketoacidosis (DKA):

High blood sugar

Thirst

Frequent urination

Drowsiness

Nausea or vomiting

Abdominal pain

Difficulty breathing

Fruity odour breath

Confusion

If you are experiencing any symptoms of DKA,
please seek medical attention immediately as this is an emergency.

Know what to do when you fall sick

- If your blood sugar level readings are over 16 mmol/L more than two times in a row, it is a sign that you should seek medical attention fast for further investigation (e.g., checking ketone levels in the blood) unless you have been otherwise advised by the main doctor looking after your diabetes. High ketones could mean DKA which is a medical emergency.

- Be sure to speak to your healthcare team to learn what you should do. A plan would include: when to seek medical attention, how often to check your blood sugar level, what foods and fluids to take during your illness, how to adjust your insulin or oral medication if you need to, if and when you need to check for ketones.

Coping tips for Type 1 diabetes

- **You can live a normal full life and manage your diabetes well.**
- You will be expected to make some adjustments, changes and take medications.
- Discuss with your healthcare team to develop an individualised treatment plan that works for you.
- Be prepared to **learn day-to-day living with diabetes skills** such as making decisions about types and amount of food, insulin doses, glucose monitoring, engaging in exercise, how to respond to different glucose levels and what to do when you feel unwell (**Sick Day Advice** – discuss this with your healthcare team).

Coping tips for Type 1 diabetes

- **Do not change, discontinue or stop any medication, treatment or therapy** without first speaking to your healthcare professional.
- It is important that you do not miss your appointments, blood and urine checks or diabetes-related complications screening.
- It is important where possible to involve your family, friends, colleagues and others in your care, especially when you are facing different stages in your life such as a new job, planning to start a family etc.
- You may wish to consider help with the emotional, psychological and social aspects of having diabetes.
- Expect that it may be necessary for changes to be made along the way.

Where can you seek help?

For more in-depth information on Type 1 diabetes, please speak to an endocrinologist/healthcare professionals or reach out to support groups. You may also refer to the links below for resources:

typeOne.sg Facebook Group
https://www.facebook.com/groups/317249489081585/about/

AIC Care Services
https://www.aic.sg/care-services

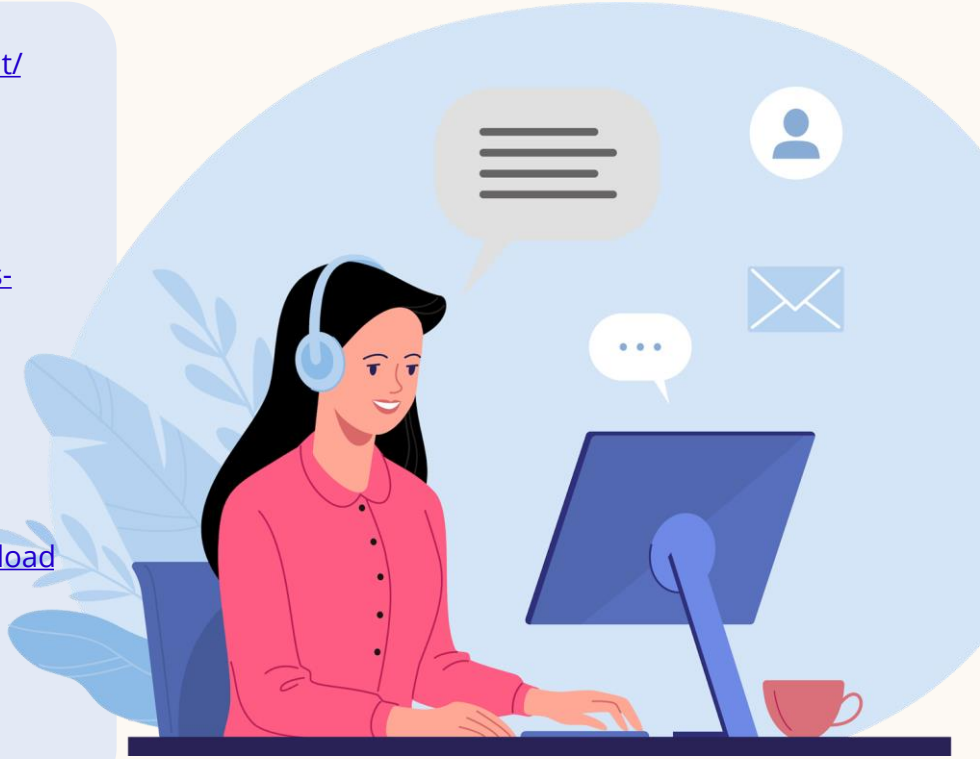
MOH Healthcare Schemes & Subsidies
https://www.moh.gov.sg/cost-financing/healthcare-schemes-subsidies

MOH Search for Healthcare Professionals
https://www.moh.gov.sg/hpp/all-healthcare-professionals/healthcare-professionals-search

Listing of Licensed Healthcare Institutions
https://www.hcidirectory.gov.sg/hcidirectory/clinic.do?task=load

National Council of Social Service
https://www.ncss.gov.sg/social-services/caregivers

National Care Hotline
1800-202-6868



BE AWARE

Traditional and Complementary Medicine

Traditional & Complementary Medicine (T&CM)

Traditional Chinese Medicine and acupuncture

Traditional medicines like Ayurveda

Herbal medicines and supplements

Traditional and complementary medicine (T&CM) aims to supplement general health and is not an alternative treatment for diabetes. The concurrent use of T&CM with diabetic treatments may not be suitable for all. Improper T&CM use has caused harm like burns from moxibustion. Such risks are greater in individuals who have complications arising from diabetes e.g., decreased feeling or sensation due to neuropathy, or kidney failure. Please speak to your doctor before starting any T&CM treatment.

Traditional & Complementary Medicine (T&CM)

Before I consider starting on T&CM

Continue with Western medicine unless otherwise advised by your doctor

Seek **advice from a T&CM practitioner** before taking herbal medicines or supplements

Continue to **monitor your blood sugar** as advised

What I need to know about T&CM

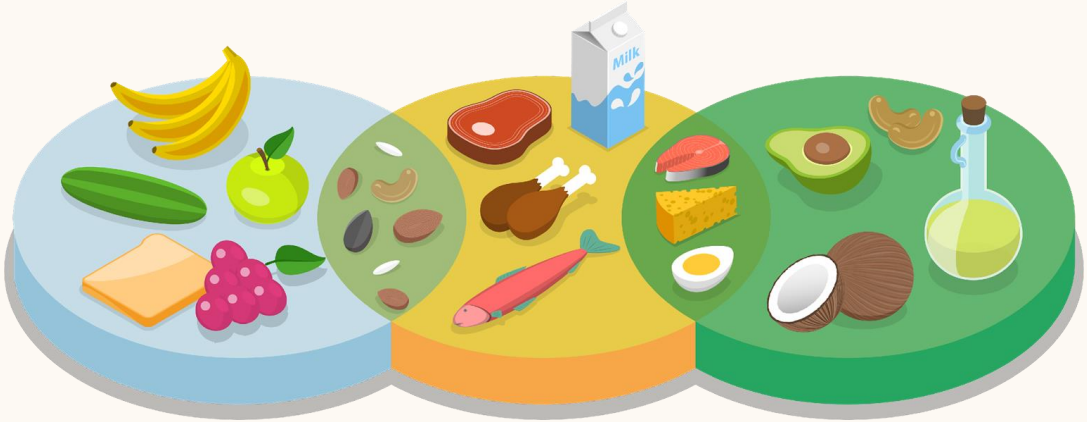
In Singapore, Traditional Medicine (TM) typically refers to Traditional Chinese Medicine (TCM), Traditional Malay Medicine (TMM), Traditional Indian Medicine (TIM), while Complementary Medicine (CM) refers to all other forms of medicine that are non–mainstream, e.g., chiropractic, osteopathy, aromatherapy, etc.

Scientific studies on effectiveness of T&CM for diabetes and its complications are inconclusive or insufficient.

BE HEALTHY

Healthy Eating

Healthy Eating When You Have Diabetes



Diet is an important part of diabetes management. Eating well not only helps with your diabetes control, but also with weight, blood pressure, cholesterol levels and general health.

Healthy eating is recommended for everyone, including individuals with diabetes.
All individuals can enjoy the same healthy meals.

Read on for a general guide on how you can make healthy food choices and have a balanced diet.
For nutritional advice personalised to your condition and needs,
do speak to a healthcare professional such as a dietitian.

What is a healthy diet?

Healthy Eating When You Have Diabetes

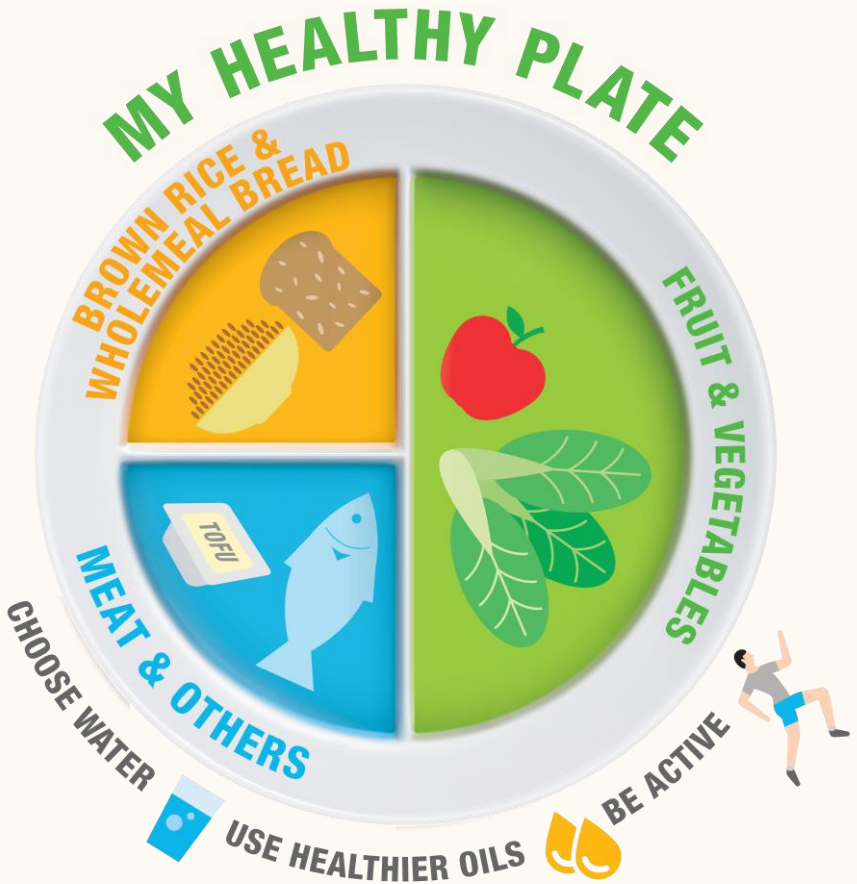
Food provides us with nutrients that we need for energy and for our body functions to keep us healthy.

- **Macronutrients that our body needs in larger amounts for energy.** There are 3 main types: carbohydrates, protein and fat.
  - Of these, **carbohydrates have the greatest impact on blood sugar.**
  - While protein and fat may not have a direct impact on blood sugar levels, **eating too much protein and fat can lead to weight gain** which will increase insulin resistance and make diabetes control more difficult.
  - **The type and amount of fat consumed is important.** Mono- and poly-unsaturated fats are better for you. We should limit our intake of saturated and trans fats (e.g., found in fried chicken and baked products) to reduce our risk of cardiovascular disease.

- **Micronutrients that our body needs in smaller quantities are very important for many body functions**, such as bone health and our immune system. There are 2 main types: vitamins and minerals.

There is no one food that contains all the nutrients that we need. Instead, it is important that we eat a variety of foods in the right portions every day as part of a balanced diet.

What should I eat?



My Healthy Plate is a visual guide you can use to help you make healthy food choices.

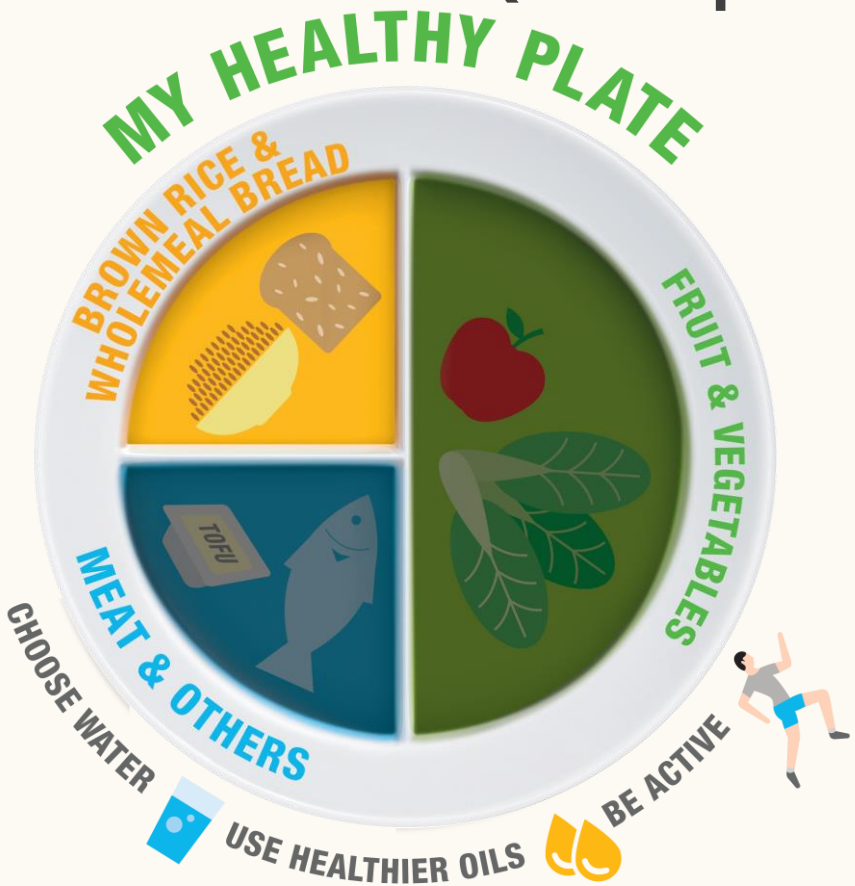
A balanced meal consists of:

- ¼ plate of wholegrains
- ¼ plate of good sources of protein
- ½ plate of fruit and vegetables

We should also be mindful to:

- Choose water as your drink of choice
- Choose healthier oils which are lower in saturated fats
- Keep physically active

Quarter plate of wholegrains

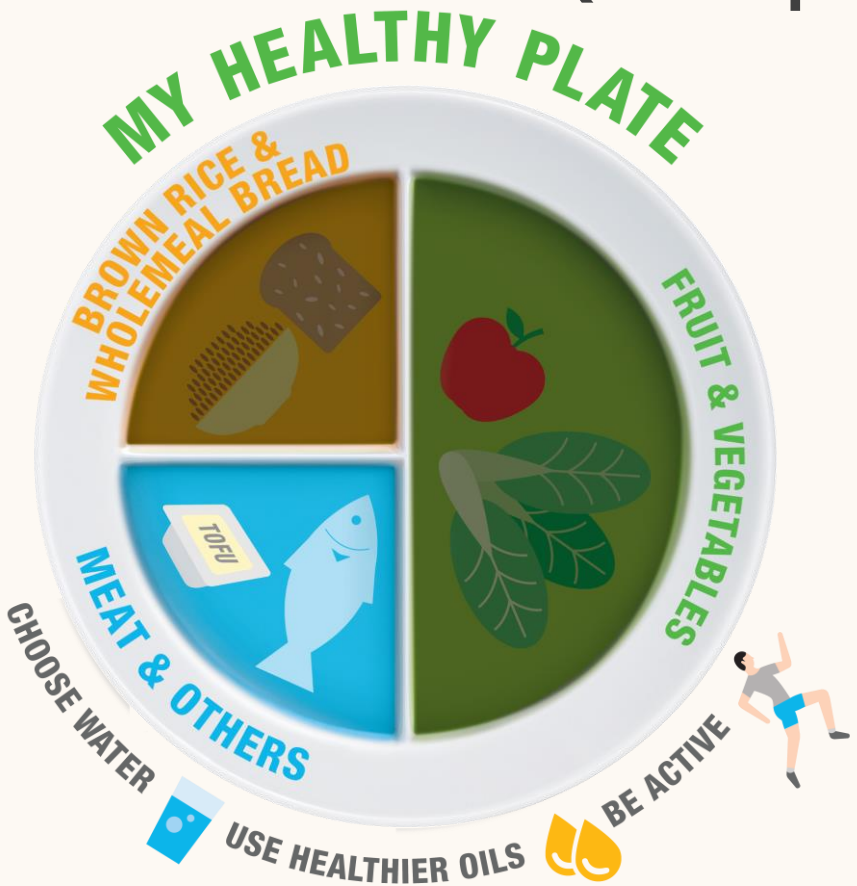


Wholegrains are richer in nutrients compared to refined grains such as white rice as they have not been over-processed.

As they are **rich in fibre**, they help you feel full for longer, which helps prevent overeating.

¼ plate = 2 servings of carbohydrates
Daily recommended intake = 5 to 7 servings of carbohydrates

Quarter plate of protein



Protein sources include:

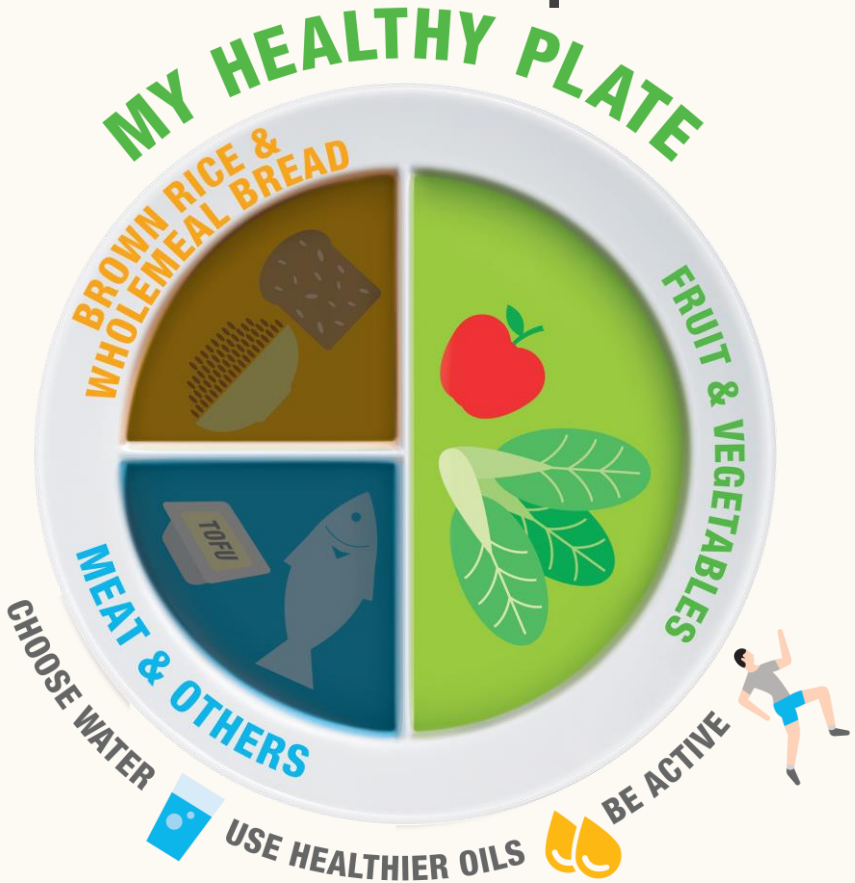
- Animal-based protein e.g., eggs, fish, chicken, dairy products such as milk and yoghurt
- Plant-based protein e.g., soy milk, tofu, nuts, beans and legumes

For quality protein intake:

- Choose lean over fatty meat
- Choose fresh over processed meat
- Have a mix of animal-based and plant-based protein

¼ plate = 1 serving of protein
Daily recommended intake = 2 to 3 servings of protein

Half plate of fruit and vegetables

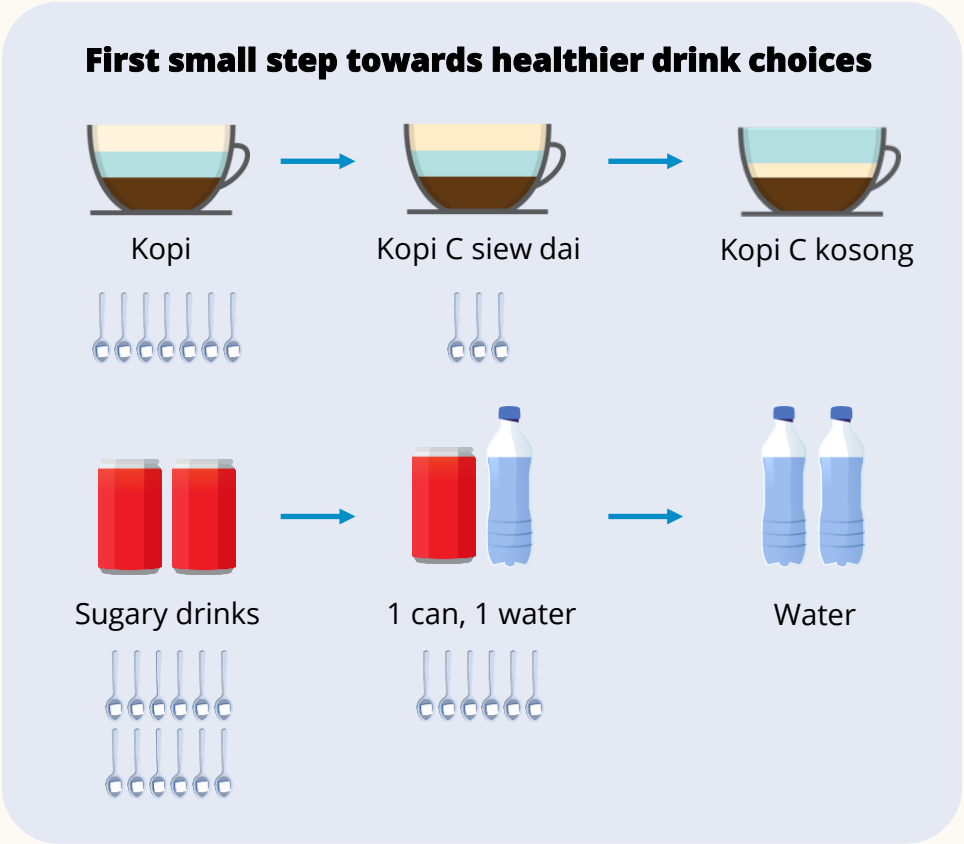


Tips for eating fruit and vegetables:

- End your meal with fresh or frozen fruit for dessert
- Eat whole fruit instead of drinking fruit juices
- Fruit **juices** are not recommended as they can cause a **spike in blood sugar levels**. Instead, eat the whole fruit with the pulp and skin as they are high in fibre, which slows the absorption of sugar into your blood.
- Add vegetables/fruits to your meat dishes to add colour, flavour and fibre to your meat dishes

½ plate = 2 servings, i.e., 1 serving of fruit and 1 serving of vegetables
Daily recommended intake = at least 2 servings of fruit and 2 servings of vegetables

Drinks



- Make water your drink of choice
- Sugary drinks can make your diabetes control more difficult and also lead to weight gain
- Unsweetened tea and coffee can be taken in moderation.
- Canned drinks usually contain a large amount of sugar. For canned drinks, opt for diet or 'zero' versions
- If you choose a sugary drink, avoid drinks with Nutri-Grade mark C or D, and opt for healthier options that have reduced sugar, such as drinks with the Healthier Choice Symbol or Nutri-Grade mark A or B.
- Fruit juices are not recommended. While they usually have a ‘no added sugar’ label, they often contain large amounts of naturally occurring fruit sugar

Carbohydrates

What are carbohydrates?

Carbohydrates are an important nutrient found in foods and drinks. Carbohydrates are converted to glucose by the body and are essential in giving you **energy.** Being the main source of energy in the human diet, there is no need to avoid them and they should be included as part of **a healthy eating plan** for individuals with diabetes. A balanced meal gives your body the nutrients it needs.

How are carbohydrates converted to glucose?

- Your digestive system breaks down the carbohydrates in your food to glucose.
- This enters the bloodstream, causing a **rise in blood sugar levels.**

It's important to note that **different carbohydrates affect blood sugar differently.** Knowing how fast a carbohydrate food converts to sugar can help you to **optimise sugar control.**

Types of carbohydrates

There are 3 types of carbohydrates:

Sugars are simple carbohydrates that are easy to digest. They raise blood sugar levels **quickly**.

Starches are complex carbohydrates that are made up of sugars linked together. The speed at which starches are digested by the body into sugar depend on how processed they are and how much fibre the food item contains.

Fibre is the part of complex carbohydrates that cannot be digested by the body. It makes you feel full and helps with sugar control by slowing down the passage of food through the digestive system.

Sugar

There are two main types of sugar:

1. **Naturally occurring sugar** – this is sugar that is found naturally in foods such as fruits, vegetables and dairy products. Excessive intake of such sugar can lead to weight gain and suboptimal control of glucose. Examples: fructose (found in fruits), lactose (found in milk).

2. **Added sugar** - this includes any sugar (including natural sugar) or caloric sweetener added to food or beverages during processing or preparation (such as when sugar is added to coffee or tea). Example of added sugar: molasses, high fructose corn syrup.

Sugar

Sugars can be both a natural sugar AND an added sugar. Examples include sucrose (also known as table sugar or granulated sugar) and honey, which are natural sugars commonly added to food and drinks.

Avoid food and drinks with “added sugar” (e.g., cakes, sugar-sweetened soft drinks, cookies, kueh) and beware of items with “no sugar added” as they may already contain naturally occurring sugar (e.g., fruit juice). Excessive intake of such foods contributes to caloric intake and can lead to weight gain and sub-optimal blood sugar control.

Starch

Starches should make up ¼ of your plate. Choose wholegrain/wholemeal varieties, such as brown rice, as they result in a more gradual rise in blood sugar levels than their refined versions such as white rice.

Examples include brown rice, rolled oats, potato with skin on, sweet potato, corn, yam, and legumes such as peas.

Minimise foods made from refined grains and processed starchy foods. They tend to be stripped of nutrients and fibre, and can cause a quicker rise in blood sugar levels.

Examples include: white bread, instant oats, white rice, skinless or mashed potato.

Fibre

Dietary fibre can slow carbohydrate digestion and glucose absorption, for better blood sugar control.

High fibre food include vegetables, fruits and whole-grain products.

Increase your fibre intake by **switching** to these options:

- Brown rice
- Wholewheat noodles and pasta
- Wholegrain bread
- Steel-cut or rolled oats

These **contain more dietary fibre** than their refined versions and can help manage blood sugar levels.

What is the Glycaemic Index (GI)?

GI measures **how fast your food or drink can cause blood sugar levels to rise.** It ranks carbohydrates from 0 to 100, according to this impact. The higher the GI, the faster blood sugar levels are expected to rise.

Eating foods lower in GI brings about a slower increase in blood sugar over time, and reduces the spike in the body's insulin hormone response. This also helps the individual feel full longer.

Many factors can affect the GI of food including:

Processing - Less processed foods have a lower GI. For example, whole fruits have lower GI compared to fruit juice as the skin and pulp have not been removed.

Cooking time - Food that is less broken down by cooking has a lower GI. For example, for the same amount of grain, boiled rice has a lower GI compared to porridge which takes longer to cook.

Meal composition - In a meal where carbohydrates are mixed with protein and other food types, the GI will be lower. For example, the same amount of rice eaten with meat and vegetable side dishes will have a lower GI than if it were eaten on its own.

There are limitations in relying on GI alone to make healthy food choices.

Fat in a food item lowers its GI, so not all low GI food are healthy choices. A diet high in fat and calories may have a low GI, but it increases the risk of weight gain, insulin resistance and heart disease.

GI of foods and blood sugar levels

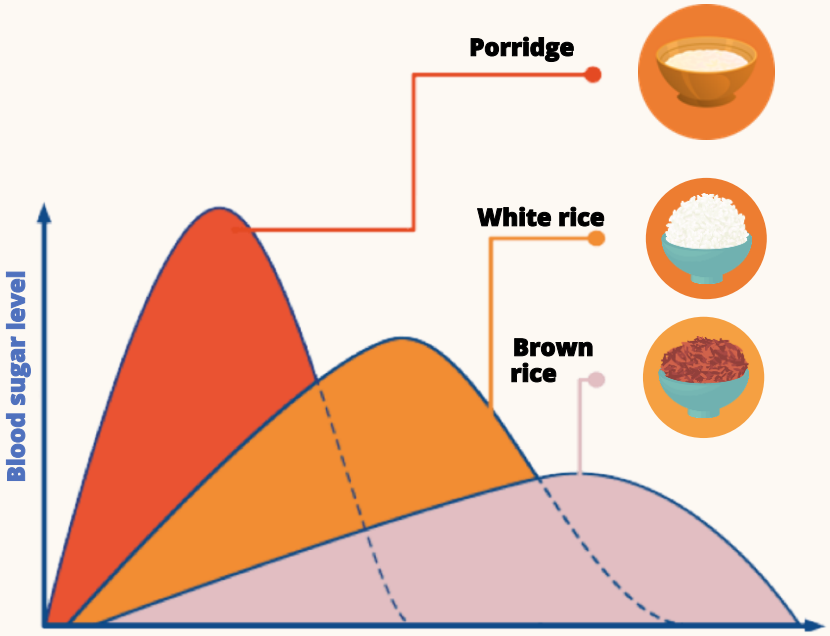


Diagram compares 1 serving of each category

Do note that a high fat content may lower the GI of a meal. Meal 2 may have a lower GI due to its high fat content, but it is a high calorie dish and can cause weight gain in the long run.

Meal 1
Yong Tau Foo with vegetables and tofu

Meal 2
Economy fried rice

Practical tips & advice

Meal times for individuals with Diabetes

- Individuals with diabetes are recommended to have **regular meal times** every day.
- For persons on regular insulin treatment and certain oral diabetic medications (i.e., sulfonylureas such as glipizide, gliclazide, glimepiride, tolbutamide), **it is especially important not to skip or delay meals.** This is to prevent the risk of hypoglycaemia (low blood sugar level).
- **You should consult your doctor if you are planning to fast or change your meal times for a prolonged period of time** (e.g., religious reasons such as Ramadan), as your diabetic medication may have to be adjusted accordingly.

Meal times

- If your schedule does not allow you to take regular meals, do **discuss with your healthcare team on a diabetic medication regimen that is more suited for your lifestyle.**
- **If you are planning to substantially reduce the amount of carbohydrates in your meals, you may be at risk of hypoglycaemia if you are on insulin or certain oral medications** (sulfonylureas such as glipizide, gliclazide, glimepiride, tolbutamide). Do discuss with your doctor on how your medication can be adjusted to match any change in your diet.

Healthier cooking

You can whip up delicious and healthy meals even if you have diabetes. Some tips on how you can do this:

- **Use healthier cooking methods (e.g., steaming, baking, boiling, grilling).**
- **Use healthier ingredients**
  - ↳ Choose wholegrains instead of refined grains. For example, replace white rice with brown rice
  - ↳ Choose lean meat and remove all visible fat before cooking
  - ↳ Reduce salt, instead use natural seasoning (e.g., herbs and spices) Use condiments and sauces in moderation
- **Plan meals that incorporate vegetables as the main dish (together with fruits, they should make up 50% of your plate), rather than meat or carbohydrates as part of a balanced diet.**

Healthy recipes you can try.

How can I cook healthy and yummy meals?

Stir fry

Boil or steam

Grill or bake

Reduce salt, instead use natural seasonings e.g., herbs and spices

Choose healthier cooking oil (e.g., sunflower, olive or canola)

Remove all visible fat before cooking

Healthier Cooking - Local Cuisine

Chinese

- Steam dumplings instead of frying
- Switch to brown rice
- Control the amount of sodium (e.g., salt and soy sauce)
- Use herbs and spices

Malay

- Choose Ikan Bakar or Ayam Panggang
- Use low-fat or skimmed milk in curries and gravies, instead of coconut milk
- Cook meat together with gravy instead of stir-frying separately
- Use leaner cuts of meat

Indian

- Use healthier oil options
- Grill, boil, steam & bake where possible
- Use low-fat plain yoghurt as a substitute

Eating out

It can be challenging to eat healthy when eating out with the wide variety of food and drink options available in Singapore.

Some tips on how you can make healthier food choices when eating out:

- **Plan ahead** – look out for food outlets that are part of the Healthier Dining Programme. These outlets have healthier dishes which are lower in calories , prepared with wholegrains or healthier oil, or lower in sugar. Ordering food when you are very hungry can cause you to order more than you intended to, and overeat. Look at the menu before arriving to better plan your meal.

- **Read the menu with care** – look for menu wordings to check how food is prepared. For example, foods that are described as 'steamed', 'boiled', 'baked' or 'poached' are healthier than foods that are 'fried in oil'. Avoid foods that are also 'rich' and 'creamy' which tend to be high in fat.

- **Eat just enough** – it is okay to not eat everything on your plate. Aim to eat until you are 80% full. To prevent food wastage, request to take away any remaining food to eat later. Do not leave cooked food standing at room temperature for more than 2 hours. Reheat stored cooked food at temperatures above 75°C and make sure it is served piping hot.

Choose healthier options when eating out

For main meals:

- Select **a variety of items** to make up a balanced meal – include one or two vegetable side dishes, and one or two protein-rich items such as tofu, fish, or lean meat
- Select foods that are prepared with healthier cooking methods (e.g., steamed, baked) rather than fried foods
- Rice, bread or pasta – choose wholegrain options (e.g., brown rice, multigrain bread)
- Choose fresh salads with **non-cream based** dressings

For drinks:

- Request for **water**
- Ask for **less ("siew dai") or no added sugar ("kosong")** options
- Choose drinks with reduced sugar or no sugar (e.g., drinks with Healthier Choice Symbol or Nutri-Grade mark A or B)

For desserts:

- Choose **fresh fruits** over fruit juice
- Share desserts to control your intake

Healthier options at hawker centres

Sliced Fish Soup*

Yong Tau Foo*

Grilled Chicken Chop

Bee Hoon Soto

Chapati

*Omit soup to reduce your salt intake

Healthier options with economy rice

Choose this

- Brown rice
- Steamed, stewed, braised or stir-fried dishes

Instead of this

- White, flavoured or fried rice
- Deep-fried dishes

You can also:

- Order more non-starchy vegetables dishes (e.g., kailan, broccoli, eggplant)
- Limit the amount of gravy and sauce

Tips for eating at a buffet

- **Don’t skip your meals before going for the buffet.** Going to a buffet on an empty stomach will cause you to eat more than needed. You can eat a small snack before heading out.

- **Check which options are available before you pick up the plate**. Choose healthier options and try new food in smaller portions. This will help you make the best choices for yourself.

- **Enjoy your meal slowly and don’t rush through it just so that you can eat more.** Consuming more food doesn't necessarily mean a better dining experience!

Eating during festive occasions and social gatherings

Food is often an integral **part of social experiences**, such as going to a buffet for celebrations, or catching up with friends over a meal in a restaurant. However, these situations may encourage overconsumption, especially of less nutritious food.

Some tips on how to eat healthy during social occasions:

- **Having a bottle of water on hand** helps you stay hydrated and you will have a readily available alternative to sugary drinks.
- If a meal portion served is too much or if there are leftovers, **don't be afraid to ask to take it away to consume at a later time.**
- **Avoid alcohol** as it provides empty calories, i.e., provides energy with limited nutritional value. If you do drink, **limit your intake and don't consume alcohol on an empty stomach** as it can cause hypoglycaemia (low blood sugar) if consumed excessively.

How can I continue with healthy eating during festivals and celebrations?

Plan meals ahead

HEALTHIER CHOICE
Health Promotion Board

Eat All Foods in Moderation

Opt for healthier products

Use healthier cooking methods

Eat in **moderation**

Avoid alcohol as much as possible

Maintain **medication schedule and insulin** dosage

Peer pressure at social gatherings. How do I handle it?

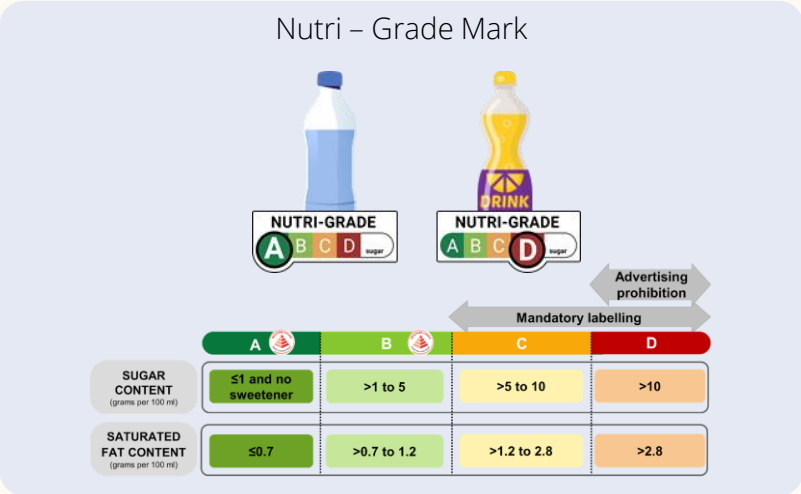
Peer pressure during social situations is common, and it's okay **to communicate your boundaries** when you feel pressured to eat something you don't want to.

Have some phrases in mind to help practise them politely when a situation calls for it!

Food shopping tips for healthy eating

- Make a **shopping list** – plan in advance what you intend to prepare for every meal.
- **Avoid food shopping when you are hungry** as you will be likely to buy more food than required.
- **Choose fresh or frozen fruit and vegetables**
- Choose food items with **the Healthier Choice Symbol (HCS)** – these are healthier options compared to others in its category. Even if it's a healthier option, do eat it in moderation.
- **Reduce intake of pre-packaged beverages with Nutri-Grade mark C and D**. All pre-packaged beverages are graded from A to D (from healthiest to least healthy), based on their sugar and saturated fat contents. Look out instead for pre-packaged beverages with Nutri-Grade mark A and B or with the HCS logo.

For more information on Nutri-Grade mark, see https://go.gov.sg/nutri-grade.



Ingredient list

Ingredient lists are listed in descending order according to their weight or amount.
Be aware that some ingredients, such as sugar and salt/sodium, can be listed as other names in different lists.

Sugar is also called:

- Glucose
- Sucrose
- Maltose
- Fructose
- Honey
- Agave nectar
- Brown sugar
- Golden syrup
- Corn syrup
- Rice syrup
- Maple syrup
- Invert sugar
- Fruit juice concentrate
- Molasses

Sodium is also called:

- Monosodium glutamate (MSG)
- Sea salt
- Rock salt
- Celery salt
- Table salt
- Himalayan pink salt
- Meat extract
- Stock cubes
- Baking soda
- Sodium bicarbonate
- Soy sauce
- Vegetable extract
- Yeast extract

Nutrition information panel (NIP)

The NIP provides information on the nutritional value of the food product. This includes:

- Serving size and servings per package
- Energy or caloric content
- Nutritional components, including carbohydrate, sugars, dietary fibre, protein, fat, saturated fat, cholesterol and sodium

The amount of each nutrient is listed in two formats

- Per 100g or per 100ml
- Per serving

Understanding food labels

Food labels provide nutritional information which can help you make informed decisions to choose healthier food products

Date Marking

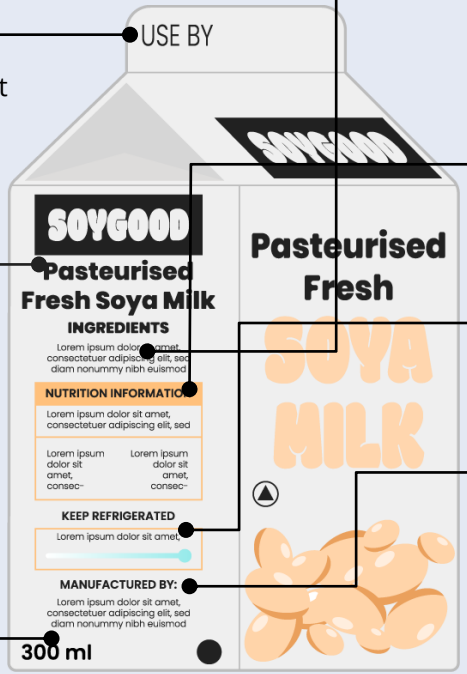
This is the ‘Use by’, ‘Sell by’ and ‘Best Use Before’ date. It gives the date by which the food should be eaten.

Product Name

Usually beside the brand name. Tells you what the food is.

Net Weight

This gives the actual weight of the food excluding the packaging. For canned foods packed in liquid, the net weight is the weight of the drained food.



Ingredient List

This shows all ingredients that make up the product. The ingredients are listed in descending order by weight.

Nutrition Information

This panel shows the nutrients found in one serving or in 100 g / 100 ml of the food.

Usage Instructions

These are instructions for storing or using the product.

Manufacturer’s Details

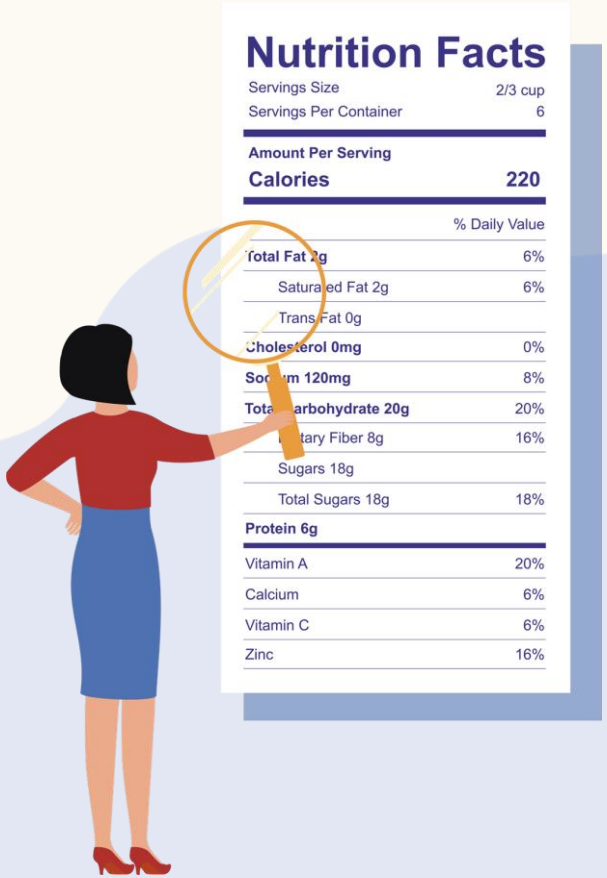
Every label includes the name and address of the manufacturer, importer or distributor.

The ingredient list and nutrition information are particularly useful in making healthier food choices

How to read food labels

Things to pay attention to:

- **Ingredients list** – for example, sugar might be referred by another name such as sucrose
- **Serving size** – the food item may contain more than one serving size
- **Calorie (or energy) content**
- **Carbohydrate content**
  - ↳ **"Sugar-free" does not mean carbohydrate-free – starch also contributes to carbohydrate content**
  - ↳ **"No sugar added" does not mean no carbohydrates. The food item may contain naturally occurring sugars (e.g., fruit juices) or other carbohydrates such as starches**
  - ↳ Fat-free products can still have carbohydrates which contribute to caloric intake



How to read food labels

- **Dietary fibre content** – high-fibre foods (≥ 4g per serving) can slow the rise of blood sugar
- **Fat content** – foods low in total fat (≤ 3g per 100g or ≤ 1.5g per 100ml) and saturated fat (≤1.5g per 100g or ≤ 0.75g per 100ml) reduce the risk of heart disease
- **Sodium content** – choose low sodium foods (≤ 120mg per 100g). Eating too much sodium can increase blood pressure

How to read food labels

Bread A
Wholemeal Bread

Bread B
White Bread

Nutrition Information		
Servings per package: 7		
Serving size: 2 slices (60g)		
	Per serving	**Per 100g**
Energy	145 kcal*	242 kcal*
Protein	7.4 g	12.4 g
Total fat	1.4 g	2.3 g
Saturated fat	0.7 g	1.1 g
Trans fat	0 g	0 g
Cholesterol	0 mg	0 mg
Carbohydrate	28 g	48 g
Dietary fibre	3.6 g	6 g
Sodium	206 mg	344 mg

Nutrition Information		
Servings per package: 7		
Serving size: 2 slices (75g)		
	Per serving	**Per 100g**
Energy	157 kcal*	314 kcal*
Protein	6.3 g	12.5 g
Total fat	3.7 g	7.3 g
Saturated fat	1.0 g	2.0 g
Trans fat	No data	No data
Cholesterol	0 mg	0 mg
Carbohydrate	26.3 g	52.6 g
Dietary fibre	1.9 g	3.7 g
Sodium	142 mg	285 mg

*1 kcal = 4.2kJ

As the serving size of these two products differ, comparing them using the "per serving" values would be inaccurate.

- We can make a fair comparison only by using values in the "per 100g" column.
- Bread A contains lower fat, lower saturated fat and higher dietary fibre than Bread B. Thus, it is a healthier choice as compared to Bread B.

'De-junk' your kitchen

1. **Avoid placing unhealthy snacks on your kitchen counter.** Replace with healthier alternatives - fruits, wholegrain bread etc.
2. **Ensure fresh produce is at eye level** for easier access
3. **Create a shopping list** - keeps you in check to avoid any temptations
4. **Use smaller plates and bowls** - helps control portion to reduce calorie intake
5. **Shop around supermarket perimeters to avoid shopping in the snack aisles** (these tend to be located in the middle aisles)
6. **Avoid shopping when hungry** – your cravings could lead to unhealthy decisions or bingeing

Source

Sugar substitutes (1 of 2)

These are **sweeteners or substitutes** that you can use instead of sugar (e.g., table sugar, honey), and come in 2 categories:

1. Nutritive Sweeteners (also known as caloric sweeteners)

- They are digestible and **contribute to calories**
- **Sugar alcohol** is a commonly used nutritive sweetener
  - They are neither sugars nor alcohol like wine. Although they have fewer calories and are digested more slowly than sugar, they do contain calories and should not be consumed excessively
  - **Examples include:**
    - Xylitol (a natural sugar alcohol found in many fruits and vegetables)
    - Sorbitol (commercially produced from glucose)
    - Palatinose (derived from sugar beet)
- Allulose is an uncommon sugar naturally found in figs and raisins, and is much lower in calories compared to sucrose

Sugar substitutes (2 of 2)

2. Non-Nutritive Sweeteners

- These **do not contribute to calories**
- Artificial Intense - produced in the laboratory, and includes aspartame and sucralose
- Natural Intense - found in nature, and includes stevia and monk fruit

While sugar substitutes are not actually needed to help manage diabetes, they can be used to sweeten foods, as long as they are **used in small amounts** and generally eaten as part of a meal.

BE HEALTHY

Physical Activity

Physical Activity

For individuals with Diabetes

Exercise for those with Diabetes

Exercise is important for your general health and well-being. If you have diabetes, you can still exercise if you take some precautions, depending on your:

- **Type of diabetes**
- **Pre-exercise glucose level**
- **Medication and timing**
- **Recent food intake**
- **General health condition**

What exercise are appropriate for me?

If the patient is a wheelchair user, skip Step 1 and proceed to Step 2

Step 1: Determine mobility level		
• On your own, do you have any difficulty standing up from a seated position without using your arms?	**Yes**	**No**
• On your own, do you have any difficulty walking for about 1 bus stop (~400m) without resting and using walking aids?	**Yes**	**No**
• On your own, do you have any difficulty climbing up 10 steps without resting, using handrails or walking aids?	**Yes**	**No**
• On your own, do you have any difficulty getting up from the floor without using furniture or other aids?	**Yes**	**No**

Step 2: Determine activity level	
• Sedentary	Seldom exercise
• Semi-active — some exercise	30 minutes, 3 times per week, at **less** than moderate intensity (can talk but can't sing), for past 3 months
• Active — regular exercise	30 minutes, 3 times per week, at **moderate** intensity (can talk but can't sing) to **high** intensity (can only say a few words) for past 3 months

What exercise are appropriate for me?

If the patient is a wheelchair user, skip Step 1 and proceed to Step 2

Step 3: Get relevant handouts			
	Full mobility	**Limited mobility**	**Wheelchair users**
Sedentary	**1A**	**1B**	**1C**
Semi-active	**2A**	**2B**	**2C**
Active	**3A**	**3B**	**3C**

- This assessment tool is designed for use by individuals as a guide to calibrate their physical activity based on their mobility and activity levels
- Complete steps 1 to 3 to identify the relevant category of handouts for the individual

Exercise recommendations

Frequency

- Aim to exercise **3 to 7 days per week**
- Aerobic and stretching exercises can be done every day, with strength training on alternate days

Intensity

- Aim for **moderate intensity**, i.e., **talk but can't sing** while exercising

Time

- Aim for an average of **150 - 300 minutes of exercise per week** or 30 minutes of exercise for 5 days per week
- Do more to lose weight

Type

- Include a combination of aerobic, resistance and flexibility (stretches) exercises
- Progress to include other types of exercises such as balance, agility and even power training

How can I exercise safely?

Start slow if you have not been physically active

Wear **comfortable clothing** and **appropriate footwear** (well-fitted shoes with adequate support)

Check your feet for wounds before and after exercising

Exercise at a **cooler time** (mornings or evenings, or in a cooler environment)

Bring along **healthy snacks** or sugar-containing sweets, in case of hypoglycaemia (low blood sugar)

Keep hydrated

Exercise **with family and friends**

How can I exercise safely?

When exercising, please rest or stop if you experience
Symptoms of hypoglycaemia (low blood sugar of < 4 mmol/L)

Hunger

Hand tremors

Abnormally fast heartbeat

Difficulty breathing

Fatigue

Mood changes
(e.g., anxiety, irritability, nervousness)

Dizziness or **headaches**

Pain
(especially in the chest or abdomen)

To note: Delay or postpone exercise if you are feeling unwell. Always listen to your body.

Regular physical activity benefits you in many ways

Improves productivity
Boost attention, memory and creativity

Improves overall mood
Reduces stress and improves mental health

Increases health benefits
Reduces risk of colon cancer, heart diseases, diabetes and high blood pressure

Increase fitness levels
Improves strength and stamina

Recommended guidelines

At least moderate intensity
150 - 300 mins/week

and

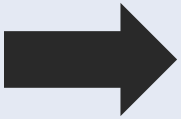
At least 2 days/week
Muscle strengthening

Singapore Physical Activity Guidelines 2022

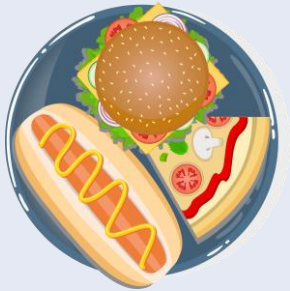
You can’t out exercise a bad diet

For an 80kg individual:

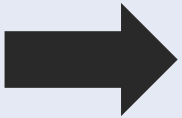
320 calories



39 minutes of walking



792 calories



1 hour & 35 minutes of walking

Taking small steps towards an active lifestyle

Make it a habit to do a few of these activities throughout your day

Take the stairs instead of the lift

Brisk walk for 10 minutes

Walk around every hour

Take **10,000 steps** daily

Get off one bus stop earlier and walk

Exercise with **family** and **friends**

Improving your fitness and performance gradually

Progression of aerobic exercise

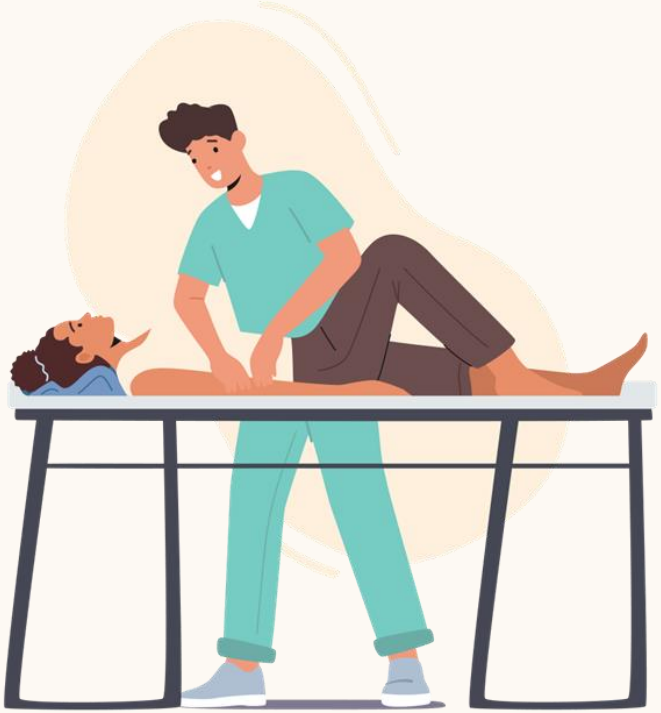
Once you're ready, you can add more structure into your routine.

You can progress to higher intensities of exercise based on your individual exercise tolerance.

There are 3 methods for challenging your aerobic fitness:

- Increase your speed
  - E.g.,: Walking on a treadmill, at 3.5km/h → 3.8km/h → 4.2km/h
- Increase your resistance
  - E.g.,: Lifting hand-weights, of 0.5kg → 1kg → 1.5kg
- Increase your duration
  - E.g.,: Going for a walk, for 20min → 30min → 40min

Exercise and pain management



Post-exercise muscle soreness

- Normal and expected discomfort occurs between 24 and 48 hours after activity (especially if you are new to the activity).
- Usually resolves on its own.
- If it is (1) excessive in intensity or (2) persists longer than 2-3 days, consider reducing the duration or intensity of your exercise.

Injury management (for minor sprains and strains)

- Rest: Do so for 48-72 hours; avoid excessive movement to the injured area.
- Ice: Apply for 10-15 mins to the affected area. Precautions: (1) use a towel – do not apply directly against your skin; (2) do not apply onto open wounds; (3) check your skin integrity and condition after applying ice.
- Elevate: If possible, keep the injured area elevated to reduce swelling.
- Seek medical attention if the injury does not improve.

Exercise and pain management

Claudication pain* for those with peripheral vascular disease

- Only exercise to the point of moderate pain (i.e., 3 out of 4 on the Claudication Pain Scale).
- Sit and rest intermittently when moderate pain is reached, and resume only when pain is COMPLETELY alleviated.

Claudication Pain Scale	
0 = no pain	Resting or early exercise effort
1 = very mild pain (onset of claudication)	1st feeling of any pain in legs
2 = mild pain	Pain which the patient's attention can be diverted
3 = moderate pain	Intense pain from which patient's attention cannot be diverted. (Most exercise programmes may recommend cessation of exercise at this point)
4 = severe pain	Excruciating and unbearable pain

* Pain in your thigh, calf, or buttocks when you walk, which can make you limp.
Source: https://www.hopkinsmedicine.org/health/conditions-and-diseases/claudication

Monitor your blood sugar before exercising

For individuals with Type 2 Diabetes

#For individuals with Type 1 diabetes, please seek advice from your health provider

< 4.0 mmol/L	4.0 – 5.5 mmol/L	5.6 – 15.0 mmol/L	> 15.0 mmol/L

HYPOGLYCAEMIA

- **Delay your exercise**
- Follow the 15/15 rule to treat hypoglycemia
- **Do not exercise if you:**
  - ↳ Feel unwell
  - ↳ Had a hypoglycaemic episode in the last 24 hours that required someone's assistance.
  - ↳ Are exercising alone or engaging in a potentially unsafe exercise.

15g of fast-acting sugars (carbs) example:

- 3 teaspoons of dextrose powder/table sugar in 120ml of water
- ½ can of regular soft drink
- 1 can of low-sugar soft drink
- ½ glass (150ml) of fruit juice
- 3 soft/jelly sweets

Check your blood sugar level after 15 minutes

Monitor your blood sugar before exercising

For individuals with Type 2 Diabetes

#For individuals with Type 1 diabetes, please seek advice from your health provider

< 4.0 mmol/L	4.0 – 5.5 mmol/L	5.6 – 15.0 mmol/L	> 15.0 mmol/L

- **Exercise with caution.**
- **Have a light snack** (15 - 30g of long-acting sugars e.g., 3 pieces of biscuits and milo) **and wait 15 minutes before exercising**
- **If exercising duration > 30 minutes, consume additional carbohydrates**

Note: *If you are on insulin and/or sulphonylurea, standby 15g of fast-acting sugars due to a higher risk of hypoglycemia occurring with exercise.*

Monitor your blood sugar before exercising

For individuals with Type 2 Diabetes

#For individuals with Type 1 diabetes, please seek advice from your health provider

< 4.0 mmol/L	4.0 – 5.5 mmol/L	5.6 – 15.0 mmol/L	> 15.0 mmol/L

< 4.0 mmol/L
HYPOGLYCAEMIA

- **Perform 15/15 Rule**
- Check blood sugar level after 15 minutes

4.0 - 5.5 mmol/L

- Have a light snack (15 – 30 g of long-acting sugars e.g., 3 pieces of biscuits and milo) and wait 15 minutes before exercising
- If exercising duration > 30 minutes, consume additional carbohydrates

Increase in blood sugar levels

- Certain exercises cause an increase in blood sugar levels for a short while.
- The stress (of exercise) on the body releases hormones (e.g., adrenaline, cortisol) that cause a temporary increase in glucose production and hence an increase in the glucose level.

Examples:

- Brief but intense exercises such as sprinting, powerlifting.
- Usually a small increase that lasts for 1-2 hours is not a concern if your pre-exercise glucose level was not excessively high.

Perform the 15/15 rule

15g of fast-acting sugars (carbs) example:

- 3 teaspoons of dextrose powder/table sugar in 120ml of water
- ½ can of regular soft drink
- 1 can of low-sugar soft drink
- ½ glass (150ml) of fruit juice
- 3 soft/jelly sweets

Check your blood sugar level after 15 minutes

Monitor your blood sugar before exercising

For individuals with Type 2 Diabetes

#For individuals with Type 1 diabetes, please seek advice from your health provider

< 4.0 mmol/L	4.0 – 5.5 mmol/L	**5.6 – 15.0 mmol/L**	> 15.0 mmol/L

- **Good range!**
- Go ahead with your exercise, **but monitor signs and symptoms throughout** as you do so.
- If your session lasts longer than 60 mins, you may **need additional carbs.**

Pro tip!

Blood sugar levels between 5.6 to 15 = Good to Go!

Note: *If you are on insulin and/or sulphonylurea, standby 15g of fast-acting sugars due to a higher risk of hypoglycemia occurring with exercise.*

Monitor your blood sugar before exercising

For individuals with Type 2 Diabetes

#For individuals with Type 1 diabetes, please seek advice from your health provider

< 4.0 mmol/L	4.0 – 5.5 mmol/L	5.6 – 15.0 mmol/L	> 15.0 mmol/L

DIFFICULT TO REMEMBER?

Pro tip!

Blood sugar levels between 5.6 to 15 = Good to Go!

Note: *If you are on insulin and sulphonylureas, it is best to consult a physiotherapist for a guided exercise session before determining the appropriate blood sugar levels for exercise, as there are many other factors to consider.*

Monitor your blood sugar before exercising

For individuals with Type 2 Diabetes

#For individuals with Type 1 diabetes, please seek advice from your health provider

< 4.0 mmol/L	4.0 – 5.5 mmol/L	5.6 – 15.0 mmol/L	> 15.0 mmol/L

- **If you are feeling well and have taken your usual medications, proceed to exercise with caution**
- Monitor your **glucose trend** and **increase your fluid intake**

Summary of Pre & Post-Exercise Monitoring

Post-exercise

< 4.0 mmol/L	4.0 – 5.5 mmol/L	5.6 – 15.0 mmol/L	> 15.0 mmol/L

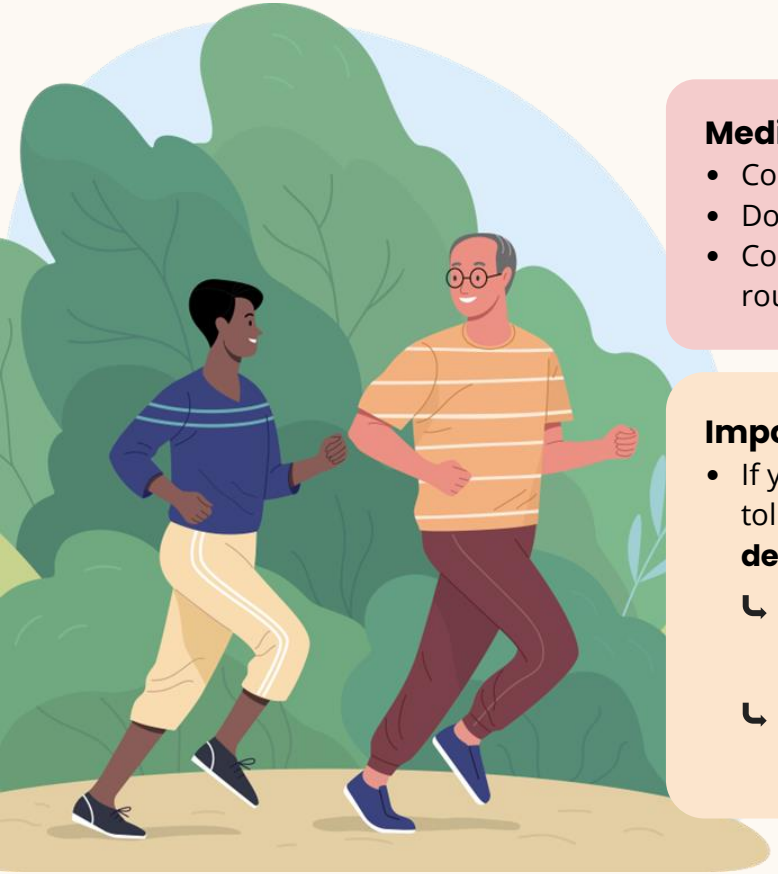
< 4.0 mmol/L
HYPOGLYCAEMIA!

- **Perform 15/15 rule:**
- 15g of fast-acting glucose e.g.,
  - 3 teaspoons of dextrose powder/ table sugar in 120ml of water
  - ½ can of regular soft drink
  - ½ glass (150ml) of fruit juice
  - 3 soft/jelly sweets
  - 1 can of low-sugar soft drink
- Check blood sugar level after 15 minutes

4.0 - 5.5 mmol/L

- Have your next meal **within 1 hour.**
- Have a light snack if your next meal is more than 1 hour away.

Pre-exercise Medication



Medications

- Consume your medications as prescribed by your doctor.
- Do not skip medications and attempt to replace it with exercise.
- Consult your doctor for a medication review if you are changing your exercise routine.

Important Medicine

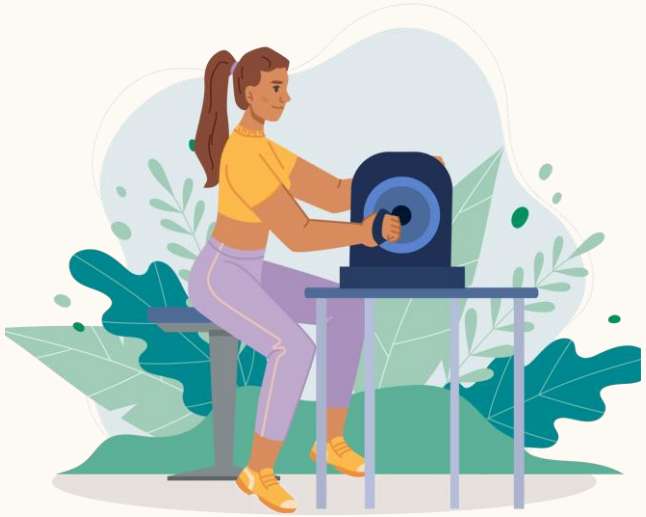
- If you are on insulin, sulphonylurea (e.g., gliclazide, glimepiride, glipizide and tolbutamide) or meglitinides (e.g., repaglinide), your **blood sugar levels may decrease faster** as compared to other medications.
  - ↳ Start easy, monitor signs and symptoms closely, and avoid prolonged exercise.
  - ↳ Consult your doctor for a medication review if you experience signs and symptoms of **hypoglycaemia.**

Exercise Recommendations:

For individuals with foot ulcer and lower limb pain

Non-Weight Bearing Exercises

If you have a foot ulcer or have difficulty exercising while standing, you can modify your exercises



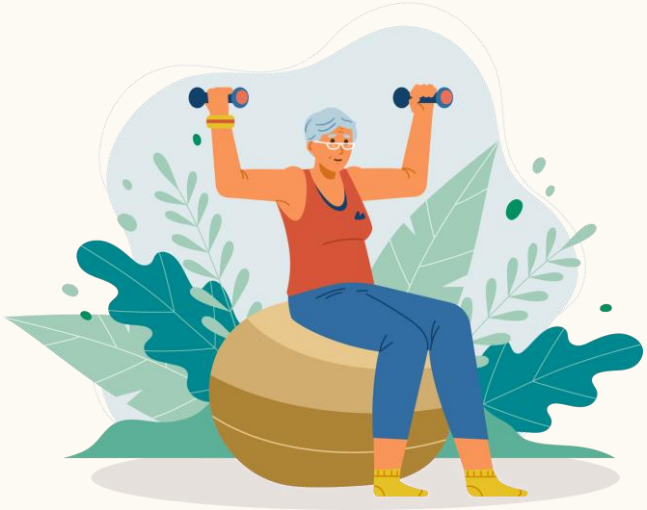
You should still aim to include aerobic, resistance and flexibility exercises while avoiding periods of being sedentary/inactive

Non-Weight Bearing Aerobic Exercises

Arm cycling, supine air cycling, seated marching, seated dance exercise.

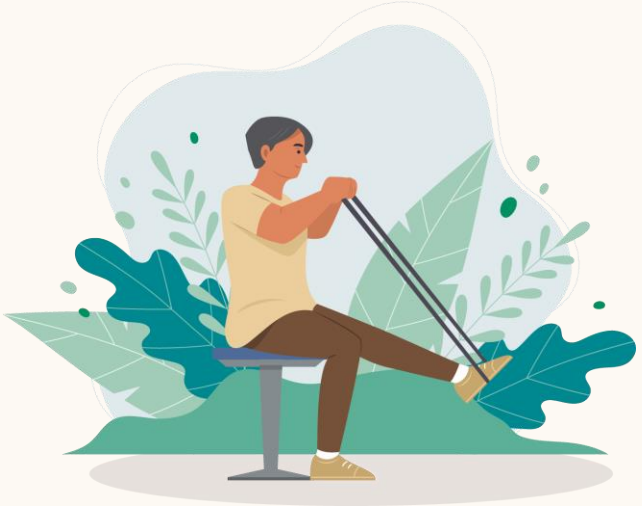
Depending on the location of your ulcer, you may be able to use the recumbent exercise bike at a low intensity. Discuss this with your podiatrist.

Non-Weight Bearing Resistance Exercises



Upper body:

While seated, certain exercises such as shoulder press, lateral raises, biceps curl, reverse flyers, chest press (band/free weights), seated row (band), lats pull down (band) and abdominal curl/seated reverse crunch can be performed



Lower body:

Straight leg raises (supine and long sit), side lying hip abduction, knee extension (ankle weights/band), prone hip extension, knee flexion (ankle weights/band).

Depending on the location of your ulcer, you may be able to do seated calf press (band), double/single leg bridge.

Non-Weight Bearing Flexibility Exercises

Upper body:
While seated, consider performing exercises such as chest stretch, deltoid stretch, neck stretches, triceps stretch and forearm stretch.

Lower body:
Some examples of exercises include side lying quads stretch, seated calf stretch using towel, seated hamstring stretch and seated gluteal stretch.

For individuals with obesity

How obesity affects you

Mechanical consequences:

Osteoarthritis, sleep apnoea, gastro-oesophageal reflux disease etc.

Metabolic health:

Diabetes mellitus, gout, fatty liver, certain cancers etc.

Mental health:

Self-esteem, body image etc.

Monetary health:

Cost from treatment

Effects of weight loss on diabetes & pre-diabetes

For individuals with pre-diabetes or at high risk of developing diabetes:

A 5-7% weight loss is recommended to prevent or delay the onset of Type 2 diabetes.

For individuals with Type 2 diabetes:

A ≥ 5% weight loss improves glucose, lipids and blood pressure control

Types of interventions and expected weight loss

Type of intervention	Expected weight loss
Exercise only*	0 to 3%
Diet + exercise	3 to 10%
Weight loss medications, very low calorie diet	5 to 10%
Endoscopic bariatric procedures	15 to 20%
Bariatric surgery	25 to 30%

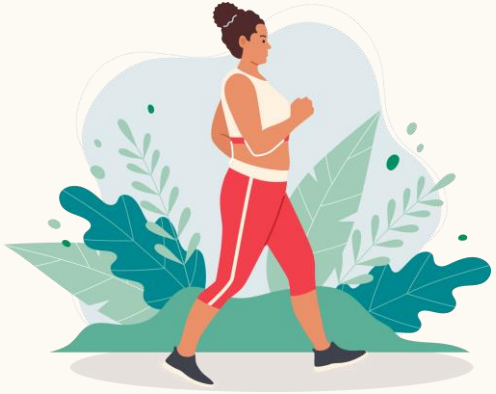
(SGH Obesity Centre; Swift et al., 2018*)

General considerations for individuals with obesity

Lower physical activity levels are prevalent in adults who are overweight and obese

This is likely due to low exercise capacity and being easily fatigued

Modifications:



Start slow

E.g., If you are starting a walking programme, start with leisure walking instead of brisk walking.

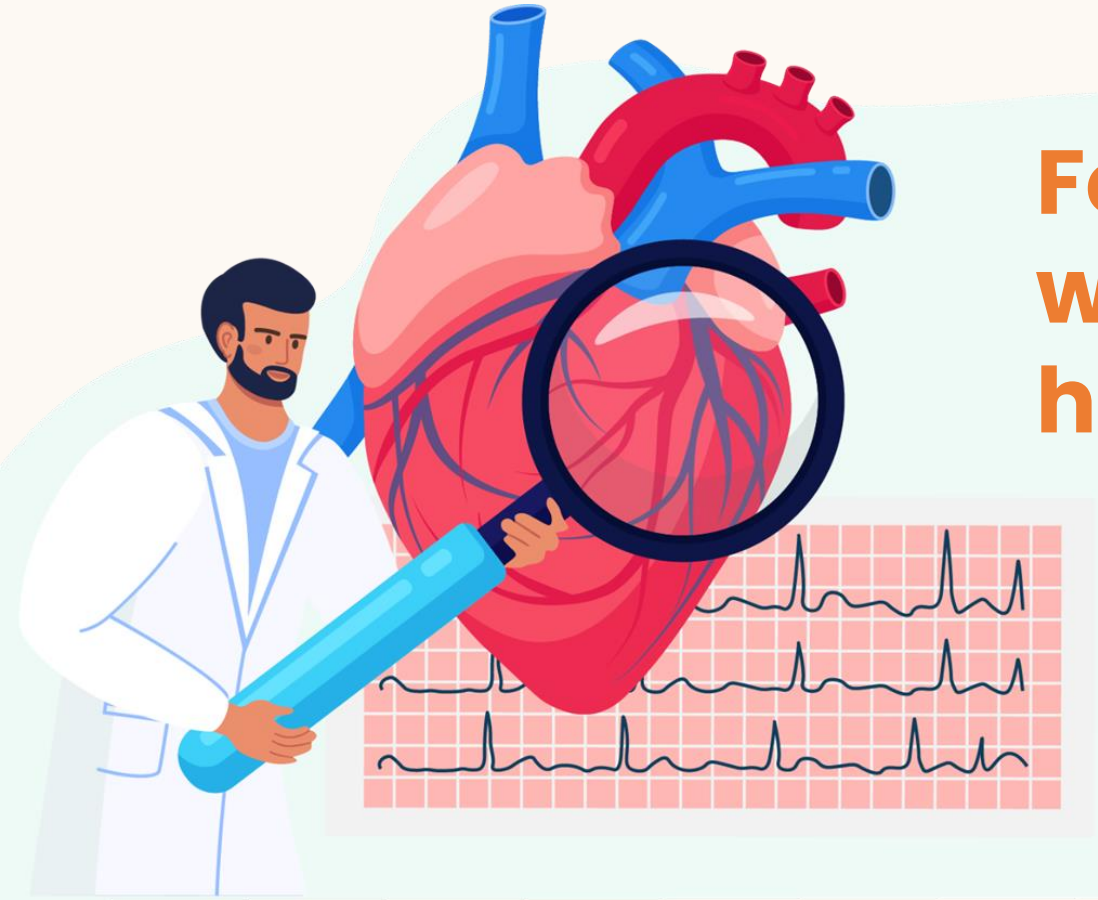
Take breaks in between

E.g., Instead of doing 20 mins of physical activity continuously, aim for 2 x 10 mins with a break in between.

Progress gradually

Monitor your overall energy and fatigue levels during and the day after exercise. Ensure that you do not feel excessively fatigued, such that you can't carry out your normal daily routine.

(Source: Cassidy et al., 2017)



For individuals with coronary heart disease

Benefits of being physically active for individuals with Diabetes and Coronary Heart Disease

Exercising and participating in physical activity:

- Improves glucose utilisation and insulin sensitivity
- Controls weight
- Improves fitness
- Reduces your risk of a cardiac event
- Increases your chances of surviving a cardiac event

Impaired glucose control and being sedentary are major risk factors of coronary heart disease. **Increasing your participation in physical activity and exercising is a modifiable factor that you can work on**.

Precautions – what to look out for

Seek medical attention IMMEDIATELY if you experience one or more of the following symptoms before, during or after exercising:

Chest pain (with or without the discomfort radiating through left shoulder/arm)

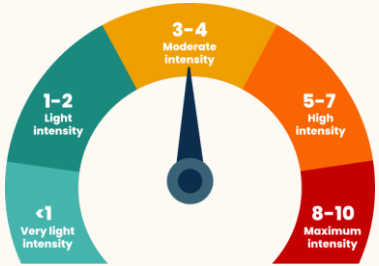
Dizziness/lightheadedness

Profuse perspiration

Monitoring your intensity (Exertion)

- **Exercise at moderate intensity.**
- If you have a less active lifestyle, start off with a **lower intensity.**
- **Monitor the intensity of your activity with:**

A heart rate monitor
Get a recommendation from your health care team



An exertion scale
Rating of Perceived Exertion (RPE) or talk test

Using the “Talk Test” to estimate exercise intensity

Low Intensity:
Able to sing and talk in full sentences

Moderate Intensity:
Noticeable increase in breathlessness, but can talk in phrases and short sentences

High Intensity:
Breathlessness and having difficulty talking

Exercising After A Cardiac (Heart) Event

Reduce sedentary time by:

- Adopting an active lifestyle through daily physical activities
- Increasing your daily step count

Seek medical clearance – get a referral for a Fitness Assessment and enrol yourself in a Supervised Cardiac Rehabilitation Programme:

- At the Singapore Heart Foundation
- Through your cardiologist at the hospital

BE HEALTHY

Avoid Smoking & Drinking

Smoking increases insulin resistance, risk of diabetes and its complications

Quit smoking!

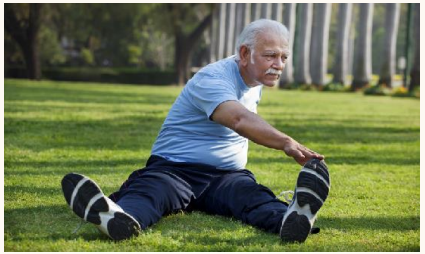
Managing common withdrawal symptoms

Warn family and friends of potential irritability

Distract yourself by doing something else

Do light exercises like brisk walking to lift your mood

Take small, regular meals



Do **stretching exercises**

Join the **I Quit 28-Day Countdown**

Smoking increases insulin resistance, risk of diabetes and its complications

Managing common withdrawal symptoms

- **Feeling irritable**

(Your brain is adjusting to a nicotine-free life)

  - Do light exercises (e.g., brisk walking) to release endorphins to lift your mood
  - Engage in relaxing hobbies

- **Having headaches**

(Your brain is most likely adapting to the increased level of oxygen)

  - Get enough sleep
  - Read or watch TV with adequate lighting

- **Coughing**

(Your lungs are starting to function properly again and are working to clear tar, dead cells and extra mucus accumulated from smoking)

  - Sip warm water

- **Feeling tired**

(Nicotine is a stimulant that forces your body to feel awake; as your blood circulation improves, you will feel alert without the need to smoke)

  - Take small, regular meals to regulate your blood sugar level and boost your energy

- **Tingling hands and feet**

(Your blood circulation is slowly improving; as more oxygen gets to your fingers and toes, the tingling will stop)

  - Do stretching exercises

- **Constant cravings**

  - Distract yourself by doing something else

Avoid drinking alcohol

- Drinking excessive alcohol can cause hypoglycaemia (low blood sugar) due to increased insulin secretion, especially if consumed on an empty stomach or if you are taking certain diabetes medications.
- Alcohol has been linked to increased insulin resistance, and can interfere with meals plans and glucose control, especially if you are taking insulin or medication for diabetes.
- The amount of sugar content varies depending on the type of alcohol. Commercial alcoholic drinks may also be mixed with soda or fruit juices that are high in sugar content.
- Alcoholic drinks such as beer contain high amounts of calories, which can lead to weight gain.

What to do if drinking is unavoidable?

- Avoid drinking regularly
- Do not drink on an empty stomach
- Limit your alcohol intake per day to:
  - 1 standard drink for women
  - 2 standard drinks for men
- Choose light beer or wine spritzer, dilute mixers with water
- Avoid craft beer and sweet wine
- Sip your drinks slowly
- Drink plain water for hydration

What is 1 standard drink?

330 ml beer

100 ml wine

60 ml sweet wine
or fortified wine

30 ml spirit or liqueur
(e.g., brandy,
vodka, whisky)

1 standard drink contains 10g of alcohol

BE HEALTHY

Emotional Well-being

- Diabetes can affect your emotions as well as your physical health.
- Difficulties coping with emotions can increase the risk of diabetes-related complications.
- Getting support can help you manage stress, low mood, uncertainty or even feelings of burnout.
- This can happen whether you’re newly diagnosed or have been living with diabetes for a while.
- Here are some ways to detect and better understand how you feel.
- You can also consider these steps to gain greater control over your diabetes management.

Living well with diabetes by creating your healthy body & self

The first step begins with being clear about:

- Your symptoms
- What you want to do to make it better and
- What you can actually do to feel better

These can take you closer to living well with diabetes and creating your Healthy Body and Self

Here are positive affirmations you use to motivate yourself or your loved ones.
This is a journey that begins with choosing a path with the belief that:

'I can'
'I want to'
'I will take one step at a time'
'I will go step-by-step'
'I'll be better than yesterday"
'I'll persevere"
'I will ask, when in doubt'
'I will be kind and patient with myself'

You get closer to creating your Health Body and Self when you feel healthy, happy, in harmony and willing to do what is helpful to achieve your goals for living well with diabetes

Living well with diabetes by creating your healthy body & self

- What you do to take care of yourself and manage diabetes day-to-day matters and affects how successful the prescribed treatment would be.
- Making lifestyle changes for diabetes can be as powerful as medications to prevent complications. These include healthy eating, being active, blood sugar monitoring, taking medication, problem solving, reducing risks, coping with stress.
- Starting can feel difficult and overwhelming, but as you learn, build skills and carry these steps out, they will become easier and more effortless.
- Learning self-care and ways to tackle stress and diabetes distress, and then following through with them, can get you feeling more independent, in-charge and gaining better health.

Stress & Diabetes

- When stressed, your adrenal glands release ‘stress hormones’ (i.e., adrenaline & cortisol) into your bloodstream, resulting in increased blood sugar.
- When blood sugar remains high, it makes diabetes control difficult.
- Stress can also contribute to high blood pressure, increase the risk of heart attack and stroke, and suppress the immune system.
- Stress can cause mood changes and result in worries that affect sleep.
- When not managed well, the impact of this stress can affect your personal, work and social functioning.

If you are experiencing any of these symptoms, talk with your doctor, nurse or healthcare professional.

Stress & Diabetes

Signs that stress may be out of control & further action is needed:

- Worries and anxious thoughts
- Irritability, frustration, anger
- Low mood or depression
- Changes in appetite (eating too much or not enough)
- Significant weight loss or gain
- Teeth grinding
- Loss of memory, concentration and difficulties completing tasks
- Sleeping too much or too little
- Stomach discomfort (e.g., nausea, constipation, diarrhoea)
- Headaches
- Trembling
- Profuse sweating

If you are experiencing any of these symptoms, talk with your doctor, nurse or healthcare professional.

Diabetes distress

- Diabetes distress is the emotional distress from living with diabetes and the difficulties faced with daily self-management.
- Strong negative emotions from living with diabetes can happen with checking blood sugar, taking medication, keeping up with physical activity and eating healthy.
- These feelings may be unique to you. Diabetes distress can be managed.

What can contribute to Diabetes Distress:

- Newly diagnosed diabetes
- Not reaching target goals for managing diabetes
- Loss of meaning of life, direction and focus in life
- Start and persistence of long-term complications
- Diabetes self-care expenses
- Unclear goals or direction for diabetes care
- Feeling disconnected, unheard or misunderstood by diabetes care providers
- Lack of psychosocial-emotional support
- Feeling burn out from the burden of living with diabetes

Diabetes & Depression

- Living with diabetes can be stressful, and limit your involvement in pleasurable activities.
- Ongoing emotional struggles of coping with diabetes can include feeling you are constantly failing at managing your diabetes, feeling hopeless, fearing the long-term complications and feeling very alone.
- Physical symptoms including fatigue, low energy, poor sleep, appetite and concentration.
- Depressive symptoms impact self-care, reduce motivation in taking care of yourself, and can contribute to hyperglycaemia or hypoglycaemia.
- Depression can be managed.

Have you experienced … or noticed changes in

- Sleep
- Interest
- Guilt
- Energy
- Concentration
- Appetite
- Nervousness
- Suicidal thoughts?

If you are experiencing any of these symptoms, talk with your doctor, nurse or healthcare professional.

FOUR 'A'S OF STRESS MANAGEMENT

1. Avert

You don’t have to deal with all the stressors all at once. Avert and divert your attention to activities that relax you.
If you already have a lot to do, it is alright to say no.
If you feel tired and need time to rest, it is alright to let your family / friends know you will join them for the next outing.

2. Alter

Change the way you see your situation.
You want to get all your work done, and go for a 30 minute walk this evening.
You can choose not to tidy the kitchen today and do so the next day instead.
You want a good relationship with your family members.
When they remind you not to eat 2 bowls of rice at every meal, you feel irritated.
Tell yourself that they are your family, that they care about you and your health.

Swift, C.S., & Clark, N.G. (2015) Overcoming Type 2 Diabetes. New York, Penguin Random House LLC.

FOUR 'A'S OF STRESS MANAGEMENT

3. Accept

Accept, acknowledge and deal with stressors.
You feel frustrated and stressed when you think about living with diabetes the rest of your life. You know you choose how you feel and there is always a choice.
You can choose to use helpful or unhelpful ways to deal with your frustrations.
You know you cannot change the situation causing you stress. Decide what you want or don't want, and focus on what you can do about it.

4. Adapt

Adjust how you think and adapt to stressful situations.
When you notice a negative or unhelpful thought, turn it around, think positive, for example, 'I'm open to giving this a try', 'I can do it one step at a time', 'I can be kind to myself', 'I know it's okay to be imperfect'
When you are feeling down, make a list of all the things you are grateful for. Read through this list whenever you find yourself stressed.

Swift, C.S., & Clark, N.G. (2015) Overcoming Type 2 Diabetes. New York, Penguin Random House LLC.

Overcoming Stressors in Diabetes Management: Manage Emotional Eating

Manage emotional eating

- Identify the negative emotions that drive you to eat mindlessly and find alternative methods for addressing and overcoming the difficult emotions.
- Minimise temptations to eat mindlessly e.g., don't buy / put snacks in the cupboard. Plan and engage in meaningful activities in the evening.
- Minimise over-restriction and schedule a regular (morning / afternoon / evening) snack time.
- Plan for your snack and take intentional steps to select a satisfying and enjoyable one, based on healthy portions recommended.
- Engage in conversation or activity with close friends or find a meaningful hobby.

Overcoming Stressors in Diabetes Management: Enhancing Moods with Exercise

(cont'd)

Engage in physical activity

- Identify activities that are fun, enjoyable and rewarding.
- Adjust to your environment; arrange an activity and exercise at a time and location you find convenient.
- Make a concrete plan for regular exercise you want to do, think you can do and are willing to do.
- Find company for the activity or exercise you want to do.
- Identify and address self-defeating thoughts by asking yourself what evidence you have or how true it is, e.g., that you are too old or too overweight to exercise.

Problem Solving:
4 steps for better diabetes management

- Problem solving helps people to cope with stressful or overwhelming situations, and when no solution seems workable or it is difficult to get started.
- Helps you feel more motivated when the task is broken down into easier steps.
- First, select steps even if there is no ideal solution.
- Second, take a difficult task and break it into manageable steps.
- Let’s look at how we can use this technique in 4 steps.

Problem Solving:
4 steps for better diabetes management

Step 1
Describe the problem in as few words as possible.
Example – I do not exercise enough but would like to as I know it will help my health.

Step 2
List all **possible solutions.**
Come up with as many solutions as possible even if you are not sure they will give you the ideal outcome. List them even if you think you are not sure if you will do them.

Examples of possible solutions:
- Get off the bus two stops early and walk to work.
- Use the staircase instead of the lift.
- Join a gym.

Problem Solving:
4 steps for better diabetes management

Step 3
List the **pros and cons** of each solution.
Think about the pros and cons for each possible solution.

Example of Pros & cons of solution
For possible solutions: Walk to work instead of drive.

Pro: More relaxed walking than driving; better for health with fresh air.

Con: With heat from weather, I'll get sweaty and uncomfortable; needing more time to walk than drive means I need to get up earlier, even when I don't get enough sleep.

Problem Solving:
4 steps for better diabetes management

Step 4

Is this a solution you think you would likely choose?

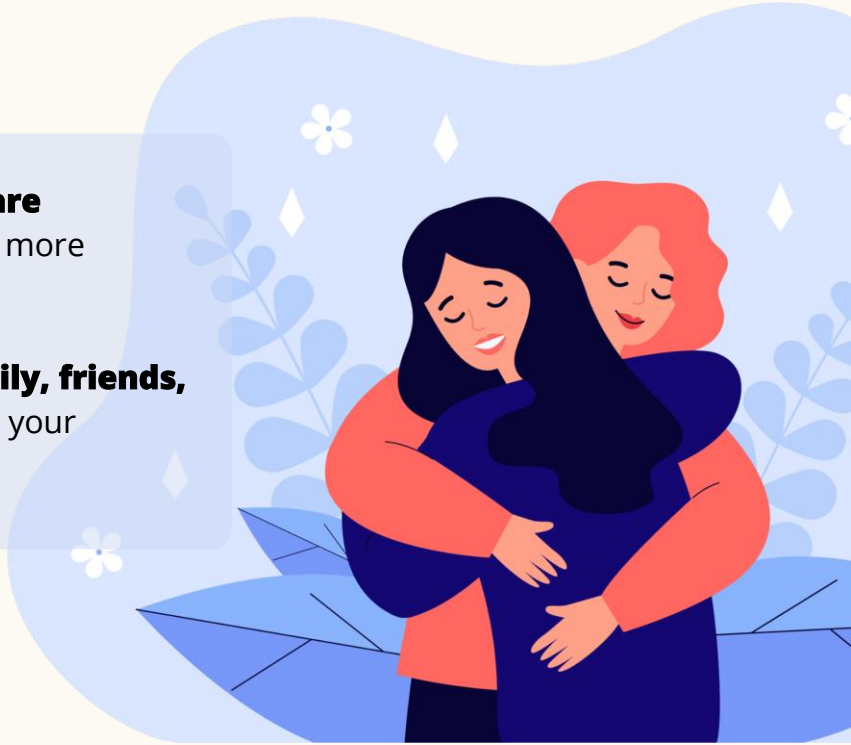
If so, let's break the solution down into doable steps.

Carry out the best option.
Do it one step at a time.

IMPROVING MY RELATIONSHIP WITH OTHERS WHO CARE ABOUT ME

Positive relationships with your **doctor, nurse and any healthcare professional** who support you in diabetes management give you more confidence to better manage diabetes.

Connecting and seeking support from people in your life, like **family, friends, co-workers** help you to feel better understood, valued and boost your motivation to make positive changes.

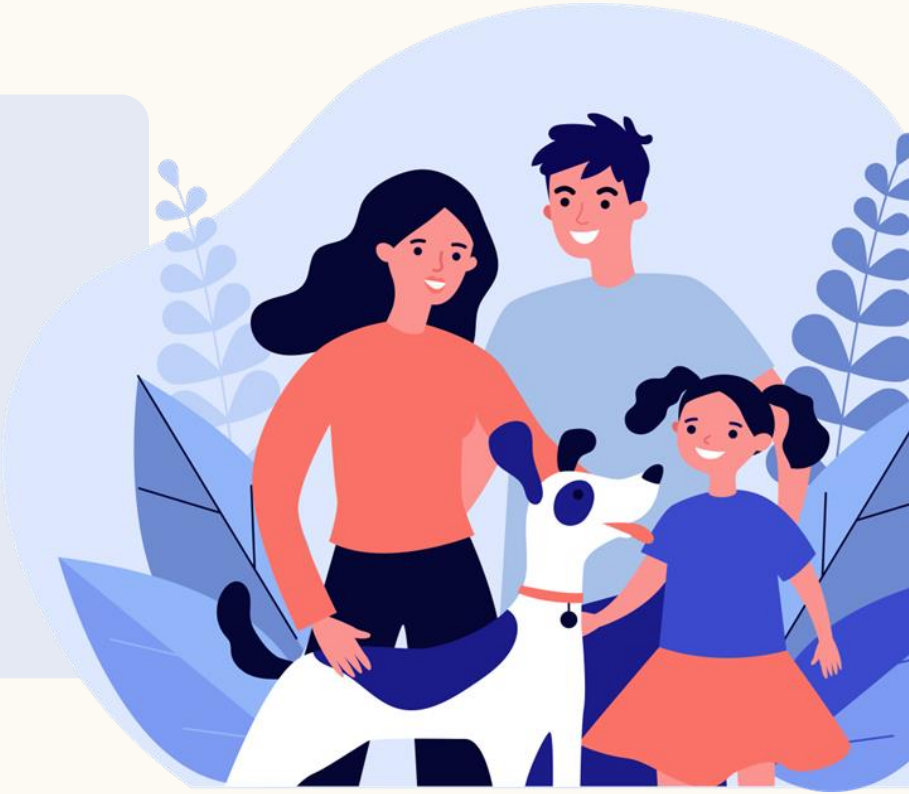


IMPROVING MY RELATIONSHIP WITH OTHERS WHO CARE ABOUT ME

Family members you relate well with make helpful allies who stand by you and support you when you feel angry, frustrated, disappointment, down or depressed.

NOTE:
Overly concerned family may also offer support in unwanted ways. This could contribute to strong negative emotions, with no constructive or helpful outcomes for both.

You could share with them what enables you to feel more supported.



IMPROVING MY RELATIONSHIP WITH OTHERS WHO CARE ABOUT ME

COMMUNICATE

What you think, How you feel, and What can help

a. Describe: When you _____
b. Explain: I feel _____
c. Specify: If you would do _____ instead
d. Consequence: I will feel _____

Here is an example

a. Describe: When you tell me I cannot eat kueh
b. Explain: It makes me feel like I don't know my limits and I feel like eating more kueh
c. Specify: If you would ask me how much kueh might be healthy or when might be a better time to eat it
d. Consequence: I would feel that you care and are supporting me

STIGMATISATION OF INDIVIDUALS WITH DIABETES

- Diabetes stigma includes the **experience** of exclusion, rejection, prejudice, and blame that some people with diabetes encounter. Learn how to identify this stigma, how it can lead to worse health outcomes, and what you can do to stand up to it.

- **Stigmatisation** can be a major challenge for **those** with diabetes **and** exists everywhere, including in the family, school, workplace, and healthcare **settings.** It prevents people from seeking care and managing their physical and mental health.

WAYS TO MANAGE STIGMATISATION

- **Be kind to yourself**. Never blame yourself. You may mistakenly believe you are responsible for your condition, but internalised stigma can be just as harmful to your health as stigma from others. Educate yourself on the many causes of diabetes and connect with people who share your experiences to help you overcome self-blame.

- **Speak up** if you see stigmatising behaviour or statements being made, and try to open up a conversation with others by sharing accurate information about diabetes. Being an ally to individuals with diabetes is key.

WAYS TO MANAGE STIGMATISATION

- **Share your stories with others**. While many people may be reluctant to tell others they have diabetes, having these conversations with your friends, family, and colleagues can help humanise diabetes to those who are not familiar with the condition. Join a diabetes support group.

- **Seek help.** If you, your child or anyone you know, are being stigmatised and need assistance, please find a counsellor at a Family Service Centre (FSC) near you.

WAYS TO MANAGE STIGMATISATION

Or you can contact the following diabetes groups:

Diabetes Singapore
Email: enquiry@diabetes.org.sg
(65) 6564 9818
https://www.diabetes.org.sg/

TOUCH Diabetes Support
Email: tds@touch.org.sg
(65) 6377 0122

typeOne.sg
https://www.facebook.com/groups/typeonesg

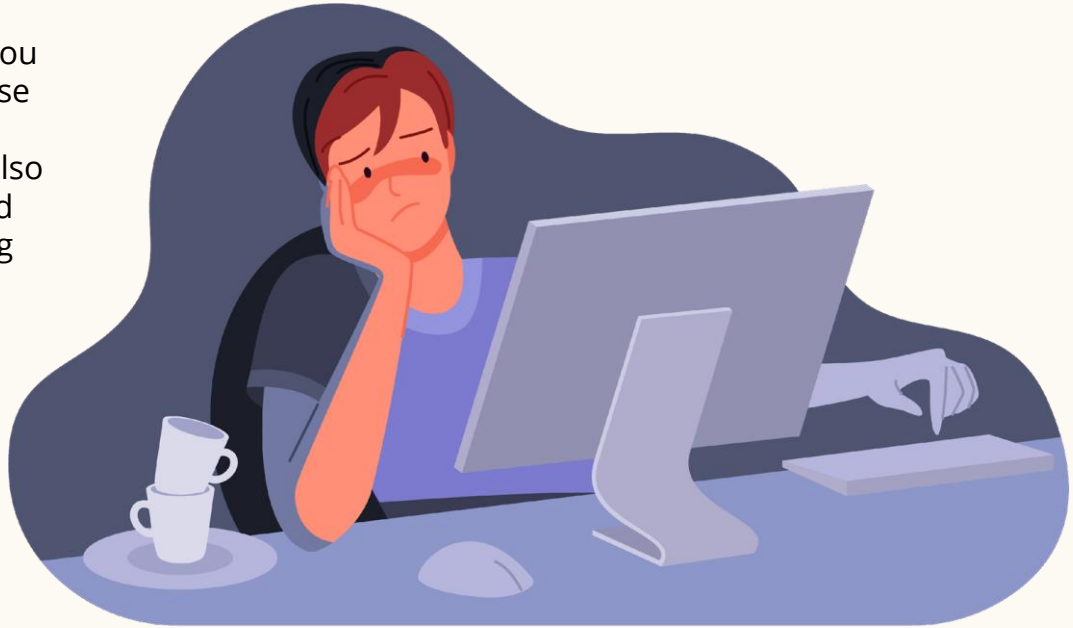
SLEEP AND DIABETES

How diabetes can affect sleep

- Diabetes and pre-diabetes has been linked to problems sleeping well.
- Effects of lack of sleep or poor sleep quality include and are not limited to:
  - **Mental abilities:** Poor attention, concentration and memory, impaired judgment, and reaction time
  - **Emotional state:** Irritability and other mood disturbances, difficulty managing intense emotions
  - **Physical state:** Fatigue, weakened immunity, high blood pressure, weight gain

How diabetes can affect sleep

- High blood sugar (hyperglycaemia) and low blood sugar (hypoglycaemia) during the night can lead to **insomnia and next-day fatigue.**
  - When blood sugar levels are high, the kidneys overcompensate by causing you to urinate more. During the night, these frequent trips to the bathroom can disrupt sleep. High blood sugar may also cause headaches, increased thirst, and tiredness that can interfere with falling asleep.
  - In contrast, going too many hours without eating or taking the wrong balance of diabetes medication can also lead to low blood sugar levels at night. This can cause nightmares, or wake you up at night drenched in sweat, or make you feel irritated or confused when you wake up.



Dangers of nocturnal hypoglycaemia!

When blood sugar falls **below 4.0 mmol/L while sleeping** at night, the person experiences **nocturnal hypoglycaemia** or “night-time hypo”. This can be dangerous and cause sudden death.

Some ways to avoid it:

Test your blood sugar levels before bed.

Avoid skipping meals, including dinner.

Avoid physical activity at night.

Look out for warning signs: Restlessness and irritability, hot, clammy or sweaty skin, trembling or shaking, changes in breathing, nightmares, and racing heartbeat.

Consult your doctor about nocturnal hypoglycaemia.

Sleep problems in diabetes

- As with many chronic conditions, the emotional struggle of coping can contribute to depression or stress about the disease itself. These affect your stress-related hormonal cycle and disrupt your sleep cycle. You may take longer to fall asleep, be awake more than usual through the night or wake far too early in the morning.
- Insomnia happens when a person experiences sleep difficulties and related daytime symptoms, like fatigue and attention issues.
- Those with insomnia commonly feel distressed about their inability to sleep and daytime symptoms caused by sleep issues.
- The distress and frustrations of not being able to fall asleep, worries and fears from not sleeping can reinforce the sleep difficulties. Symptoms can be severe enough to affect your work or school performance, as well as social or family life.

Talk to your doctor about sleep issues. Based on your personal situation, your doctor may be able to recommend sleep aids or additional ways to get better sleep. They may even conduct a sleep study, to see if a sleep disorder is a potential contributor to your sleep problems.

Common sleep disorders in diabetes:

- Obstructive sleep apnoea
- Restless leg syndrome

BE PROACTIVE

Setting Goals

Consider different areas of your life and which of these are important to you

Relationships

Health and **physical well-being**

Work and **career**

Personal and **spiritual growth**

Recreation and **leisure**

Helpful ways to improve sleep quality

Maintain a regular bedtime and wake time routine.

Exercise regularly. Light exercise can be included in the evening.

Avoid large meals before bed.

Avoid nicotine, alcohol and caffeine 4-6 hours before bedtime.

Switch off or avoid using electronic device (e.g., mobile phone, computer or television) at least 30 minutes before bedtime.

Keep your bedroom dark, cool, quiet and comfortable.

Consider different areas of your life and which of these are important to you

Identify the areas of life that are important to you

- What are some lifestyle changes you are thinking of making or have made?
- How might/ did these changes contribute to important areas of your life?

Setting my goal

Example of healthy eating goal

Step 1:
Where do you want to be?

Where I am now:
"I love having fried chicken everyday!"

Where I want to be:
Manage my weight better
Eat more veggies and less fried food

This goal is important to me because:
I want to be healthier and look better

Setting my goal

Step 2:
Set your goal

I will ...

Action
Stick to My Healthy Plate

Day/Time
Lunchtime on Mondays and Thursdays

Location
At work

Time period
For the next 3 months

Start date
From 14 January

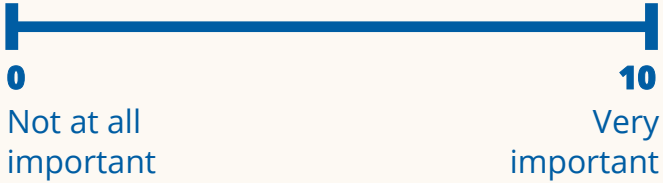
Step 3:
Identify and work around potential barriers

What might get in the way	What I can do	Person(s) who can help
1. Colleagues suggest having fast food for lunch	Suggest to try out eateries with healthier options	My colleague James likes vegetables
2. I have a particular craving for curry puffs when I'm stressed	Unwind in other enjoyable ways, like walking or listening to music	Walk and chat with my neighbour in the evening
3. There is a stall that sells delicious fried food, on my way home	Take an alternative path home	NIL

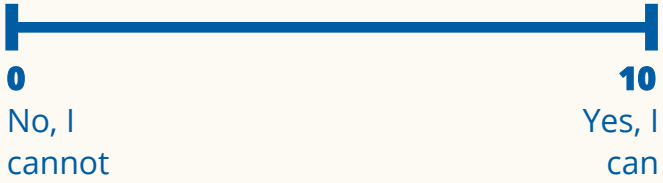
Setting my goal

- **Complete the "Setting my goal" handout to set a new goal**
- **Use the two rulers to check that the goal is doable**
  - ↳ If scores are less than 7, adjust the goal

Is reaching this goal important to you?



Do you think you can reach this goal?



Setting my goal

Example of physical activity goal

Step 1: Write down the original goal

I will ...

Action
Brisk walk for 30 minutes

Day/Time
Mondays, Wednesdays and Fridays after dinner at 8pm

Location
Along the park connector

Time period
For the next 4 weeks

Start date
From 18 June

Step 2: Solve the problem

	What got in the way?	How can I work around it?
1	I couldn't get off work on time	Do lunchtime exercises or pick a day without 5pm meetings
2	Poor weather	Do indoor exercises
3	Low energy level	I can sleep earlier the night before or pick a weekend day to exercise earlier

Step 3: Revise your goal

I will ...

Action
Do lunchtime exercises and brisk walk

Day/Time
- Lunchtime exercise on Mondays
- Brisk walk on Wednesdays and Saturdays

Location
Office gym, park connector

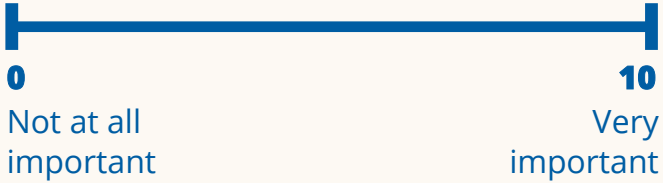
Time period
Another 4 weeks

Start date
From 18 July

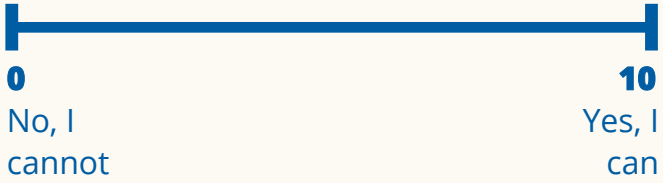
Keeping up with my goal

- **Complete the "Keeping up with my goal" handout if there were barriers to accomplishing the goal**
- **Use the two rulers to check that the goal is doable**
  - ↳ If scores are less than 7, adjust the goal

Is reaching this goal important to you?



Do you think you can reach this goal?



BE PROACTIVE

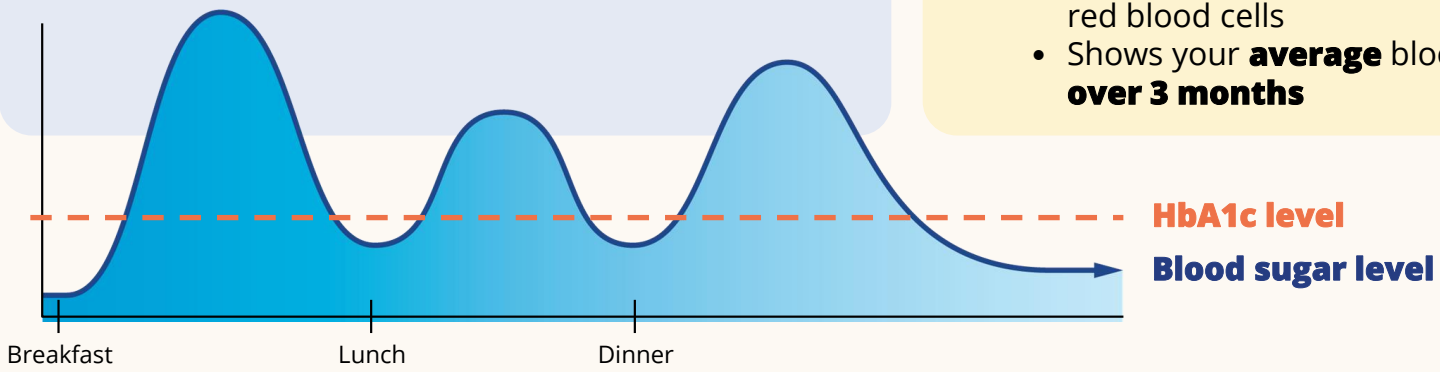
Treatment targets and monitoring

Different ways to test your blood sugar level

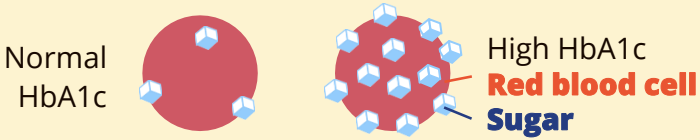
Done at home using a glucometer

What is blood sugar level?

- **"At the moment"** level of sugar (glucose) in your blood



Done at the clinic



What is HbA1c?
(Glycosylated haemoglobin)

- **Sugar** (glucose) **attached to protein** in red blood cells
- Shows your **average** blood sugar level **over 3 months**

Different ways to test your blood sugar level

For individuals with Type 2 diabetes,
consider self-monitoring (using a glucometer), if you are

At increased risk of developing hypoglycaemia (low blood sugar)

Pregnant with pre-existing diabetes or Gestational Diabetes

Experiencing acute illness

Having difficulty achieving glycaemic goals

Fasting for religious reasons (e.g., Ramadan)

Monitor your blood sugar level before and after meals

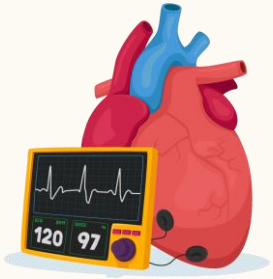
Blood sugar	Before food	2 hours after food
Too high Risk of hyperglycaemia	**>7.0** mmol/L	**>10.0** mmol/L
Optimal	**4.0 to 7.0** mmol/L	**4.0 to 10.0** mmol/L
Too low Hypoglycaemia	**<4.0** mmol/L	**<4.0** mmol/L

Your targets may vary depending on your condition; discuss this with your doctor or care team

Common signs and symptoms of HYPOglycaemia (low blood sugar of < 4 mmol/L)

Hunger

Hand tremors



Abnormally fast heartbeat

Fatigue

Mood changes
(e.g., anxiety, irritability, nervousness)

Dizziness or **headaches**

Changes in behaviour
(e.g., confusion, weakness, unclear speech)

Drowsiness

Follow the 15-15 rule if you experience HYPOglycaemia symptoms or your blood sugar level is low (< 4 mmol/L)

1

Take 15g of fast-acting sugars, e.g.,

Half a glass of fruit juice

OR

3 soft candies (sugar-containing) or sugar (glucose) tablets

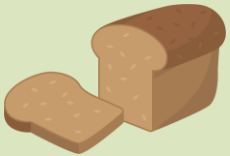
2

After 15 minutes, check blood sugar level

If **symptoms persist** or blood sugar level is low (< 4 mmol/L)

If symptoms **resolve** or blood sugar level is ≥ 4 mmol/L

3



Eat a light snack (e.g., bread, biscuits) or have your next meal earlier **to prevent blood sugar levels** from **dropping** again

Repeat steps **1 & 2**, one more time

If **symptoms persist after second attempt, seek medical advice** (if your doctor is unavailable and it is an emergency, head to the A&E)

- **Record what happened prior to experiencing hypoglycaemia**
- **If hypoglycaemia is frequent, do a medication check with your doctor**

These steps are only applicable if the person is conscious. If the person is unconscious, call an ambulance immediately.

How can I prevent HYPOglycaemia (low blood sugar)

What to do

Do not skip meals even when busy

Bring a few sugar-containing sweets along whenever you go out

If needed, eat extra carbohydrates **before moderate** or **vigorous intensity activities**

Do not take diabetes or insulin injection in the morning when fasting for a blood test

Closely **follow instructions** on when to take your medication, especially in relation to meals

If you experience **hypoglycaemia frequently, check with your doctor** as your medication may need adjusting

Common signs and symptoms of HYPERglycaemia (high blood sugar)

Increased thirst

Frequent urination

Increased hunger

Blurred vision

Headaches

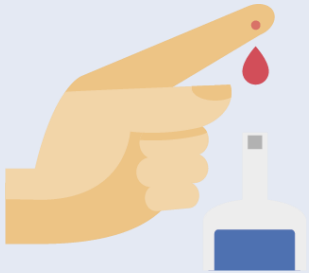
Weight loss

Slow-healing cuts

Blood sugar level
> 16 mmol/L

If you experience HYPERglycaemia symptoms or your blood sugar level is high (> 16 mmol/L)

1



Check your blood sugar level more often

2

Drink plenty of **plain water**

3

Seek medical advice if symptomatic, or if blood sugar level remains persistently high **> 16 mmol/L**

How can I fast safely (for religious reasons)?

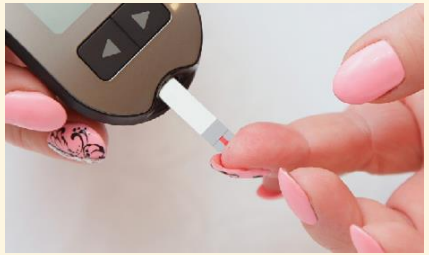
Before fasting

Consult your doctor if it is safe for you to fast

Adjust your diet with your healthcare professional

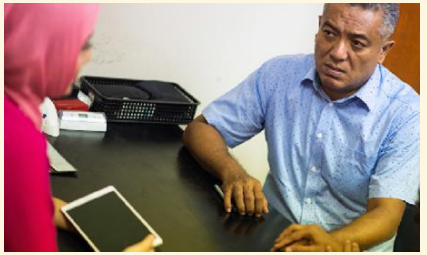
Adjust your medication or insulin dose with your doctor

During fasting



Self-monitor blood sugar levels regularly and **check for symptoms of hypoglycaemia** (low blood sugar)

If your blood sugar level is low (< 4 mmol/L), **stop your fast** and take a sweetened drink

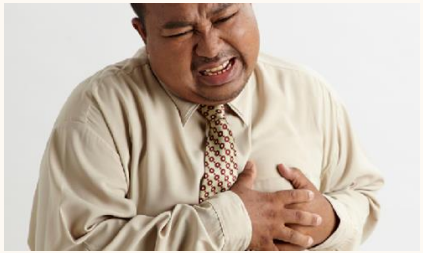


If symptoms of low or high blood sugar persist, **stop your fast and seek medical attention**

When should I not fast?

When you are or have any of the following

Frequent hypoglycaemia (low blood sugar) or **poorly controlled diabetes**



Serious conditions such as nerve disorders, heart problems or uncontrolled hypertension

Pregnant or **breastfeeding**

Sick

Not been following your prescribed medication, diet and physical activities

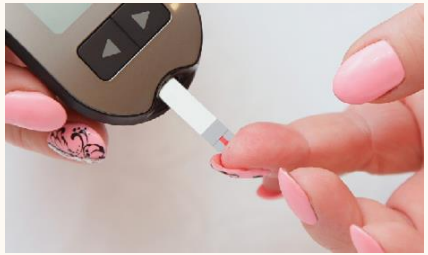
What to do when I am sick*?

*Feeling unwell, e.g., fever, cough, runny nose, vomiting and diarrhoea

See your **doctor**

Discuss with your healthcare team if **dose adjustments** need to be made

Get plenty of **rest**

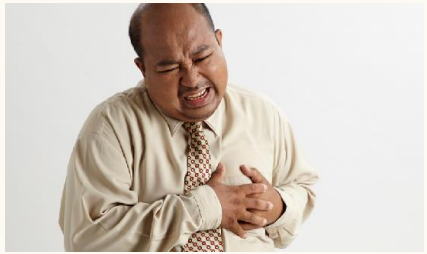


Check your blood sugar level more often

Drink plenty of **water**

Have small, frequent meals or fluids (e.g., soups, diluted juices or sweetened drinks)

When do I have to see my doctor?



Chest pain, shortness of breath, fruity breath, dry lips or tongue or abdominal pain

Severe vomiting or diarrhoea for more than 6 hours

Recurrently low blood sugar levels (< 4 mmol/L) **or persistently high** (> 16 mmol/L) for more than 24 hours

Loss of appetite

Skin sores

Go for your regular check up to detect and prevent complications

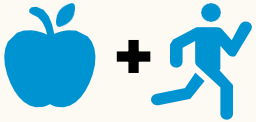
Assessment/Test	Frequency	Possible Complications
 • Weight and height (BMI) • Blood pressure • HbA1c (blood sugar) • Stress, emotional well-being	**At least every 3 to 6 months depending on your condition**	**Kidney Failure** **Blindness** **Amputation** **Heart attack** **Stroke**
 • Lipid profile (cholesterol) • Kidneys • Eyes • Feet	**At least once a year depending on your condition**	

Manage diabetes well

	Blood sugar	Blood pressure	LDL cholesterol
	HbA1c^ (%)*	(mmHg)	(mmol/L)
	≥ 8.1	≥ 160/100	≥ 3.4
	7.1 – 8.0	140/80 to 159/99	2.6 to 3.3
	≤ 7	< 140/80	< 2.6

Speak with your care team as your targets may vary

^HbA1c tells you how your blood sugar control has been like the past 3 months.



Healthy eating habits and regular physical activity and exercise can help you achieve target levels of blood sugar control, blood pressure and cholesterol

*The HbA1c cut-offs are updated as of November 2023.

Weight management in diabetes

Weight management is an important part of diabetes care. It helps you achieve better blood sugar levels, so keeping within your optimal weight range is important.

How do I know if my weight is within the optimal range?

Body Mass Index (BMI) screens for weight categories that may lead to increased risk of cardiovascular health problems, but it does not diagnose the body fatness or health of an individual. BMI is one of the many useful tools individuals can use to track their health.

For Asians, a BMI 23 and greater is considered of increased risk. You can use the formula to calculate your BMI, then check against the table.

If you are overweight (BMI 23 and more), even losing 5 – 10% of your weight can help lower your blood sugar levels, blood pressure and cholesterol levels.

Speak to your healthcare team for personalised advice on how best to achieve or maintain an optimal weight.

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

WHO Asian classification of BMI risk category

BMI (kg/m2)	Health Risk
27.5 and above	High risk for cardiovascular diseases^
23.0-27.4	Moderate risk for cardiovascular diseases^
18.5-22.9 [optimal]	Low risk for cardiovascular diseases^
Below 18.5	Risk of nutritional deficiency diseases and osteoporosis

^Cardiovascular diseases affect the heart or blood vessels, and include heart disease and stroke.

BE PROACTIVE

Self-Monitoring of Glucose

Self-monitoring of Blood Sugar

- **Keeping your blood sugar levels within the target range** can help reduce your risk of diabetes-related complications. Self-monitoring your glucose levels can help you better understand how food, physical activity and insulin dose affect your blood sugar levels, and make the necessary changes to optimise your diabetes control.

- **Blood sugar targets can be individualised** in order to prevent risk of hypoglycaemia (too low levels of blood sugar) or other adverse effects associated with blood sugar control that is too tight.

- **Discuss with your healthcare team** if you need to self-monitor your blood sugar, which tools you should use and how often to use it.

- **Your target blood sugar range can depend on:** age, lifestyle and overall health.

When to check blood sugar levels:

Before meals

Two hours after a meal

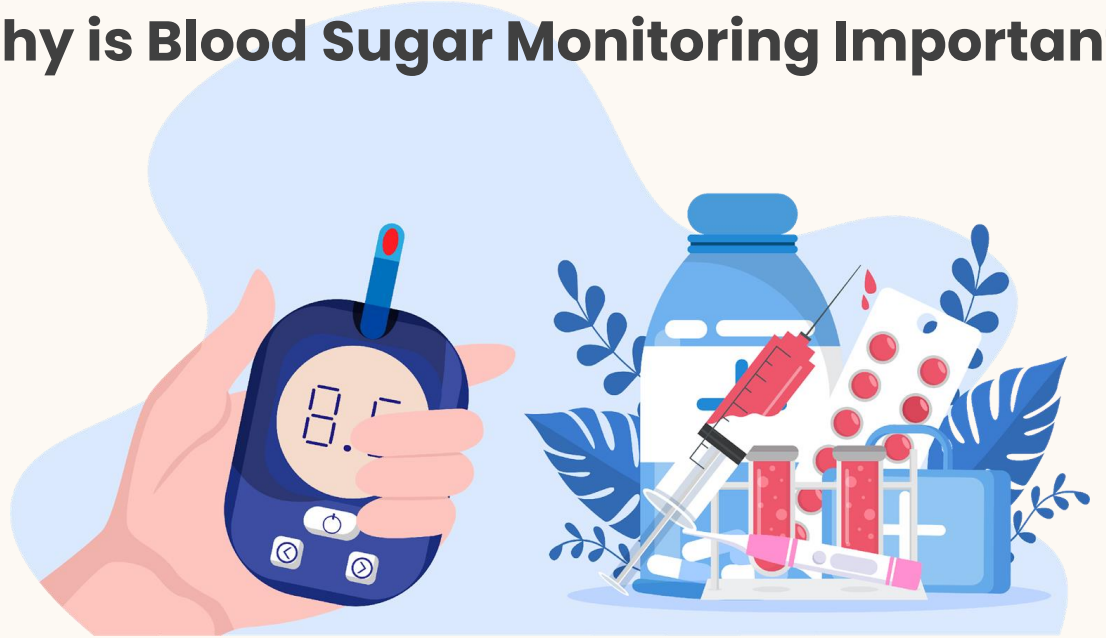
Before bedtime

Before and after exercise

When feeling unwell

Other times as necessary, as discussed with your healthcare professional

Why is Blood Sugar Monitoring Important?



1. Gives you a clear idea of your blood sugar level at a given time
2. Informs if you have hypoglycaemia (blood sugar too low) or hyperglycaemia (blood sugar too high) at a given time
3. Tells you how your lifestyle and medication regimen is affecting your blood sugar levels
4. Helps you and your diabetes healthcare team evaluate and determine the best management strategy for you

How to Monitor Blood Sugar

Blood Glucose Meter

- Blood sugar level can be easily monitored using a Blood Glucose Meter.
  - ↳ Wash your hands with soap and water and dry with tissue
  - ↳ Prick your finger and put a small drop of blood on the meter's test strip
  - ↳ Your blood sugar level will appear on the meter within seconds
  - ↳ A blood glucose meter is usually the least expensive home testing option, but it only reveals your blood sugar level at the time of check
- Blood sugar and interstitial fluid (fluid found in spaces around body cells) glucose levels are usually similar to each other, and glucose levels can also be measured from the interstitial fluid. There are two types of monitors that measure interstitial fluid glucose: flash glucose monitors and continuous glucose monitors.

How to Monitor Blood Sugar

Flash Glucose Monitor (FGM)

- It consists of a sensor and a reader, and depending on the type of sensor, it is placed either at the back of the upper arm, on the abdomen or the upper buttocks.

- FGMs can be used up to 14 days. It allows you to view interstitial fluid glucose levels at the time of check and can tell you if your glucose levels are rising, falling or stable. FGMs can also give you a report on the daily pattern of your glucose levels.

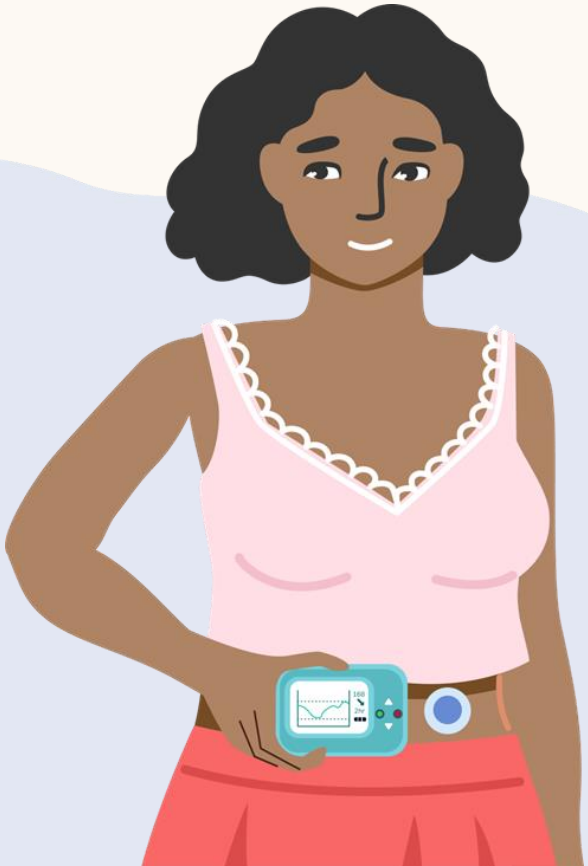
Pros

- **Does not require** blood sugar (finger prick) calibration

Cons

- Some do not have alarms
- Sensor readings are not automatically synced with the reader. You will need to flash the reader over the sensor to record your glucose readings.

How to Monitor Blood Sugar



Continuous Glucose Monitoring (CGM)

- It consists of a sensor, a transmitter and a receiver. The sensor typically needs to be replaced every 3 to 7 days. As it collects glucose readings every few minutes, the CGM is able to give you a more complete picture of your glucose profile compared to a blood glucometer.

Pros

- Triggers **alarms if glucose levels are too high or low**

Cons

- **Some types of CGMS need calibration with blood glucose meter** (i.e., will require **finger prick**)

Glucose level targets

These should be tailored to your condition.
Please discuss with your healthcare team.

Test	Targets
Pre-meal glucose^ (mmol/L)	**4.0 – 7.0**
2-hour post-meal glucose^ (mmol/L)	**< 10.0**

^Values pertaining to capillary blood sample

Low Blood Sugar: Hypoglycaemia

What is Hypoglycaemia?

- Also known as low blood sugar, Hypoglycaemia occurs when your blood sugar level falls below 4.0 mmol/L

Causes

- Imbalance between insulin intake and body's physiological needs
- Insulin overdose – injecting too much insulin but not eating enough carbohydrates
- Ill-timed insulin intake or using the wrong type of insulin
- Increased sensitivity to insulin
- Increased glucose utilisation (during or shortly after exercise)
- Mismatch between food intake timing and sulphonylureas (e.g., Glipizide) consumption

Hypoglycaemia: Symptoms and Severity

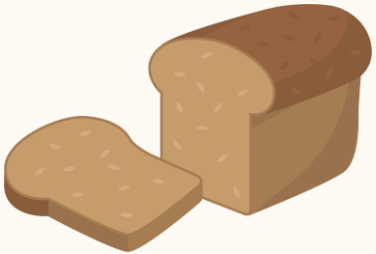
Mild	Moderate	Severe
Fast heartbeat	**Unceasing hunger despite having a full and balanced meal**	**Weakness**
Dizziness	**Irritable**	**Blurred vision**
Headache		**Slurred speech**
Sweating		**Confusion and abnormal behaviour**
		Seizures
		CANNOT self-treat

If the individual has **lost consciousness, please call an ambulance immediately!**

Hypoglycaemia is when the blood sugar levels are lower than the normal. This usually occurs at blood sugar levels less than 4 mmol/L.
Mild: 3.1-3.9 mmol/L
Moderate: less than 3.1 mmol/L
Severe: Less than 2.2 mmol/L or needs help to treat (CANNOT self treat)

Hypoglycaemia: Treatment

What type of food to take if the person is <u>conscious</u>:



Fast-acting sugars	Long-acting sugars
• 3 teaspoons of dextrose powder/ table sugar in 120ml of water • ½ can of regular soft drink • 1 can of low-sugar soft drink • ½ glass (150ml) of fruit juice • 3 soft/jelly sweets	• 3 pieces of biscuits • 1 slice of bread

Avoid using the following items to rescue hypoglycaemia

- Diet/no sugar soft drinks
- Sugar-free sweets
- High fat snacks such as chocolate – fat slows down the movement of sugar into blood!

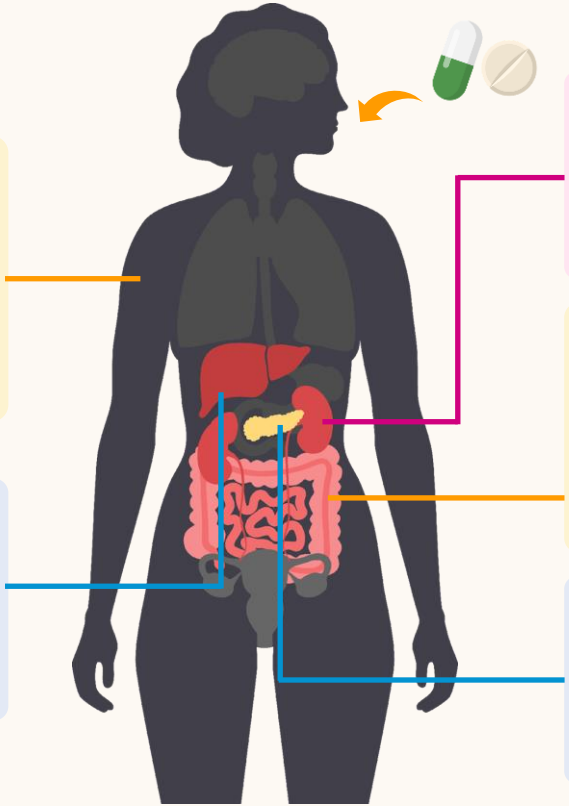
BE PROACTIVE

Medication

Medications work in different ways, on different body parts

Liver, fat tissues and muscles
E.g., Pioglitazone, metformin
- Reduces amount of sugar made by the liver, and increases the sensitivity of fat, liver and muscle cells to insulin

Liver and pancreas
E.g., Linagliptin, sitagliptin
- Helps the pancreas produce more insulin and reduce amount of sugar made by the liver



Kidneys
E.g., Dapagliflozin, empagliflozin
- Prevents the kidneys from re-absorbing sugar

Intestines
E.g., Acarbose
- Slows down breakdown of starch and absorption of sugar from the intestines

Pancreas
E.g., Glipizide, tolbutamide, gliclazide
- Helps the pancreas produce more insulin

Please visit knowyourmeds and ndf.gov.sg for more information on medication.

Take your medication as prescribed

Take your medication(s) regularly at the correct time(s)

If you miss a dose, take it as soon as you remember; if it is time for the next dose, skip the missed dose

Eat meals regularly to prevent hypoglycaemia (low blood sugar)

Avoid taking alcohol with medication

Inform your healthcare professional if you are:

Taking metformin before going for any scans (e.g., CT scans) or procedures

Pregnant or planning to get pregnant before taking medication

Experiencing **persistent symptoms of hypoglycaemia** (low blood sugar)

Take your medication as prescribed

Inform your healthcare professional if you are pregnant

- Your oral medications may not be recommended for use during pregnancy and your doctor may prescribe a different medicine or insulin

BE PROACTIVE

Insulin Treatment

Types of insulin

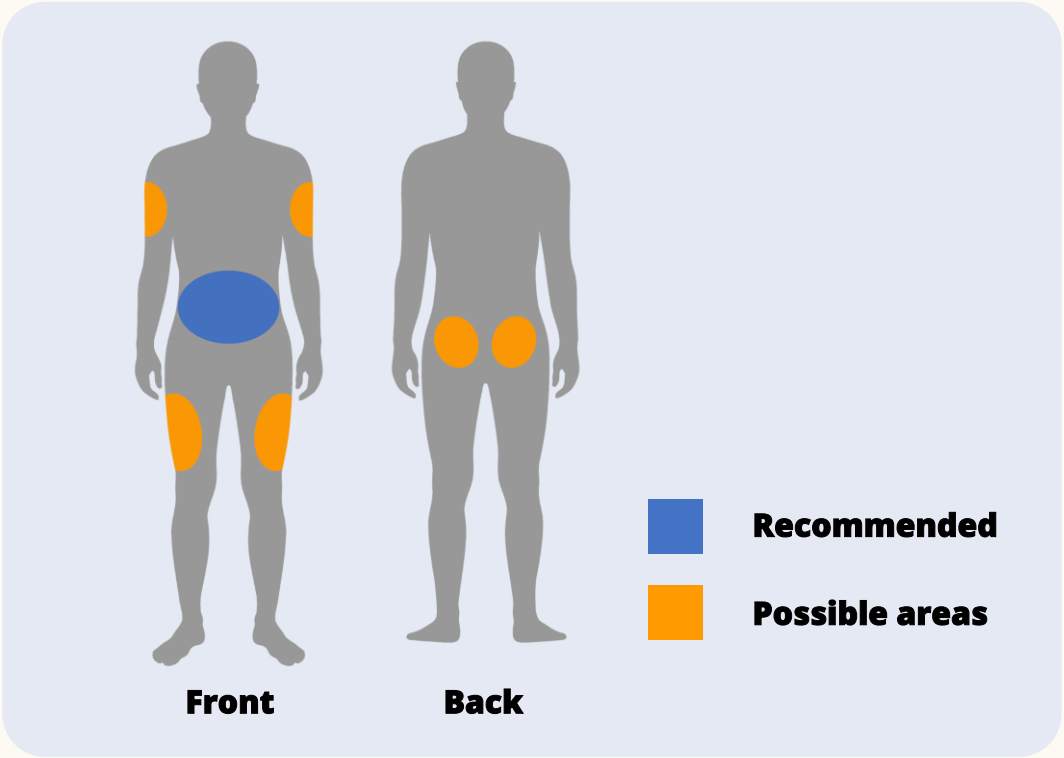
Rapid-acting
- Starts to work within 15 minutes and lasts 1-2 hours

Regular- or short-acting
- Starts to work within 30 min and lasts 3 to 4 hours

Intermediate-acting
- Starts to work within 1-2 hours, maximally at 4-6 hours and lasts up to 12 hours

Long-acting
- Can work for an entire day (depending on the type of long-acting insulin)

Types of insulin

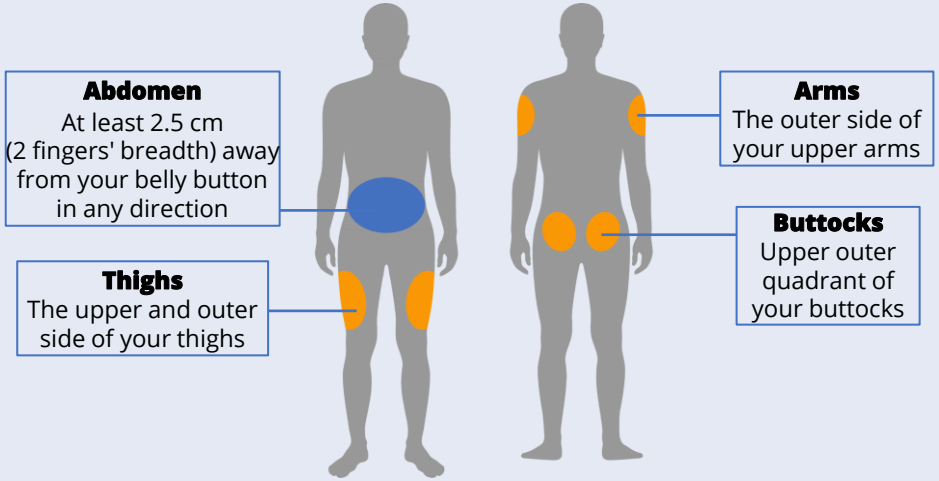


- Inject insulin into the fatty layer beneath the skin (subcutaneous).
- The belly absorbs insulin the fastest and most consistently, followed by the arms, thighs and buttock.
- Pick the proper needle length and gauge to reduce pain.
- Use a new needle for every injection.

Insulin sites

Suitable sites for insulin injection

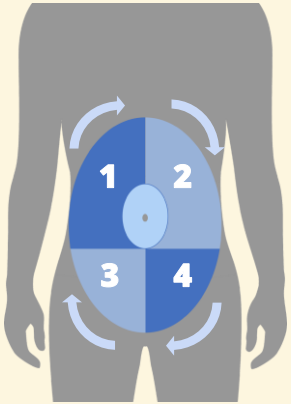
Visual guide to show where you can inject insulin



To note

- Different sites absorb insulin at different rates. Insulin is absorbed the fastest in the abdomen and slowest in the thighs
- Rotate sites (e.g., right and left thigh) to avoid swelling as this may affect insulin absorption

Site rotation



Move 2 fingers along from your last insulin injection site

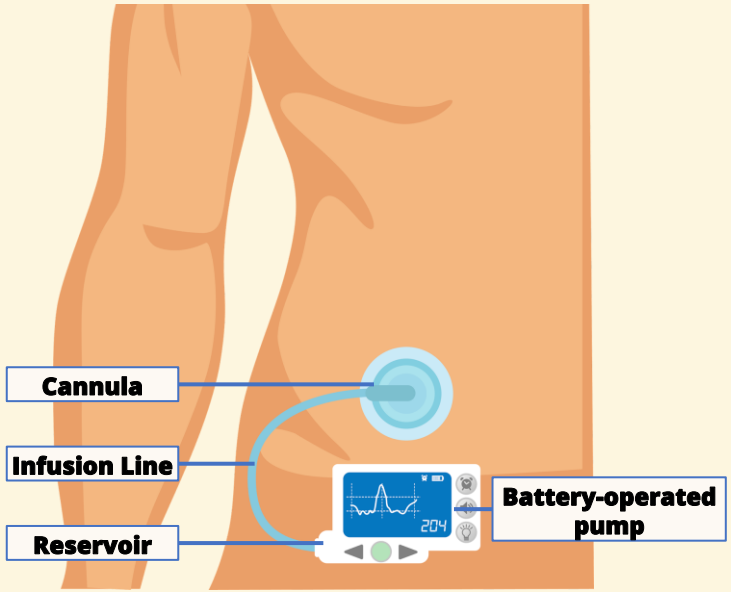
- Rotate injection sites by moving 2 fingers' breadth along from your last injection site until you have used an entire area
- Move to a new injection area every 1 to 2 weeks

Rotate your injection spots

Rotate injection sites by moving 2 fingers' breadth apart from the last injection site. Use an entire area before moving to a new area.

By rotating the spots where you inject Insulin, you can prevent fat lumps (lipohypertrophy) from forming just under the skin

Insulin pump therapy



Insulin is delivered via an infusion set and cannula into the subcutaneous layer of the abdomen*

* For illustration purposes only. Actual device may differ.

Insulin pump therapy is another way of providing insulin to your body that mimics the function of the pancreas.

A small device with an insulin reservoir that delivers both basal (continuous release over 24 hours) and rapid-acting insulin doses to match higher glucose levels during mealtimes.

It usually improves diabetes control by helping to avoid glucose levels that are “too high” or “too low”.

You can adjust the insulin dose to suit your needs (e.g., change dose at mealtimes depending on what you choose to eat).

BE PROACTIVE

Foot Care

Poorly controlled diabetes can lead to foot complications

Nerve damage can make your foot feel numb and change its shape, increasing your risk of getting **calluses** and **ulcers**

Extremely **poor blood circulation** (vasculopathy) can cause wounds to heal poorly; an **amputation** may be required to save your life

Poorly controlled diabetes can lead to foot complications

Nerve damage (neuropathy)

- Uncontrolled blood sugar levels damage nerves over time leading to decreased foot sensation and deformity, e.g., mid-foot collapse, toe deformities, extremely arched foot
- Decreased foot sensation, deformity, and improper or inadequate footwear increase risk of calluses and ulcers (wounds)

Poor blood circulation (vasculopathy)

- Extremely poor blood circulation (vasculopathy) can cause problems in your extremities (hands or feet) such as cell death, tissue damage or infections
- Surgeries such as angioplasty (unblocking blood vessels), removal of damaged tissue or amputation may be required

Good foot care practices

Monitor feet every day

Maintain **good foot care and hygiene**

Moisturise hard skin areas regularly

Wear well-fitting and covered footwear

Apply simple first aid for small wound

Seek medical help if wound is **not healing well**, or **worsens**

Good foot care practices

Monitor feet every day

- **Watch out for:**
  - Blister, wound, corn, and callus
  - Redness, swelling, bruise, or increased warmth
  - Toenail anomaly or change in foot shape

Maintain good foot care and hygiene

- Clean feet daily with mild soap and water
- Dry thoroughly between each toe
- Use a pumice stone or foot file to gently remove hard skin
- Avoid cutting nails too short; cut them straight across and file corners

Moisturise hard skin areas regularly

- Avoid using harsh soap
- Apply moisturiser daily but not between each toe
- Avoid scratching skin as it may lead to wound or bleeding

Good foot care practices

Wear well-fitting and covered footwear

- Wear well-fitted covered shoes with socks
- Home sandals are recommended
- Check and remove any stones or sharp objects inside shoes before wearing them

Apply simple first aid for small wound

- Clean small wound with saline before applying antiseptic and covering with a plaster
- Seek medical help if there is no improvement after two days or if there are signs of infection

Seek medical help if wound is not healing well, or worsens

- If signs of infection are present, such as redness, swelling, increased pain, pus, fever, or the wound starts to smell, seek medical help as soon as possible

BE PROACTIVE

Dental Care

Keep your mouth healthy

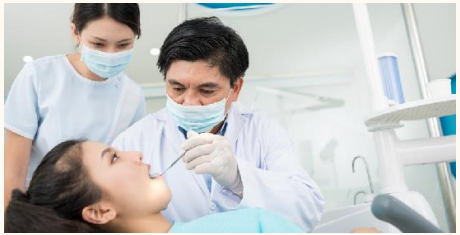
Brush your teeth and **tongue** at least twice a day (in the morning and before sleeping) for 2 minutes with fluoride toothpaste

Use a soft-bristled toothbrush; change every 3 months or when bristles spread out

If you wear **dentures**, clean them after **every meal;** remove, clean and soak dentures in water before sleeping

Clean **in between your teeth** with a floss or interdental brush at least once a day

Tilt the **brush at an angle** to your gum line, moving it in small circular motions across all front, back and chewing surfaces of your teeth, not forgetting the back molars



Visit a dentist every 6 months to 1 year to check your teeth; let the dentist know about your blood sugar control and the medication you are taking

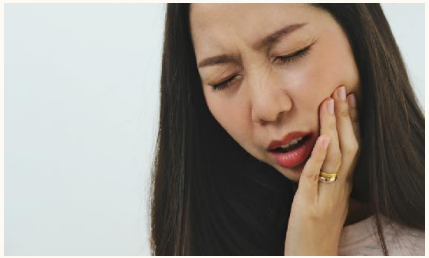
See your dentist if you have ...

Persistent bleeding gums

White patches in your mouth

Receding gum lines

Loose or shaky adult teeth and/or **widening gaps between** your adult teeth



Pain in your mouth

Bad breath or **dry burning sensation** in your mouth

BE PROACTIVE

Travelling

How can I prepare for travel?

See your doctor for a **vaccination, if possible**

Check with your care team on **medication and insulin dosage**

Bring a **medical letter or diabetes** card regarding your diagnosis and medication

Get **insurance** coverage

Put necessary **medication or insulin** items in your carry-on bag

How can I prepare for travel?

Pack these in your carry-on bag

Medication or insulin items (e.g., insulin pens, vials, pen needles, syringes, swabs)

Glucometer with test strips, finger-pricking device and lancets

Medication for common illnesses

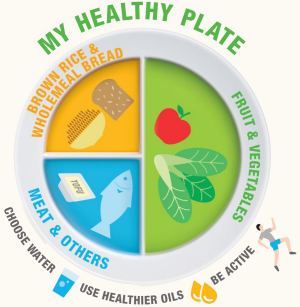
Sweets to prevent hypoglycaemia (low blood sugar)

For short-haul flight or time zone difference of 1 to 2 hours
- Maintain your medication schedule and insulin dosage

For long-haul flight or time zone difference of more than 2 hours
- Discuss with your doctor regarding possible adjustments to your medication schedule and insulin dosage

How can I manage my diabetes while abroad?

Drink plenty of **water**



Watch your **food** and **calorie intake**

Hand carry **sugar-containing sweets**

Always wear **protective shoes**

Hand carry **medication** or **insulin items**

Take **medication** as prescribed

Self-monitor your **blood sugar level** regularly

Know where to **seek help**

SUPPORT

Supporting individuals with diabetes

What is positive social support?

When they have support from loved ones, people can better manage their diabetes. However, what is the best way to support someone with diabetes? There is sometimes a fine line between caring and nagging. It is not always easy to know what to do or say.

Some tips for caregivers, family and friends of individuals with diabetes, and how you can be a positive support to them:

Learn About Diabetes

Be a Good Listener

Learn What Low Blood Sugar Is

Do It Together

Help Ease Stress

Know When to Step Back

Coping with Stigmatisation

1. Learn about diabetes

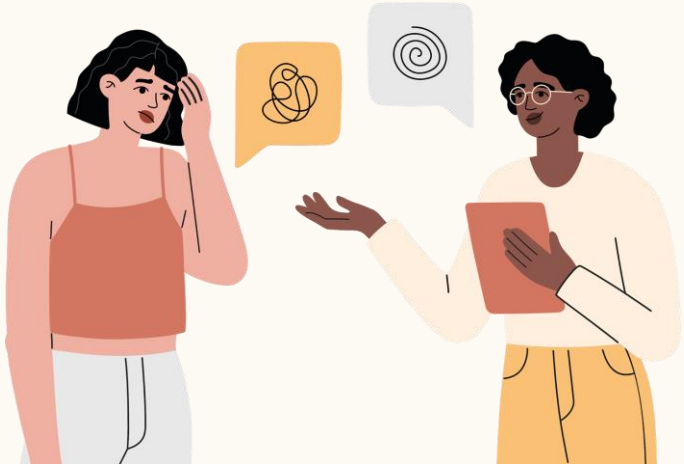
Myths and misinformation about diabetes are common. For those whose loved ones have diabetes, you can provide better support if you have accurate information about the condition. Consider accompanying your loved ones if he or she is attending a diabetes education class.

Here are some key areas of diabetes management:

- Medication adherence
- Monitoring of blood sugar
- Eating habits/ diet
- Exercise - stay active
- Sleep patterns
- Stress management
- Skills for problem-solving
- Social support
- Spirituality – healthy sense of purpose and meaning in life

2. Be a good listener

- One of the most important things you can do to help someone with diabetes is to listen to them.
- Avoid making judgmental statements, just focus on what they are saying. They are more likely to be open when they are not being judged.
- Avoid giving advice, unless requested as unsought advice can damage your relationship.

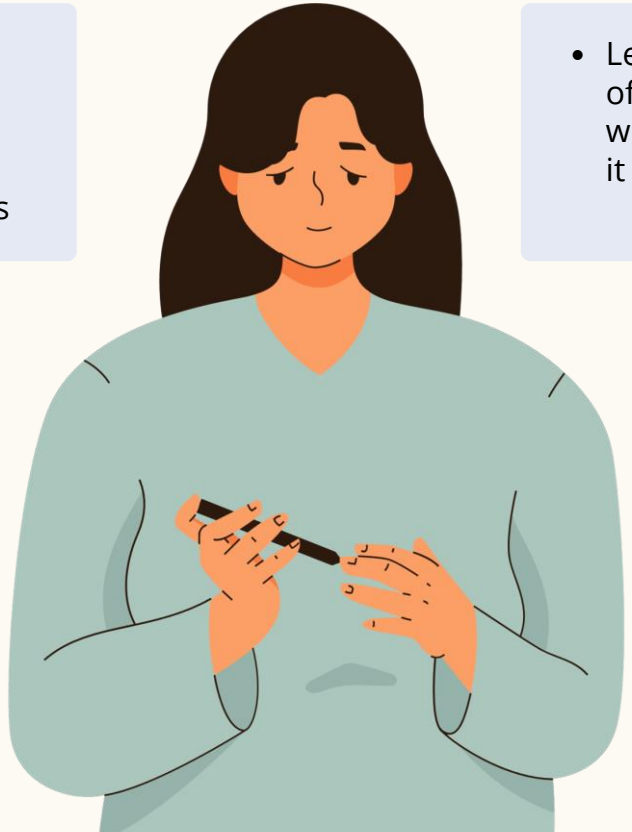


Here are some helpful questions you can ask when talking about diabetes with your loved ones:

- Would you like to share with me what the hardest part of managing your diabetes is?
- What can I do to help?
- Are there things I can do to help you make it easier to manage your diabetes (as your parent/spouse/friend/ colleague)?
- Would it be useful for me to help you:
  - ↳ Set up reminders to take your medications?
  - ↳ Prick your fingers for monitoring blood sugar?
  - ↳ Inject insulin?
- Would you like me to take you or accompany you to your doctor visits?

3. Learn what low blood sugar is

- People with diabetes can experience **‘hypoglycaemia’** or low blood sugar (blood sugar less than 4.0 mmol/L) when they use insulin or certain oral medications



- Learn about the signs and symptoms of **low blood sugar,** how to treat it when it happens, and how to prevent it from happening

4. Do it together

- A diabetes diagnosis is a chance for everyone in the family to make lifestyle changes together to be healthier.

- For example, stop buying unhealthy snacks for the home. If you and your loved ones eat out at a hawker centre, make a decision to order healthier options. If you are going to someone's home, check ahead to help ensure there are healthy food and drink choices available. Discuss with the host on behalf of your loved ones, and avoid discussing it in front of the person with diabetes during the visit.

- Your role is not to be the food police but to support healthy choices, which can include a piece of cake every now and then. Plan for such occasions and go ahead to enjoy together once in a while.

5. Help ease stress

- Too much stress can raise blood sugar levels and make it harder to manage diabetes. Encourage your loved ones to talk about feelings and frustrations.
- Try doing things together like walking, gardening, watching a funny movie or attending a diabetes support group.
- Use creative ways to manage stress.
- Manage life problems together, have a positive mindset, and learn good problem-solving skills.

6. Know when to step back

- Remember that the person with diabetes is responsible for managing it, not you. Living with diabetes can be difficult. By having the positive support of family and friends, they are better able to make the best possible choices about their diabetes.

- Sometimes less can be more. Know when to give your loved ones the space to reflect on their own, and make mistakes. Be sensitive if they are experiencing any diabetes distress or burnout from managing it. Learn what the signs are, and gently encourage them to seek help instead of blaming or scolding them for poor management.


CAREGIVER
STRESS AND TIPS

Am I experiencing caregiver stress?

Common signs and symptoms

Finding **no meaning** in caregiving

Loss of **appetite**

Insomnia

Chronic **fatigue**

Feeling **hopeless and helpless**

Withdrawal from family and friends

How can I manage caregiver stress?

Practise self-care

Get enough **rest**

Positive self-talk

Physical activities and other hobbies

Meditation, yoga, taichi, or qigong

Seek support

Talk to supportive **friends and family**

Join **support groups**

Make use of **respite care**

Seek **professional help**

How can I manage caregiver stress?

Practise self-care

- Positive self-talk
- Tell yourself daily that you are helping the person in your care even if you do not do everything well; you are doing everything with love and you are improving

Make use of respite care

- Take a rest first so you are more able to care for others

Join support groups

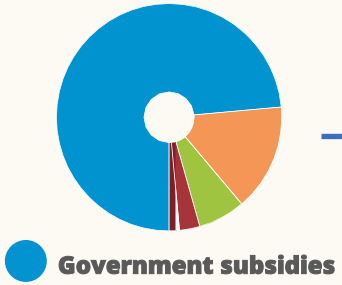
- Hospital support groups
- Community support groups
- Online communities

Seek professional help

- From a therapist, counsellor or spiritual advisor

FINANCE

How your outpatient bill may be covered



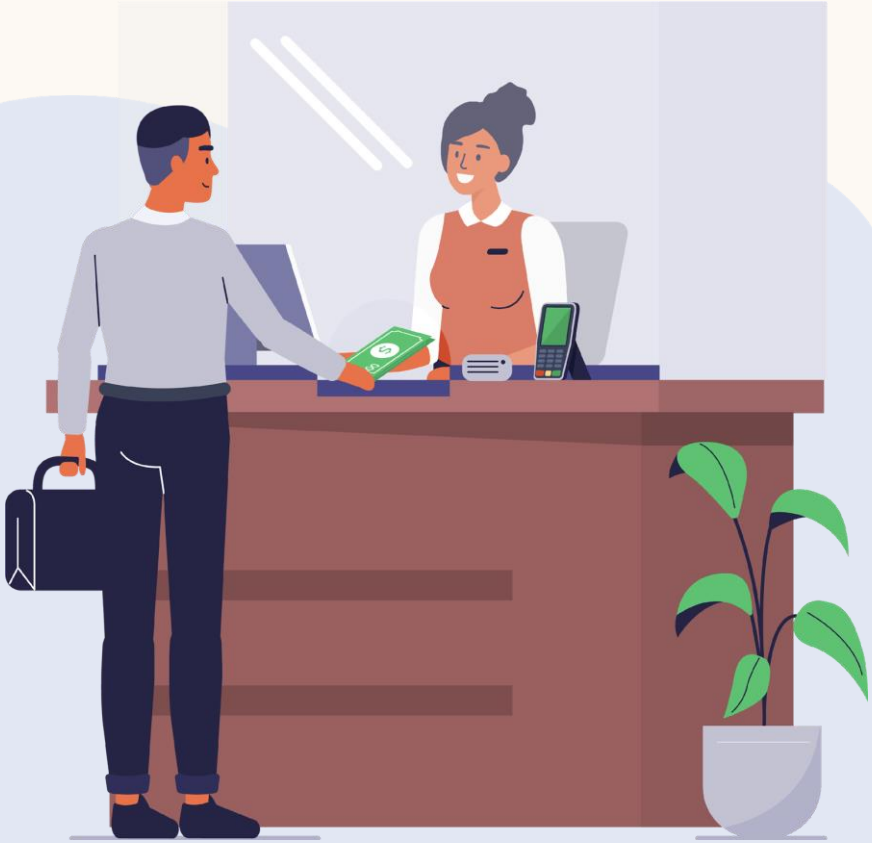
Offset your bill with government subsidies first
E.g., Government subsidies at public specialist outpatient clinics and polyclinics, Community Health Assist Scheme (CHAS), Pioneer Generation (PG) and Merdeka Generation (MG) outpatient subsidies

Then, if available, **further reduce your bill by tapping on employee benefits or private medical insurance**

You can then **use your MediSave** through the **Chronic Disease Management Programme (CDMP)** to reduce out-of-pocket costs

After deduction from the sources above, you may still need to **cover the remaining bill with out-of-pocket payment**

How your outpatient bill may be covered



1. **Government Subsidies**
   Available at public specialist outpatient clinics (SOCs), polyclinics and CHAS GPs
   Refer to government subsidy pages for more information

2. **Employee benefits/Private Medical Insurance (PMI)**

3. **MediSave/Chronic Disease Management Programme (CDMP)**
   Refer to MediSave pages for more information

4. **Out-of-pocket payment (OOP)**
   This is determined after deducting government subsidies, available employee benefits and private medical insurance, and the amount that the patient wishes to deduct from MediSave

Government subsidies at subsidised specialist outpatient clinics (SOCs) and polyclinics

Households with income				
Household Monthly Income Per Person	Subsidy at subsidised SOCs^		Subsidy at polyclinics	 Additional PG / MG subsidy
	Subsidised services	Subsidised medications	Subsidised medications for adults*	
$1,200 and below	70%	75%	75%	PG: Additional 50% off the remaining bill MG: Additional 25% off the remaining bill
$1,201 to $2,000	60%			
Above $2,000/ Unassessed	50%	50%	50%	

Households with no income				
Annual Value# (AV) of Home	Subsidy at subsidised SOCs^		Subsidy at polyclinics	 Additional PG / MG subsidy
	Subsidised services	Subsidised medications	Subsidised medications for adults*	
$13,000 and below	70%	75%	75%	PG: Additional 50% off the remaining bill MG: Additional 25% off the remaining bill
$13,001 to $21,000	60%			
Above $21,000/ Unassessed	50%	50%	50%	

Government subsidies at subsidised specialist outpatient clinics (SOCs) and polyclinics

^To receive subsidies for public SOC visits, you will first need to be assessed and referred by a CHAS clinic or polyclinic. The doctor will refer you to a public SOC as a subsidised patient where eligible.

*Children (18 years or younger) and elderly (65 or older) already receive 75% subsidy for subsidised medications at the polyclinics

#The AV of your home is the estimated annual rent if it is rented

Government subsidies at CHAS GPs

From 1 November 2019

					
PCHI (Per Capita Household Income)	**Above $2,000**	**$1,201 to $2,000**	**$1,200 and below**	**All Merdeka Generation seniors receive CHAS benefits, regardless of income or AV of home**	**All Pioneers receive CHAS benefits, regardless of income or AV of home**
AV (Annual Value) of Home (For households with no income)	**Above $21,000**	**$13,001 -$21,000**	**$13,000 and below**		
Acute (common illnesses)	-	Up to $10 per visit	Up to $18.50 per visit	Up to $23.50 per visit	Up to $28.50 per visit
Simple Chronic	Up to $28 per visit, capped at $112 per year	Up to $50 per visit, capped at $200 per year	Up to $80 per visit, capped at $320 per year	Up to $85 per visit, capped at $340 per year	Up to $90 per visit, capped at $360 per year
Complex Chronic	Up to $40 per visit, capped at $160 per year	Up to $80 per visit, capped at $320 per year	Up to $125 per visit, capped at $500 per year	Up to $130 per visit, capped at $520 per year	Up to $135 per visit, capped at $540 per year
Dental	-	$50 to $170.50 subsidy per procedure (denture, crown, root canal treatment only)	$11 to $256.50 subsidy per procedure (dependent on procedure)	$16 to $261.50 subsidy per procedure (dependent on procedure)	$21 to $266.50 subsidy per procedure (dependent on procedure)
Recommended Health Screening under Screen for Life (SFL) 	A fixed fee of $5 with SFL Invitation letter, for recommended screening test(s) and first post-screening consultation, if required	A fixed fee of $2 with SFL Invitation letter, for recommended screening test(s) and first post-screening consultation, if required		A fixed fee of $2 with SFL Invitation letter, for recommended screening test(s) and first post-screening consultation, if required	Free with SFL Invitation letter, for recommended screening test(s) and first post-screening consultation, if required
	Free for all Healthier SG Enrollees at their enrolled clinic, for recommended screening test(s) and first post-screening consultation, if required (from Jul 2023)				

Government subsidies at CHAS GPs

Pioneer Generation eligibility

- Born on or before 31 December 1949
- Received citizenship by 31 December 1986

Merdeka Generation eligibility

- Born from 1 Jan 1950 to 31 Dec 1959; and
- Received citizenship on or before 31 Dec 1996

OR

- Born on or before 31 Dec 1949; and
- Received citizenship on or before 31 Dec 1996; and
- Did not receive Pioneer Generation Package

Type of visit

Acute (common illnesses)

- Capped at 24 visits for common illnesses per patient per calendar year, across all CHAS clinics, from 2020 onwards

Simple

- "Simple" refers to visits for a single chronic condition

Complex

- "Complex" refers to visits for multiple chronic conditions, or a single chronic condition with complication(s)

Refer to MediSave pages for the list of chronic conditions under the Chronic Disease Management Programme (CDMP) for CHAS Chronic conditions

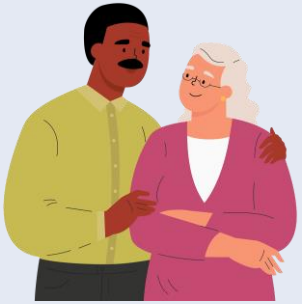
Screen for Life

- Recommended health screening refers to screening for diabetes, high blood pressure, high blood cholesterol, colorectal cancer and cervical cancer

MediSave for outpatient bills

Chronic Disease Management Programme (CDMP)

- Covers 23 chronic conditions
- Requires 15% co-payment
- Part of MediSave500/700, i.e., can use up to $500 or $700 per year, depending on complexity of chronic condition
  - ↳ Patients can tap on accounts of immediate family members (i.e., spouse, parents and children)
  - ↳ Patients who are SC/PR can tap on grandchildren's and sibling's MediSave



Flexi-MediSave

- For patients ≥ 60 years old
- Can be used for the 15% co-payment under CDMP

Up to $300 per patient per year

- ↳ Patient's own and spouse's accounts may be used, provided spouse is also ≥ 60 years old

MediSave for outpatient bills

MediSave

- National medical saving scheme
- Can help to pay for personal or immediate family members' hospitalisation, day surgery, and certain outpatient expenses

MediSave 500/700

- Can help to pay for outpatient treatment of CDMP conditions and approved vaccinations and screenings

Flexi-MediSave

- Can be used at Specialist Outpatient Clinics (SOC) in public hospitals and national specialty centres, polyclinics, and participating Community Health Assist Scheme (CHAS) GP clinics

MediSave for outpatient bills

Chronic Disease Management Programme (CDMP)

23 conditions for outpatient treatment

- Diabetes (including pre-diabetes)
- Hypertension
- Lipid disorders
- Stroke
- Asthma
- Chronic Obstructive Pulmonary Disease (COPD)
- Schizophrenia
- Major depression
- Bipolar disorder
- Dementia
- Osteoporosis
- Benign Prostatic Hyperplasia (BPH)
- Anxiety
- Parkinson’s disease
- Chronic kidney disease (nephrosis/ nephritis)
- Epilepsy
- Osteoarthritis
- Psoriasis
- Rheumatoid arthritis
- Ischaemic heart disease
- Allergic rhinitis
- Chronic hepatitis B
- Gout

Patients can tap on CDMP after

- Certification by a doctor that they have at least one of the listed chronic conditions
- Authorising the use of MediSave through the Medical Claims Authorisation Form

Acknowledgements

Acknowledgements

Members				
S/N	**Role**	**Name**	**Designation/Organisation**	**Cluster**
1	**Chairperson**	Dr Khoo Yin Hao Eric	Adjunct Assistant Professor, Yong Loo Lin School of Medicine, National University of Singapore (NUS) Endocrinologist, Gleneagles Medical Centre	NUHS
	Settings			
2	**Polyclinic**	Ms Christine Chern	Nurse Clinician, Kallang Polyclinic, National Healthcare Group Polyclinics (NHGP)	NHG
3		Dr Low Kang Yih	Associate Consultant, Family Physician, Ang Mo Kio Polyclinic, National Healthcare Group Polyclinics (NHGP)	NHG
4		Ms Ng Soh Mui	Senior Nurse Clinician, Jurong Polyclinic, National University Polyclinics (NUP)	NUHS
5		Dr David Tan	Senior Consultant, Family Physician, National University Polyclinics (NUP)	NUHS
6		Dr Gilbert Tan	Director, Regional Clinical Services (Southeast) SingHealth Polyclinics (SHP)	SHS
7		Ms Vernice Tay	Assistant Nurse Clinician, Bedok Polyclinic, SingHealth Polyclinics (SHP)	SHS

Acknowledgements

Members				
S/N	**Role**	**Name**	**Designation/Organisation**	**Cluster**
	Settings			
8	**Private GPs/PCNs**	Dr Anthony Chao	Clinical Director Shared Care Partnership Office (SCPO) Yishun Health, National Healthcare Group Consultant, Family Physician Diabetes Centre Admiralty Medical Centre Kampung Admiralty Family Physician Consultant Boon Lay Clinic & Surgery	NA
9		Dr Jonathan Pang	Family Physician, Everhealth Family Clinic & Surgery and Everhealth Medical Centre, Frontier Primary Care Network (PCN)	NA
10		Ms Jacqueline See Hui Yin	Assistant Nurse Clinician, Raffles Medical Primary Care Network	NA
11	**Hospital**	Dr Kao Shih Ling	Senior Consultant, Division of Endocrinology, Department of Medicine, National University Hospital (NUH)	NUHS

Acknowledgements

Members				
S/N	**Role**	**Name**	**Designation/Organisation**	**Cluster**
	Settings			
12	**Community organisations**	Dr Kalpana Bhaskaran	President, Diabetes Singapore (DS) President, Singapore Nutrition and Dietetics Association (SNDA) Deputy Director, Industry Partnerships Head, Glycemic Index Research Unit, School of Applied Science, Temasek Polytechnic	NA
13		Ms Angela Lee	Member, Typeone.sg- Type 1 diabetes patient	NA
14	**Patients, caregivers and citizens**	Mr Ardhanari Arumugam	Type 2 diabetes patient- Diabetes Singapore Volunteer	NA
15		Ms Brenda Lim Bee Khim	Caregiver of Type 2 patient- Citizen Design Workshop Participant- HOD, Nursing, National Skin Centre (ADON)	NA
16		Mr Lu Kee Hong	Citizen without diabetes- Citizen Design Workshop Participant	NA
17		Ms Nidhi Raj	Type 1 diabetes patient- Community Pop-up Booth Respondent	NA
18		Ms Christina Tan	Type 2 diabetes patient- HPB Health Ambassador- Diabetes Singapore Volunteer	NA

Acknowledgements

Members				
S/N	**Role**	**Name**	**Designation/Organisation**	**Cluster**
	MOH & Statutory Boards			
19	**AIC**	Ms Marine Chioh Mei Suang	Assistant Director, Primary & Community Care Development Division, Agency for Integrated Care (AIC)	NA
20	**HPB**	Ms See Li Lin	Senior Manager, Health Screening and Management Division, Health Promotion Board (HPB)	NA
21	**IHiS**	Ms Mary Soh	Senior Manager (HealthHub Digital Marketing), Digital Services and Integration Division, Integrated Health Information Systems (IHiS)	NA

Area of profession-specific Reps/Resource Panelists				
S/N	**Topic/Area**	**Name**	**Designation/Organisation**	**Cluster**
22	**ADES/Nursing**	Ms Poh Siew Huay, Winnie	President, Association of Diabetes Educators Singapore (ADES) Advanced Practice Nurse (Community, Chronic Disease Management), Nurse Clinician Kallang Polyclinic, National Healthcare Group Polyclinics (NHGP)	NA
23		Ms Sam Pei Fen	Community Health Assistant Director of Nursing	NUHS

Acknowledgements

Area of profession-specific Reps/Resource Panelists				
S/N	**Topic/Area**	**Name**	**Designation/Organisation**	**Cluster**
24	**Behavioural health/Emotional Well-being**	Ms Kelly Ann	Psychologist, Department of Psychology, Singapore General Hospital (SGH)	SHS
25		A/P Griva Konstadina	Associate Professor of Health Psychology and Behavioural Medicine, Lee Kong Chian School of Medicine, Nanyang Technological University (NTU) President, Society of Behavioural Health Singapore (2019-2022)	NA
26		Dr Low Ying Yee, Sarah-El	Clinical Health Psychologist Visiting Consultant: Khoo Teck Puat Hospital (KTPH) Admiralty Medical Centre (AdMC) Founder of S.Kairos LLP	NUHS
27		Dr Wong Mei Yin	Consultant Clinical Psychologist, Co-head (Clinical), Centre for Effective Living Visiting Consultant, Caregiving & Community Mental Health Division, AIC	NA
28	**CFPS**	Dr Ng Lee Beng	Member, College of Family Physicians Singapore (CFPS) Member, Chapter of Family Medicine Physicians, Academy of Medicine Singapore (AMS-FM) Senior Consultant, Family Medicine and Continuing Care Dept, Singapore General Hospital (SGH)	SHS

Acknowledgements

Area of profession-specific Reps/Resource Panelists				
S/N	**Topic/Area**	**Name**	**Designation/Organisation**	**Cluster**
29	**Healthy Eating**	Ms Kala Adaikan	Head of Department, Senior Principal Dietitian, Department of Dietetics, Singapore General Hospital (SGH)	SHS
30		Ms Ong Kai Wen	Principal Dietitian Dietetics Department, National University Hospital (NUH)	NUHS
31		Ms Pauline Xie Xinying	Principal Dietitian, National Healthcare Group Polyclinics (NHGP)	NHG
32	**Medication & Insulin**	Dr Lim Shu Fang	Principal Pharmacist (Clinical) Division of Pharmacy, Tan Tock Seng Hospital (TTSH)	NHG
33		Ms Oh Wan Lin	Principal Pharmacist, Allied Health, SingHealth Polyclinics (SHP)	SHS
34		Ms Tan Li Yan	Senior Pharmacist, Department of Pharmacy, Ng Teng Fong General Hospital (NTFGH)	NUHS
35	**MOH/PCC Traditional & Complementary Medicine**	Ms Ng Jin Ju	Manager, Traditional and Complementary Medicine Primary and Community Care Division, MOH	NA
36	**MOH/Diseases Strategy Office**	Ms Rachel Ng	Manager, Diseases Strategy Office Epidemiology & Disease Control, MOH	NA

Acknowledgements

Area of profession-specific Reps/Resource Panelists				
S/N	**Topic/Area**	**Name**	**Designation/Organisation**	**Cluster**
37	**NKF – Kidney Care and Complications**	Ms Yap Chai Kian	Deputy Director, Corporate Communications & Outreach, The National Kidney Foundation Singapore	NA
38	**Physical Activity**	Ms Irene Chu Jia Huey	Senior Physiotherapist, Physiotherapy, Singapore General Hospital (SGH)	SHS
39		Mr Muhammad Jazimin Bin Haron	Vice President, Singapore Physiotherapy Association (SPA) Senior Physiotherapist, Rehabilitation Services, Khoo Teck Puat Hospital (KTPH) Senior Physiotherapist, Rehabilitation Centre, Admiralty Medical Centre (AdMC)	NHG
40		Ms Koh Hui An	Senior Physiotherapist, Department of Rehabilitation (Physiotherapy), Ng Teng Fong General Hospital (NTFGH)	NUHS
41		Mr Mason Tan	Lecturer, School of Sports, Health and Leisure (SHL) Republic Polytechnic	NA
42	**SNEC – Eye Care and Complications**	Dr Kelvin Teo	Consultant, Singapore National Eye Centre (SNEC)	SHS

Acknowledgements

NDRM Tier 2 Secretariat with guidance from Dr Ruth Lim (Director of Primary and Community Care Division, MOH)			
S/N	**Topic/Area**	**Name**	**Designation/Organisation**
43	**MOH secretariat team**	Ms Betty Wong	Acting Deputy Director
44		Ms Shahilah Salim	Manager
45		Ms Aileen Lim	Manager
46		Dr Sarah Yong	Senior Resident
47		Dr Dominic Chia	Medical Officer
48		Dr Olymphia Wong	Resident

An initiative under the War on Diabetes

Partners

Cluster Partners

Brought to you by

References

References

Healthy Eating

1. Alcohol units and guidelines explained: Drinkiq SG. DRINKiQ. (n.d.). Retrieved February 24, 2023, from https://www.drinkiq.com/en-sg/about-alcohol/standard-drinks-and-guidelines-explained/
2. Carbohydrates and blood sugar. The Nutrition Source. (2016, July 25). Retrieved February 24, 2023, from https://www.hsph.harvard.edu/nutritionsource/carbohydrates/carbohydrates-and-blood-sugar/
3. Decoding food labels. Crunch&Sip®. (n.d.). Retrieved February 24, 2023, from https://www.crunchandsip.com.au/healthy-lunchboxes/decoding-food-labels
4. Do natural sugars count toward your daily sugar intake? dr. Jan McBarron weighs in. Dr. Jan McBarron. (2020, February 5). Retrieved February 24, 2023, from https://www.drjanmcbarron.com/2020/02/10/do-natural-sugars-count-toward-your-daily-sugar-intake-dr-jan-mcbarron-weighs-in/
5. Eating light at a hawker centre is possible. HealthHub. (2022, December 1). Retrieved February 24, 2023, from https://www.healthhub.sg/live-healthy/1463/eating-light-at-a-hawker-centre-is-possible
6. Easy healthy recipes. HealthHub. (n.d.). Retrieved February 24, 2023, from https://www.healthhub.sg/programmes/191/nutrition-hub/healthy-recipes
7. Gan, E. (2023, January 4). What is the caloric damage of your favourite CNY snacks? CNA Lifestyle. Retrieved February 24, 2023, from https://www.channelnewsasia.com/health/chinese-new-year-snacks-what-is-the-caloric-damage-diet-1422681
8. Healthier choice symbol. Health Promotion Board. (2023, February 14). Retrieved February 24, 2023, from https://www.hpb.gov.sg/food-beverage/healthier-choice-symbol
9. Healthier dining programme. (2023, March 2). Retrieved February 24, 2023, from https://www.hpb.gov.sg/healthy-living/food-beverage/healthier-dining-programme
10. Holterman, A. (2015, May 14). Here's why you should never go shopping when you're hungry. Healthline. Retrieved February 24, 2023, from https://www.healthline.com/health-news/why-you-should-never-go-shopping-when-hungry-021715
11. Hugues, S. (2021, September 14). 5 best sugar substitutes for people with type 2 diabetes. Verywell Health. Retrieved February 24, 2023, from https://www.verywellhealth.com/sugar-replacements-for-diabetics-1087191

References

Healthy Eating

12. Kaartinen, N. E., Similä, M. E., Kanerva, N., Valsta, L. M., Harald, K., & Männistö, S. (2017). Naturally occurring and added sugar in relation to macronutrient intake and food consumption: results from a population-based study in adults. Journal of nutritional science, 6, e7. https://doi.org/10.1017/jns.2017.3
13. Make healthy food & grocery choices. HealthHub. (n.d.). Retrieved February 24, 2023, from https://www.healthhub.sg/programmes/191/nutrition-hub/tools-and-resources
14. Nutritious foods for a healthy diet. HealthHub. (n.d.). Retrieved February 24, 2023, from https://www.healthhub.sg/programmes/191/nutrition-hub/eat-more
15. Goh, M.Y. (2017, May 23). Calories in 9 Hari Raya treats and how to make them healthier. Mount Elizabeth Hospital. Retrieved February 24, 2023, from https://www.mountelizabeth.com.sg/health-plus/article/calories-in-9-hari-raya-treats-and-how-to-make-them-healthier
16. Reading food labels. HealthHub. (2021, December 21). Retrieved February 24, 2023, from https://www.healthhub.sg/live-healthy/913/reading-food-labels
17. Restaurant guide to healthier eating. HealthHub. (2022, November 15). Retrieved February 24, 2023, from https://www.healthhub.sg/live-healthy/167/restaurant_guide_healthier_eating
18. The GI values of common foods. HealthHub. (2022, November 15). Retrieved February 24, 2023, from https://www.healthhub.sg/live-healthy/1330/the-gi-values-of-common-foods
19. West, H. (2017, June 3). 20 clever tips to eat healthy when eating out. Healthline. Retrieved February 24, 2023, from https://www.healthline.com/nutrition/20-healthy-tips-for-eating-out
20. What is the glycaemic index? HealthHub. (2022, November 15). Retrieved February 24, 2023, from https://www.healthhub.sg/live-healthy/1329/what-is-the-glycaemic-index
21. Win against diabetes. SingHealth. (n.d.). Retrieved February 24, 2023, from https://www.singhealth.com.sg/patient-care/patient-education/win-over-diabetes

References

Physical Activity

1. Cassidy, S., Chau, J.Y., Catt, M. et al. Low physical activity, high television viewing and poor sleep duration cluster in overweight and obese adults; a cross-sectional study of 398,984 participants from the UK Biobank. Int J Behav Nutr Phys Act 14, 57 (2017). https://doi.org/10.1186/s12966-017-0514-y
2. World Obesity Federation. (n.d.). Core learning path. https://www.worldobesity.org/training-and-events/scope/e-learning/core-learning-path
3. Singapore physical activity guidelines (SPAG). (2022). Retrieved February 24, 2023, from https://www.healthhub.sg/sites/assets/Assets/Programs/pa-lit/pdfs/Singapore_Physical_Activity_Guidelines.pdf

References

Emotional Well-being

1. Darvyri, P., Christodoulakis, S., Galanakis, M., Avgoustidis, A. G., Thanopoulou, A., & Chrousos, G. P. (2018). On the role of spirituality and religiosity in type 2 diabetes mellitus management—a systematic review. Psychology, 09(04), 728–744. https://doi.org/10.4236/psych.2018.94046
2. Gore, T. N., Williams, A., & Sanderson, B. (2012). Recipe for health: impacting diabetes in African Americans through faith-based edcuation. Journal of Christian nursing : a quarterly publication of Nurses Christian Fellowship, 29(1), 49–53. https://doi.org/10.1097/cnj.0b013e31823a8a77
3. Krederdt-Araujo, S. L., Dominguez-Cancino, K. A., Jiménez-Cordova, R., Paz-Villanueva, M. Y., Fernandez, J. M., Leyva-Moral, J. M., & Palmieri, P. A. (2019). Spirituality, Social Support, and Diabetes: A Cross-Sectional Study of People Enrolled in a Nurse-Led Diabetes Management Program in Peru. Hispanic health care international : the official journal of the National Association of Hispanic Nurses, 17(4), 162–171. https://doi.org/10.1177/1540415319847493
4. Kusnanto, K., Kurniawati, N., Dian, Abu, Wahyuni, E., & Hidayat Pradipta, R. (2020). *Spiritual-based motivational self-diabetic management on the self-efficacy, Self-care, and HbA1c of Type 2 diabetes mellitus*. Systematic Reviews in Pharmacy.
5. Miller, R. S., & Mars, D. (2020). Effectiveness of a diabetes education intervention in a faith-based organization utilizing the Aade7. ADCES in Practice, 8(1), 10–14. https://doi.org/10.1177/2633559x20887746
6. Onyishi, C. N., Ilechukwu, L. C., Victor-Aigbodion, V., & Eseadi, C. (2021). Impact of spiritual beliefs and faith-based interventions on diabetes management. World journal of diabetes, 12(5), 630–641. https://doi.org/10.4239/wjd.v12.i5.630
7. Pascoe, M. C., de Manincor, M., Tseberja, J., Hallgren, M., Baldwin, P. A., & Parker, A. G. (2021). Psychobiological mechanisms underlying the mood benefits of meditation: A narrative review. Comprehensive psychoneuroendocrinology, 6, 100037. https://doi.org/10.1016/j.cpnec.2021.100037
8. Raveendran, A. V., Deshpandae, A., & Joshi, S. R. (2018). Therapeutic Role of Yoga in Type 2 Diabetes. Endocrinology and metabolism (Seoul, Korea), 33(3), 307–317. https://doi.org/10.3803/EnM.2018.33.3.307
9. Baylor College of Medicine. Resilience and diabetes behavioral research lab. (n.d.). https://www.bcm.edu/research/faculty-labs/resilience-and-diabetes-behavioral-research-lab

References

Emotional Well-being

10. Singh, V. P., & Khandelwal, B. (2020). Effect of Yoga and Exercise on Glycemic Control and Psychosocial Parameters in Type 2 Diabetes Mellitus: A Randomized Controlled Study. International journal of yoga, 13(2), 144–151. https://doi.org/10.4103/ijoy.IJOY_45_19
11. Sinha, S. S., Jain, A. K., Tyagi, S., Gupta, S. K., & Mahajan, A. S. (2018). Effect of 6 Months of Meditation on Blood Sugar, Glycosylated Hemoglobin, and Insulin Levels in Patients of Coronary Artery Disease. International journal of yoga, 11(2), 122–128. https://doi.org/10.4103/ijoy.IJOY_30_17
12. Sridhar, G. R. (2012). Diabetes, religion and spirituality. International Journal of Diabetes in Developing Countries, 33(1), 5–7. https://doi.org/10.1007/s13410-012-0097-8
13. Whitney, E., Kindred, E., Pratt, A., O'Neal, Y., Harrison, R. C. P., & Peek, M. E. (2017). Culturally Tailoring a Patient Empowerment and Diabetes Education Curriculum for the African American Church. The Diabetes educator, 43(5), 441–448. https://doi.org/10.1177/0145721717725280

References

Others

1. American College of Sports Medicine (2009). American College of Sports Medicine position stand. Progression models in resistance training for healthy adults. Medicine and science in sports and exercise, 41(3), 687–708. https://doi.org/10.1249/MSS.0b013e3181915670
2. American Dietetic Association, Dietitians of Canada, American College of Sports Medicine, Rodriguez, N. R., Di Marco, N. M., & Langley, S. (2009). American College of Sports Medicine position stand. Nutrition and athletic performance. Medicine and science in sports and exercise, 41(3), 709–731. https://doi.org/10.1249/MSS.0b013e31890eb86
3. Centers for Disease Control and Prevention. (2022, December 30). Diabetes symptoms. Retrieved February 24, 2023, from https://www.cdc.gov/diabetes/basics/symptoms.html
4. Centers for Disease Control and Prevention. (2022, March 11). What is type 1 diabetes? Retrieved February 24, 2023, from https://www.cdc.gov/diabetes/basics/what-is-type-1-diabetes.html
5. Continuous glucose monitor pricing and coverage. Quest Health Solutions. (2021, September 23). Retrieved February 24, 2023, from https://questhealthsolutions.com/blog/continuous-glucose-monitors/continuous-glucose-monitor-pricing-and-coverage/
6. Cryer P. E. (2010). Hypoglycemia in type 1 diabetes mellitus. Endocrinology and metabolism clinics of North America, 39(3), 641–654. https://doi.org/10.1016/j.ecl.2010.05.003
7. Franz, M. J., Boucher, J. L., Rutten-Ramos, S., & VanWormer, J. J. (2015). Lifestyle weight-loss intervention outcomes in overweight and obese adults with type 2 diabetes: a systematic review and meta-analysis of randomized clinical trials. Journal of the Academy of Nutrition and Dietetics, 115(9), 1447–1463. https://doi.org/10.1016/j.jand.2015.02.031
8. Bourley, G.-J. (2022, October 14). Differences between type 1 and type 2 diabetes. Diabetes UK. Retrieved February 24, 2023, from https://www.diabetes.org.uk/diabetes-the-basics/differences-between-type-1-and-type-2-diabetes
9. Hypoglycemia (low blood glucose). National University Hospital. (2023, February 6). Retrieved February 24, 2023, from https://www.nuh.com.sg/our-services/Specialties/Medicine/Endocrinology/Pages/Hypoglycemia-(low-blood-glucose).aspx

References

Others

10. Liu, N. F., Brown, A. S., Folias, A. E., Younge, M. F., Guzman, S. J., Close, K. L., & Wood, R. (2017). Stigma in People With Type 1 or Type 2 Diabetes. Clinical diabetes : a publication of the American Diabetes Association, 35(1), 27–34. https://doi.org/10.2337/cd16-0020
11. Living with diabetes. Diabetes Australia. (2022, November 30). Retrieved February 24, 2023, from https://www.diabetesaustralia.com.au/Living-with-Diabetes/
12. Losing weight when you have diabetes. HealthHub. (2022, November 15). Retrieved February 24, 2023, from https://www.healthhub.sg/live-healthy/1327/losing-weight-with-diabetes
13. Low blood sugar (hypoglycemia): Symptoms, causes, and treatment. JDRF. (2022, October 20). Retrieved February 24, 2023, from https://www.jdrf.org/t1d-resources/about/symptoms/blood-sugar/low/
14. MOH clinical practice guidelines on diabetes mellitus. Ministry of Health. (2014). Retrieved February 24, 2023, from https://www.moh.gov.sg/hpp/doctors/guidelines/GuidelineDetails/cpgmed_diabetes_mellitus
15. MSF family service centres directories. Ministry of Social and Family Development. (n.d.). Retrieved February 24, 2023, from https://www.msf.gov.sg/our-services/directories
16. National population health survey 2020. (2020). Retrieved February 24, 2023, from https://www.moh.gov.sg/docs/librariesprovider5/default-document-library/nphs-2020-survey-report.pdf
17. Osborn, C. O. K. (2022, July 1). What are the differences between type 1 and type 2 diabetes? Healthline. Retrieved February 24, 2023, from https://www.healthline.com/health/difference-between-type-1-and-type-2-diabetes
18. Schabert, J., Browne, J. L., Mosely, K., & Speight, J. (2013). Social stigma in diabetes : a framework to understand a growing problem for an increasing epidemic. The patient, 6(1), 1–10. https://doi.org/10.1007/s40271-012-0001-0
19. Schwaab, B., Kafsack, F., Markmann, E., & Schütt, M. (2020). Effects of aerobic and anaerobic exercise on glucose tolerance in patients with coronary heart disease and type 2 diabetes mellitus. Cardiovascular endocrinology & metabolism, 9(1), 3–8. https://doi.org/10.1097/XCE.0000000000000188
20. Singapore General Hospital. Obesity centre. (2022, October 30). Retrieved February 24, 2023, from https://www.sgh.com.sg/patient-care/specialties-services/Obesity-Centre

References

Others

21. Swain, D. P., Abernathy, K. S., Smith, C. S., Lee, S. J., & Bunn, S. A. (1994). Target heart rates for the development of cardiorespiratory fitness. Medicine and science in sports and exercise, 26(1), 112–116. https://doi.org/10.1249/00005768-199401000-00019
22. Sapolsky, R. M. (2017). *Behave: The biology of humans at our best and worst*. Penguin Books.
23. Swift, D. L., McGee, J. E., Earnest, C. P., Carlisle, E., Nygard, M., & Johannsen, N. M. (2018). The Effects of Exercise and Physical Activity on Weight Loss and Maintenance. Progress in cardiovascular diseases, 61(2), 206–213. https://doi.org/10.1016/j.pcad.2018.07.014
24. Turner, G., Quigg, S., Davoren, P., Basile, R., McAuley, S. A., & Coombes, J. S. (2019). Resources to guide exercise specialists managing adults with diabetes. Sports Medicine - Open, 5(1). https://doi.org/10.1186/s40798-019-0192-1
25. Type 1 diabetes: Causes, symptoms, complications & treatment. Cleveland Clinic. (2022, March 9). Retrieved February 24, 2023, from https://my.clevelandclinic.org/health/diseases/21500-type-1-diabetes
26. U.S. Department of Health and Human Services. (2017). Type 2 diabetes. National Institute of Diabetes and Digestive and Kidney Diseases. Retrieved February 24, 2023, from https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes/type-2-diabetes
27. War on diabetes. SingHealth. (2022, April 7). Retrieved February 24, 2023, from https://www.singhealth.com.sg/rhs/keep-well/War-on-Diabetes
28. WebMD. (2022, August 25). Common brands and various types of insulin for diabetics. Retrieved February 24, 2023, from https://www.webmd.com/diabetes/diabetes-types-insulin
29. Weight, BMI and health problems. HealthHub. (2022, November 15). Retrieved February 24, 2023, from https://www.healthhub.sg/live-healthy/179/weight_putting_me_at_risk_of_health_problems
30. Young-Hyman, D., de Groot, M., Hill-Briggs, F., Gonzalez, J. S., Hood, K., & Peyrot, M. (2016). Psychosocial Care for People With Diabetes: A Position Statement of the American Diabetes Association. Diabetes care, 39(12), 2126–2140. https://doi.org/10.2337/dc16-2053