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Review Article

DIABETES -THE URGENCY TO DEVELOP AND IMPLEMENT MULTI-SECTORAL STRATEGIES TO COMBAT THE GROWING EPIDEMIC

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Abstract

Diabetes is a major cause of morbidity and mortality, though these outcomes are not due to the immediate effects of the disorder. They are instead related to the diseases that develop as a result of chronic diabetes mellitus. These include diseases of large blood vessels,microvascular disease, and
peripheral ,coronary heart diseases, arterial disease) and small blood vessels (microvascular disease, including retinal and renal vascular disease), as well as diseases of the nerves.

Keywords: DM type II, multy sectoral strategies

Introduction

Diabetes mellitus refers to a group of diseases that affect how body uses blood sugar (glucose). Glucose is vital to health because it's an important source of energy for the cells that make up muscles and tissues. It's also brain's main source of fuel.

Diabetes insipidus is a distinct rare condition that causes your kidneys to produce a large amount of urine.

Pre diabetes the term used to describe elevated blood sugar (glucose) that has not yet reached the level for a type 2 diabetes diagnosis. It can be treated by lifestyle changes such as consuming a healthy diet ,weight loss and regular exercise

Diabetes is a disease that occurs when blood glucose, also called blood sugar, is too high. Blood glucose is main source of energy and comes from the food we eat. Insulin , a hormone,made by the pancreas,helps glucose from food get into cells to be used for energy. Sometimes body doesn't make enough —or any—insulin or doesn't use insulin well. Glucose then stays in blood and doesn't reach cells. Over time, having too much glucose in blood can cause health problems.

Although diabetes has no cure, steps can be taken to control and stay healthy. people call diabetes "a touch of sugar" or "borderline diabetes." These terms suggest that someone doesn't really have diabetes or has a less serious case, but every case of diabetes is serious Diabetes in population

One in 12 adults or more than 74 million people living in India are diabetes patients, according to a new report from the International Diabetes Federation (IDF)

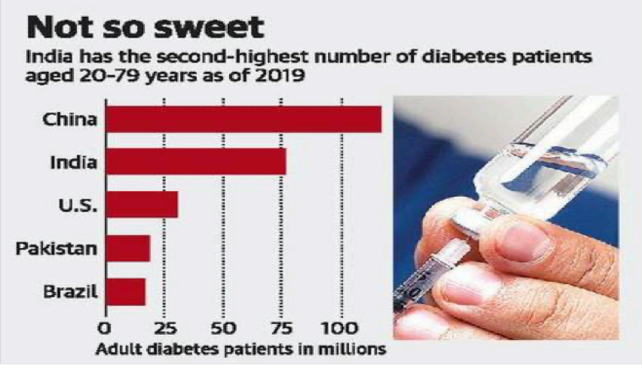
On International Diabetes Day, the International Diabetes Foundation Diabetes Atlas makes it clear India needs to pause and re- evaluate its strategy to combat diabetes.

Growing numbers

The ninth edition of the IDF Diabetes Atlas offers projections that continue to put India at the second slot right up to 2045. And the numbers are staggering — just over 134 million Indians will be diabetics in the next 25 years.

India is on the top of the table of a clutch of countries in from southeast Asia — Bangladesh, Sri Lanka, Nepal and Mauritius.

Bangladesh, which is second on the list of top five countries with diabetes



The Study has stressed the urgency to develop and implement multi-sectoral strategies to combat the growing epidemic. “Diabetes, being a lifestyle disorder with multidimensional causative factors, definitely needs a multidimensional approach,”

Because of the very high cost of treating diabetes. “In the future the costs will soar, and we will not be able to afford them.”

The IDF estimates that 10% of global health expenditure is being spent on diabetes. The way ahead, all experts concurred, was a focus on prevention. India needs a more effective national diabetes prevention programme which will require cooperation from several quarters, including medical education, health awareness in schools, and urban planning,

Study also underlined that prevention was key to the problem. “In addition to people with diabetes, the country also has a huge burden of pre-diabetics. If we target them with information on the right lifestyle options to help keep blood sugar, lipids and blood pressure under control, we can prevent at least a third of people from developing diabetes.”

Study also says To be ready to offer treatment options, at least basic care for all who are living with diabetes, and provide for the treatment of various complications, and that is likely to be a massive challenge in future,

In India,the 15- to 49-year age-group that the study evaluated, Goa had the highest prevalence of diabetes (8.6%), followed by Andaman & Nicobar Islands (8.3%) and Kerala (7.5%). The southern states had a higher prevalence: Andhra Pradesh (6.6%), Karnataka (4.6%), Tamil Nadu (6.8%) and Telangana (4.8%).

About one in every two Indians (47%) living with diabetes is unaware of their condition, and only about a quarter (24%) manage to bring it under control Different types of diabetes

The most common types of diabetes are type 1, type 2, and gestational diabetes.

Type 1 diabetes

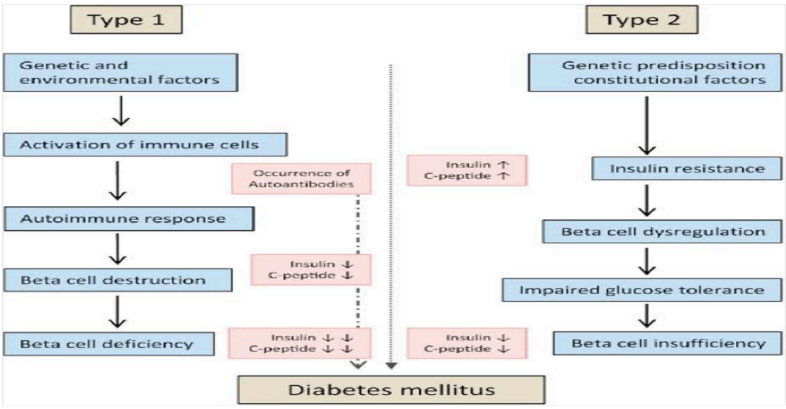
In type 1 diabetes the body does not make insulin. and immune system attacks and destroys the cells in pancreas that make insulin. Type 1 diabetes is usually diagnosed in children and young adults, although it can appear at any age. People with type 1 diabetes need to take insulin every day to stay alive.

Type 2 diabetes

type 2 diabetes,body does not make or use insulin well. type 2 diabetes can develop at any age, even during childhood. However, this type of diabetes occurs most often in middle-aged and older people. Type 2 is the most common type of diabetes. If you

- have pre diabetes
- have multiple gene mutations associated with type 2 diabetes
- have a family history of diabetes
- have been diagnosed with high blood pressure
- are age 45 years older
- are over weight
- are physically active less than 3 times a week
- have had gestational diabetes (diabetes while pregnant)
- have given birth to a baby who weighed more than 9 pounds
- have a low level of HDL known as “good cholesterol”
- have a high level of triglycerides
- were assigned male at birth; people in this group are more likely to have undiagnosed diabetes, possibly because anecdotal evidence indicates they have less doctors visit
- have depression
- have a history of heart disease or strokes
- have poly cystic ovarian syndrome (PCOD)
- have acanthosis nigricans

Gestational diabetes Gestational diabetes develops in some women when they are pregnant. Most of the time, this type of diabetes goes away after the baby is born. However, if you’ve had gestational diabetes, you have a greater chance of developing type 2 diabetes later in life.



Sometimes diabetes diagnosed during pregnancy is actually type 2 diabetes. Other types of diabetes Less common types include monogenic forms of diabetes ,which is an inherited form of diabetes, and cystic fibrosis related diabetes and Drug or chemical-induced diabetes: Examples of this type happen after organ transplant, following HIV/ AIDS treatment or are associated with glucocorticoid steroid use. health problems with diabetes Over time, high blood glucose leads to problemssuch as

- heart disease
- stroke
- kidney disease
- eye problems
- dental disease
- nerve damage
- foot problems

Signs of trouble

Regularly monitoring your blood sugar levels is important to avoid severe complications. Also, be aware of signs and symptoms that may suggest irregular blood sugar levels and the need for immediate care:

High blood sugar (hyperglycemia). Eating certain foods or too much food, being sick, or not taking medications at the right time can cause high blood sugar. Signs and

symptoms include:

- Frequent urination
- Increased thirst
- Dry mouth
- Blurred vision
- Fatigue
- Headache

Hyperglycemic hyperosmolar nonketotic syndrome (HHNS). This life-threatening condition includes a blood sugar reading higher than 600 mg/ dL (33.3 mmol/L). HHNS may be more likely if you have an infection, are not taking medicines as prescribed, or take certain steroids or drugs that cause frequent urination. Signs and symptoms include:

- Dry mouth
- Extreme thirst
- Drowsiness
- Confusion
- Dark urine
- Seizures

Diabetic ketoacidosis.

Diabetic ketoacidosis occurs

when a lack of insulin results in the body breaking down fat for fuel rather than sugar. This results in a buildup of acids called ketones in the bloodstream. Triggers of diabetic ketoacidosis include certain illnesses, pregnancy, trauma and medications — including the diabetes medications called SGLT2 inhibitors.

Although diabetic ketoacidosis is usually less severe in type 2 diabetes, the toxicity of the acids can be life-threatening. In addition to the signs and symptoms of hypoglycemia, such as frequent urination and increased thirst, ketoacidosis may result in:

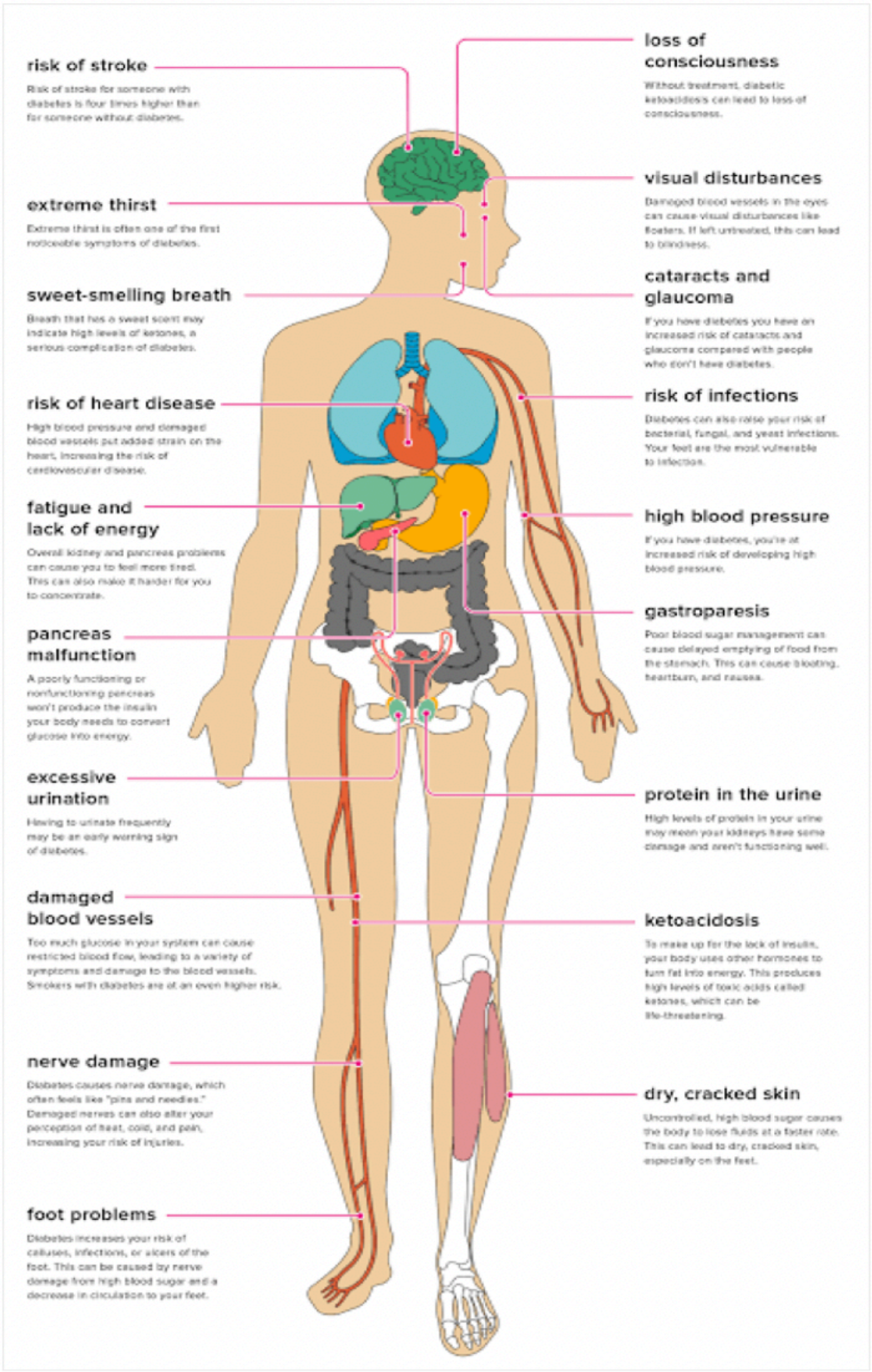
- Nausea
- Vomiting
- Abdominal pain
- Shortness of breath
- Fruity-smelling breath

Low blood sugar. If your blood sugar level drops below your target range, it's known as low blood sugar (hypoglycemia). Your blood sugar level can drop for many reasons, including skipping a meal, unintentionally taking more medication than usual or being more physical activity than usual. Signs and symptoms include:

- Sweating
- Shakiness
- Weakness
- Hunger
- Irritability
- Dizziness
- Headache
- Blurred vision
- Heart palpitations
- Slurred speech
- Drowsiness
- Confusion

If you have signs or symptoms of low blood sugar, drink or eat something that will quickly raise your blood sugar level

— fruit juice, glucose tablets, hard candy or another source of sugar. Retest your blood in 15 minutes. If levels are not at your target, repeat the sugar intake. Eat a meal after levels return to normal. If you lose consciousness, you will need to be given an emergency injection of glucagon, a hormone that stimulates the release of sugar into the blood


risk of stroke
Risk of stroke for someone with diabetes is four times higher than for someone without diabetes.
extreme thirst
Extreme thirst is often one of the first noticeable symptoms of diabetes.
sweet-smelling breath
Breath that has a sweet scent may indicate high levels of ketones, a serious complication of diabetes.
risk of heart disease
High blood pressure and damaged blood vessels put added strain on the heart, increasing the risk of cardiovascular disease.
fatigue and lack of energy
Overall kidney and pancreas problems can cause you to feel more tired. This can also make it harder for you to concentrate.
pancreas malfunction
A poorly functioning or nonfunctioning pancreas won't produce the insulin your body needs to convert glucose into energy.
excessive urination
Having to urinate frequently may be an early warning sign of diabetes.
damaged blood vessels
Too much glucose in your system can cause restricted blood flow, leading to a variety of symptoms and damage to the blood vessels. Smokers with diabetes are at an even higher risk.
nerve damage
Diabetes causes nerve damage, which often feels like "pins and needles." Damaged nerves can also alter your perception of heat, cold, and pain, increasing your risk of injuries.
foot problems
Diabetes increases your risk of calluses, infections, or ulcers of the foot. This can be caused by nerve damage from high blood sugar and a decrease in circulation to your feet.
loss of consciousness
Without treatment, diabetic ketoacidosis can lead to loss of consciousness.
visual disturbances
Damaged blood vessels in the eyes can cause visual disturbances like floaters. If left untreated, this can lead to blindness.
cataracts and glaucoma
If you have diabetes you have an increased risk of cataracts and glaucoma compared with people who don't have diabetes.
risk of infections
Diabetes can also raise your risk of bacterial, fungal, and yeast infections. Your feet are the most vulnerable to infection.
high blood pressure
If you have diabetes, you're at increased risk of developing high blood pressure.
gastroparesis
Poor blood sugar management can cause delayed emptying of food from the stomach. This can cause bloating, heartburn, and nausea.
protein in the urine
High levels of protein in your urine may mean your kidneys have some damage and aren't functioning well.
ketoacidosis
To make up for the lack of insulin, your body uses other hormones to turn fat into energy. This produces high levels of toxic acids called ketones, which can be life-threatening.
dry, cracked skin
Uncontrolled, high blood sugar causes the body to lose fluids at a faster rate. This can lead to dry, cracked skin, especially on the feet.

IMS department (ESI Telangana)
Several camps were done by the IMS team and JD IMS Hyd, the team consisted of doctors of various specialities of various dispensaries, staff nurses, pharmacist, lab-technician , and other staff of various dispensaries worked in this camps /dispensaries and study and screening for cardiac diseases were done on more than 25 thousand workers /beneficiaries from various industries / establishments

For the Study of DIABETES ,the workers and beneficiaries ,about 8000 men and 7500 women were found to be diabetic ,the diabetic were off different age group and different sex , in the age group,some where aged 40 yrs and less and other were aged more than 40 yrs ,some didn't show interest in the study This study was done by IMS department by JDIMS
Telangana Hyderabad along with the staff consisting of doctors, staff nurses, lab technicians-and other supporting staff

	< _ 40 yrs	>40yrs %
Total prevalence	35..8%	64.2%
Self reported	31.6%	68.4%
Diagnosed duringthe survey	44.2%	55.8%

Men	36.9%	63.1 %
Women	22.3%	77.7%

lncome		
Low	1348	1421
Mid-low	3140	3789
Mid-high	2572	2612

BMI

Norm al		40.7 %	59.3 %
Over weig ht		48.2 %	51.8 %
Obes ity		56.0 %	44.0 %

Cholesterollevel mg/dl

> 200	48.9 %	51.1%
<200	17.8%	82.2%

HDL·C mg/dl

<40inmen and <50 in women	20.8 %	79.2%
>_40inmen .and > 50in women	26.9%	73.1%

LDL-C mg/dl

> _100	18.95%	81.05 %
<100	18.05%	81.95%

Triglyceridesmg/dl

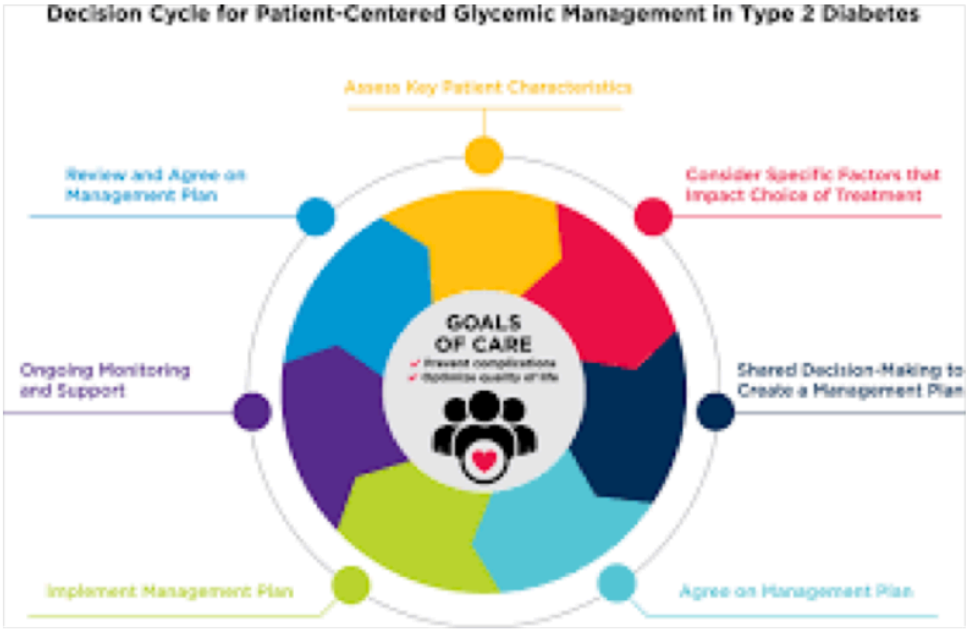
>_I50	22.8 %20	77.2%
<I50	.7%	79.3%
hypertension yes	24.9%	75.1%
No	28.6 %	71.4%

Diabetes duration (years)		
<1	3235	2582
1-2	1517	1329
3-4	1632	3326
5-9	786	2512
>10	387	765

Stress status		
Extreme stress	1158	1223
Seriousstress	3334	3412
Mild stress	2524	2789
smoker	2467	3445

Moderate alcoholconsumption	2432	2982

Treatment



Treatmentbyhealthylifestyle

1. Eat a healthy diet. Choose to eat more whole fruits and vegetables, more whole grains and lean proteins. Whole wheat, Brown rice,
Steel-cut oatmeal ,Beans ,Lentils
2. Lose weight.
3. Exercise.
4. Make a commitment to exercising regularly
5. Test your blood sugar.
6. Get enough quality sleep.
7. Getting regular checkups
8. Avoid stress as stress is shown to raise blood sugar levels. So it is important for a diabetic to avoid stressful situations and be calm. Meditation and yoga will help
9. Avoid smoking and drinking
6. Ayurvedic Home Remedies to home remedies for diabetes and Type 2 diabetes treatments. Ayurveda has helped many diabetics manage their blood sugar levels and avoid the onset of major health complications.

- Bitter Gourd: Known as Karela in the Indian subcontinent, bitter gourd has compounds which allow it to reduce the hyperglycemia, or the increase in blood sugar levels. You can increase the intake of bitter gourd in your diet by consuming it as a cooked vegetable or curry, once a

week. You can also consume the juice of the raw vegetable on an empty stomach every morning.

- Indian Gooseberry: Also called amla, it is one of the richest sources of vitamin C; and is known to help keep blood glucose levels remain balanced. You can consume raw amla everyday, or mix 1 tablespoon of alma juice with one cup of bitter gourd juice and drink it daily. You can also mix 2 tablespoons of alma juice with a cup of water and drink it every morning on an empty stomach.
- Mango Leaves: Mango leaves are known to be an effective home remedy to treat and manage diabetes. You can sun dry some tender mango leaves, grind them to a fine powder and consume it with water daily in the morning and evening.
- Fenugreek: A very commonly used herb in the Indian kitchen,

fenugreek has many benefits like improving glucose tolerance, lowering blood sugar levels, and stimulating the secretion of glucose dependent insulin. You can consume powdered fenugreek seeds with hot or cold water or milk daily. You can soak 2 tablespoons of fenugreek seeds in water overnight and drink this water on an empty stomach in the morning, daily; to bring down your glucose levels.and , adding fenugreek seeds to their diet was found to have a significant effect on controlling blood sugar.

- Drumstick Leaves: Also called as Moringa, the leaves of the drumstick tree are known for its ability to boost energy and maintain blood sugar levels. Drumstick leaves contain nutrients which increases the insulin secretion in the body, and are also known to have anti-inflammatory properties and are rich in antioxidants. You can consume these leaves by adding them to a meal, or a salad, or steam it like spinach.
- Sunlight: Many studies have shown that low Vitamin D levels also lead to insulin resistance and diabetes. Vitamin D plays an important role in the production of insulin in the body. Exposing yourself to at least 30 minutes of sunlight daily, in the morning, can help you avoid a Vitamin D deficiency. You can also include foods rich in Vitamin D in your daily diet. Some of these are soy milk, orange juice,

yoghurt, cheese and cereals

- Curcumin. A compound found in the spice tumeric, curcumin has been shown to both boost blood sugar control and help prevent the onset of diabetes.
- Ginseng. Used as a traditional medicine for millennia, studies suggest that both Asian and American ginseng may help lower blood sugar in people with diabetes. Extract from the ginseng berry was able to normalize blood sugar and improve insulin sensitivity in mice
- Psyllium. A plant fiber found in common bulk laxatives and fiber supplements, psyllium has also been used to treat diabetes historically by lowering both cholesterol and blood sugars.
- Cinnamon. Numerous studies shown that consuming about half a teaspoon of cinnamon per day can result in significant improvement in blood sugar, cholesterol, and triglyceride levels in people with Type 2 diabetes.
- Aloe vera. Normally thought of as a topical remedy for cuts, some studies suggest juice from the aloe vera plant can help lower blood sugar. Dried sap from the aloe vera plant has traditionally been used to treat diabetes in the Middle East.
- Bitter melon. A staple of traditional Chinese medicine, bitter melon is believed to relieve thirst and fatigue, two possible symptoms of Type 2 diabetes. Research has shown

that extract of bitter melon can reduce blood sugar.

- Holy basil. This herb is commonly used in India as a traditional medicine for diabetes. Studies in animals suggest that holy basil may increase the secretion of insulin. A control trial of holy basil in people with Type 2 diabetes some years ago showed a positive effect on both fasting and post-meal blood sugar

Naturopathy Treatments
Some of methods are:

● Increase Fibre Intake: It has been proven though many studies that foods which have high fibre content slow down the release of glucose from food. Whole fruit, vegetables and beans are examples of such foods.

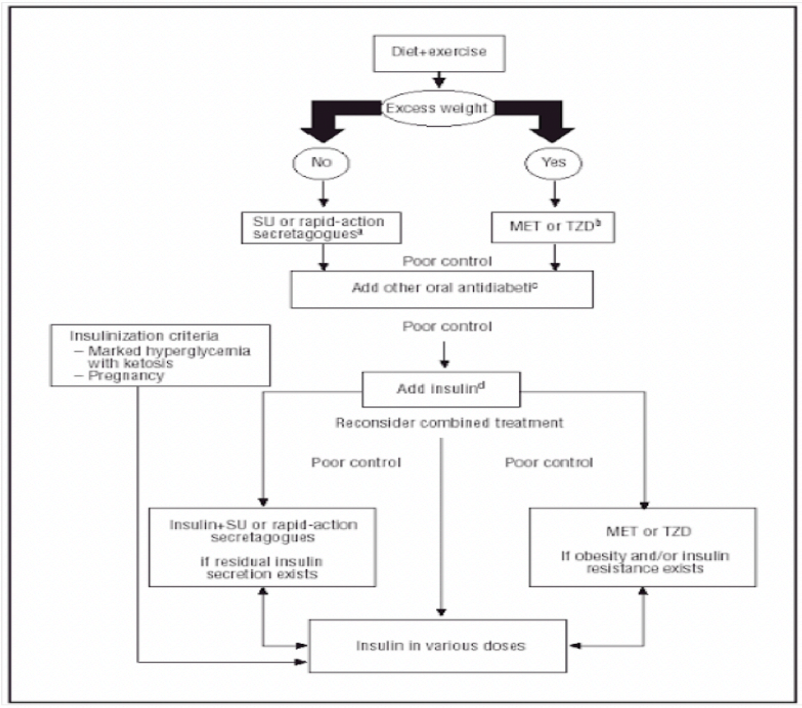
● Correcting Mineral Deficiencies: Many people who have been diagnosed withType 2 diabetes are also deficient in minerals such as chromium and magnesium. Broccoli, Kale, chard, collard greens and chard are rich sources of these minerals, Even whole grains, peas, beans, seeds and nuts can be used to correct these mineral deficiencies.

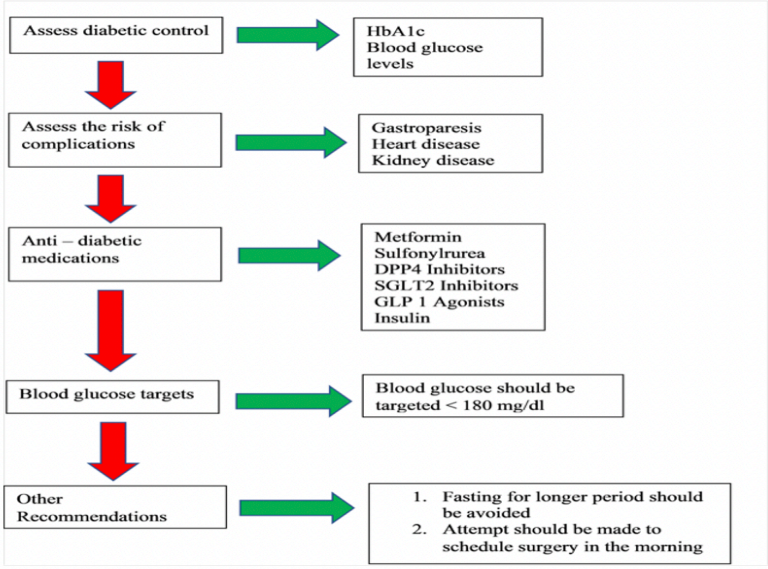
● Restrict the White Stuff: Processed or white grains and sugars cause blood sugar levels and insulin levels to spike, which further leads to insulin resistance and weight gain. Eliminating or restricting these "white" products like white bread, white rice, potatoes, white sugar and white pasta, can help prevent the insulin levels and blood sugar levels from increasing

Diabetes medications

If you can't maintain your target blood sugar level with diet and exercise, diabetes medications that help lower insulin levels or insulin therapy is required

Drug treatments for type 2 diabetes include





Oral anti- hyperglycemic drugs

Action: slows absorption of carbohydrates from the intestines

- Alpha-glucosidase inhibitors
- Acarbose (Prandase, Precose)
- Miglitol (Glyset)

Biguanides

Action: decreases liver glucose release and decreases insulin resistance

Metformin (Fortamet, Glumetza, others) is generally the first medication prescribed for type 2 diabetes. It works primarily by lowering glucose production in the liver and improving your body's sensitivity to insulin so that your body uses insulin more effectively.

Some people experience B-12 deficiency and may need to take supplements.

Other possible side effects, which may improve over time, include:

- Nausea
- Abdominal pain
- Bloating
- Diarrhea

Dopamine antagonist

Action: thought to affect circadian rhythm to decrease obesity and insulin resistance.

- Bromocriptine (Parlodel)

Sulfonylureas They help your body secrete more insulin.

- glimepiride (Amaryl)
- glimepiride and pioglitazone (Duetact)
- glimeperide and rosiglitazone (Avandaryl)
- gliclazide
- glipizide (Glucotrol)
- glyburide (DiaBeta,

Glynase, Micronase)

- chlorpropamide (Diabinese)
- Tolazamide (Tolinase)
- Tolbutamide (Orinase, Tol-Tab)

Possible side effects include:

- Low blood sugar
- Weight gain

Meglitinides

Glinides action stimulate the pancreas to secrete more insulin. They're faster acting than sulfonylureas, and the duration of their effect in the body is shorter.

Examples include repaglinide and nateglinide. Possible side effects include:

- Low blood sugar
- Weight gain

Thiazolidinediones

They make the body's tissues more sensitive to insulin.

Examples include rosiglitazone (Avandia) and pioglitazone (Actos).

Possible side effects include:

- Risk of congestive heart failure
- Risk of bladder cancer (pioglitazone)
- Risk of bone fractures
- High cholesterol (rosiglitazone)
- Weight gain

DPP-4 inhibitors

They help reduce blood sugar levels but tend to have a very modest effect.

Examples include sitagliptin (Januvia), saxagliptin (Onglyza) and linagliptin (Tradjenta).

Possible side effects include:

- Risk of pancreatitis
- Joint pain

Glucagon-like peptides -GLP-1 receptor agonists

Action: similar to natural incretin. Increases insulin secretion, slow stomach emptying and reduces appetite.

They are injectable medications that slow digestion and help lower blood sugar levels. Their use is often associated with weight loss, and some may reduce the risk of heart attack and stroke.

Examples include

- Albiglutide (Tanzeum); weekly
- Dulaglutide (Trulicity); daily
- Exenatide (Byetta); twice daily
- Exenatide extended release (Bydureon)
- Liraglutide (Victoza); daily

Possible side effects include:

- Risk of pancreatitis
- Nausea
- Vomiting
- Diarrhea

SGLT2 inhibitors

They affect the blood- filtering functions in your kidneys by inhibiting the return of glucose to the bloodstream. As a result,

glucose is excreted in the urine. These drugs may reduce the risk of heart attack and stroke in people with a high risk of those conditions.

Some of them are ..canagliflozin

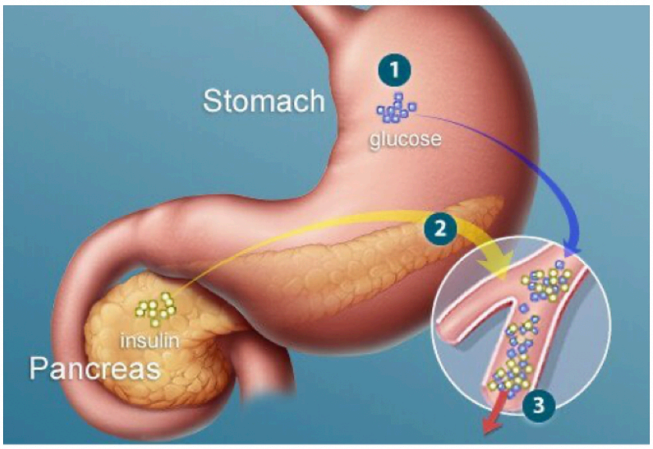
(Invokana), dapagliflozin (Farxiga) and empagliflozin (Jardiance).

Possible side effects include:

- Risk of amputation (canagliflozin)
- Risk of bone fractures (canagliflozin)
- Risk of gangrene
- Vaginal yeast infections
- Urinary tract infections
- Low blood pressure

Other medications in addition to diabetes medications include blood pressure and cholesterol- lowering medications, as well as low-dose aspirin, to help prevent heart and blood vessel disease.

Treatment of diabetes with insulin insulin helps:



Regulate blood sugar levels. After you eat, carbohydrates break down into glucose, a sugar that is the body's primary source of energy. Glucose then enters the bloodstream. The pancreas responds by producing insulin, which allows glucose to enter the body's cells to provide energy.

- Store excess glucose for energy. After you eat — when insulin levels are high — excess glucose is stored in the liver in the form of glycogen. Between meals — when insulin levels are low — the liver releases glycogen into the bloodstream in the form of glucose. This keeps blood sugar levels within a narrow range.

Insulin is a hormone that allows the body to efficiently use glucose as fuel.

Insulin remains the mainstay of treatment for patients with type 1 diabetes. Insulin is also an important therapy for type 2 diabetes when blood glucose levels cannot be controlled by diet, weight loss, exercise, and oral medications.

Ideally, insulin should be administered in a manner that mimics the natural pattern of insulin secretion by a healthy pancreas.

However, the complex pattern of natural insulin secretion is difficult to duplicate. Still, adequate blood glucose control can be achieved with careful attention to diet, regular exercise, home blood glucose monitoring, and multiple insulin injections throughout the day.

Various formulations of insulin differ in pharmacokinetics, i.e., the amount of time until they begin to work and the duration of their action after injection. These different insulins allow for more tailored regimens to optimize blood sugar control.

The types of insulin's available are:

- Rapid-acting insulin begins to take effect 5 minutes after administration. Peak effect occurs in about 1 hour, and the effect lasts for 2 to 4 hours. Examples are insulin lispro, insulin aspart, and insulin glulisine.
- Regular insulin takes effect within 30 minutes, peaks at 2 to 3 hours after injection, and lasts 3 to 6 hours total.
- Intermediate-acting insulin typically begins to lower blood glucose about 2 to 4 hours after injection, peaks 4 to 12 hours later, and lasts about 12 to 18 hours.
- Long-acting insulin takes effect within 6 to 10 hours. It usually lastes for 20 to 24 hours. The long-acting insulin analogues include glargine and detemir. The lower glucose levels fairly evenly over a 24-hour period (without major peaks or troughs).

Different methods of delivering insulin

Not only is the variety of insulin preparations growing, so are the methods for administering insulin.

Pre-filled insulin pens

In the twentieth century, insulin was available only in an injectable form that required carrying syringes, needles, vials of insulin, and alcohol swabs. Clearly, patients found it difficult to take multiple shots each day; as a result, good blood sugar control was often difficult. Many pharmaceutical companies now offer discreet and convenient methods for delivering insulin.

Many manufacturers offer pen delivery systems. Such systems resemble the ink cartridge in a fountain pen. A small, pen-sized device holds an insulin cartridge (usually containing 300 units). Cartridges are available for the most widely used insulin formulations.

The amount of insulin to be injected is dialed in, by turning the bottom of the pen until the required number of units is seen in the dose-viewing window. The tip of the pen consists of a needle that is replaced with each injection. A release mechanism allows the needle to penetrate just under the skin and deliver the required amount of insulin.

Insulin pumps

An insulin pump is composed of a reservoir similar to that of an insulin cartridge, a battery- operated pump, and a computer chip that allows the user to control the exact amount of insulin being delivered. The pump is attached to a thin plastic tube (an infusion set) that has a cannula (like a needle but soft) at the end through which insulin passes. This cannula is inserted under the skin, usually on the

abdomen.. The pump continuously delivers insulin, 24 hours a day. The amount of insulin is programmed and is administered at a constant rate (basal rate).

Often, the amount of insulin needed over the course of 24 hours varies, depending on factors like exercise, activity level, and sleep. The insulin pump allows the user to program many different basal rates to allow for variations in lifestyle. The user can also program the pump to deliver additional insulin during meals, covering the excess demands for insulin caused by eating carbohydrates.

The most exciting innovation in pump technology has been the ability to combine the pump in tandem with newer glucose sensing technology. This is called sensor-augmented insulin pump therapy.

Side effects of insulin include the risk of low blood sugar (hypoglycemia), diabetic ketoacidosis and high triglycerides.

Weight-loss surgery

Weight-loss surgery changes the shape and function of your digestive system. This surgery may help you lose weight and manage type 2 diabetes and other conditions related to obesity. There are various surgical procedures, but all of them help you lose weight by limiting how much food you can eat. Some procedures also limit the amount of nutrients you can absorb.

Weight-loss surgery is only one part of an overall treatment plan. Your treatment will also include diet and nutritional supplement guidelines, exercise and mental health care.

Generally, weight-loss surgery may be an option for adults living with type 2 diabetes who have a body mass index (BMI) of 35 or higher. BMI is a formula that uses weight and height to estimate body fat.

Depending on the severity of diabetes or comorbid conditions, surgery may be an option for someone with a BMI lower than 35.

Weight-loss surgery requires a lifelong commitment to lifestyle changes. Long-term side effects include nutritional deficiencies and osteoporosis.

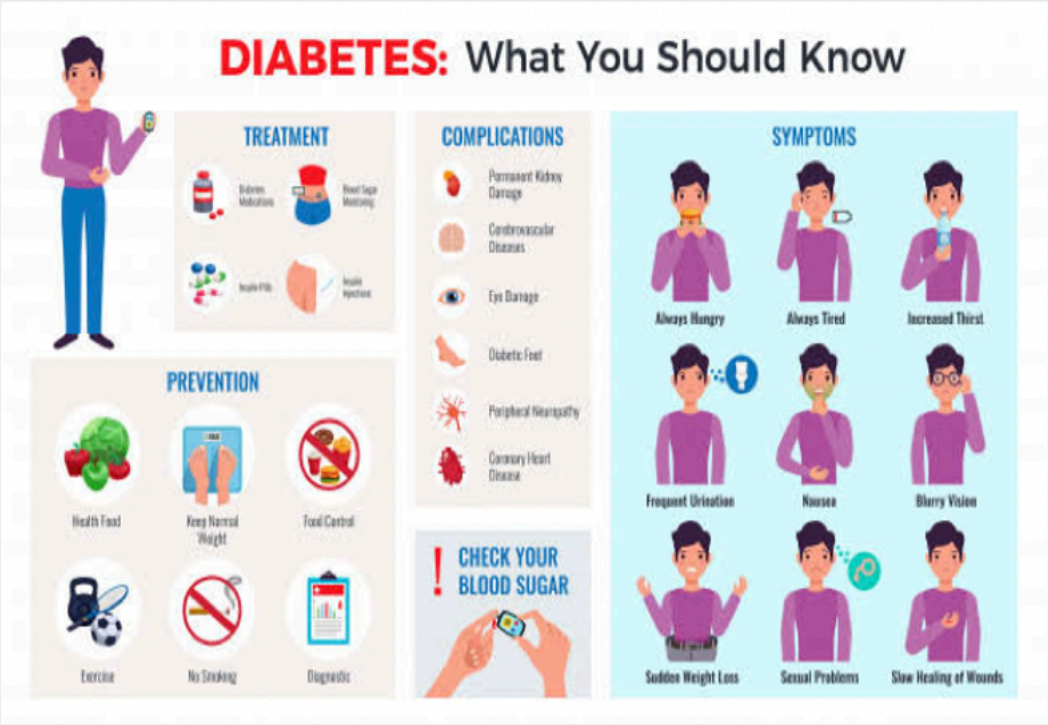
Pregnancy

Women with type 2 diabetes will likely need to change their treatment plans and adhere to diets that carefully controls carbohydrate intake. Many women will need insulin therapy during pregnancy and may need to discontinue other treatments, such as blood pressure medications.

There is an increased risk during pregnancy of developing diabetic retinopathy or a worsening of the condition. If you are pregnant or planning a pregnancy, visit an ophthalmologist during each trimester of your pregnancy, one year postpartum or as advised.

Diabetes prevention

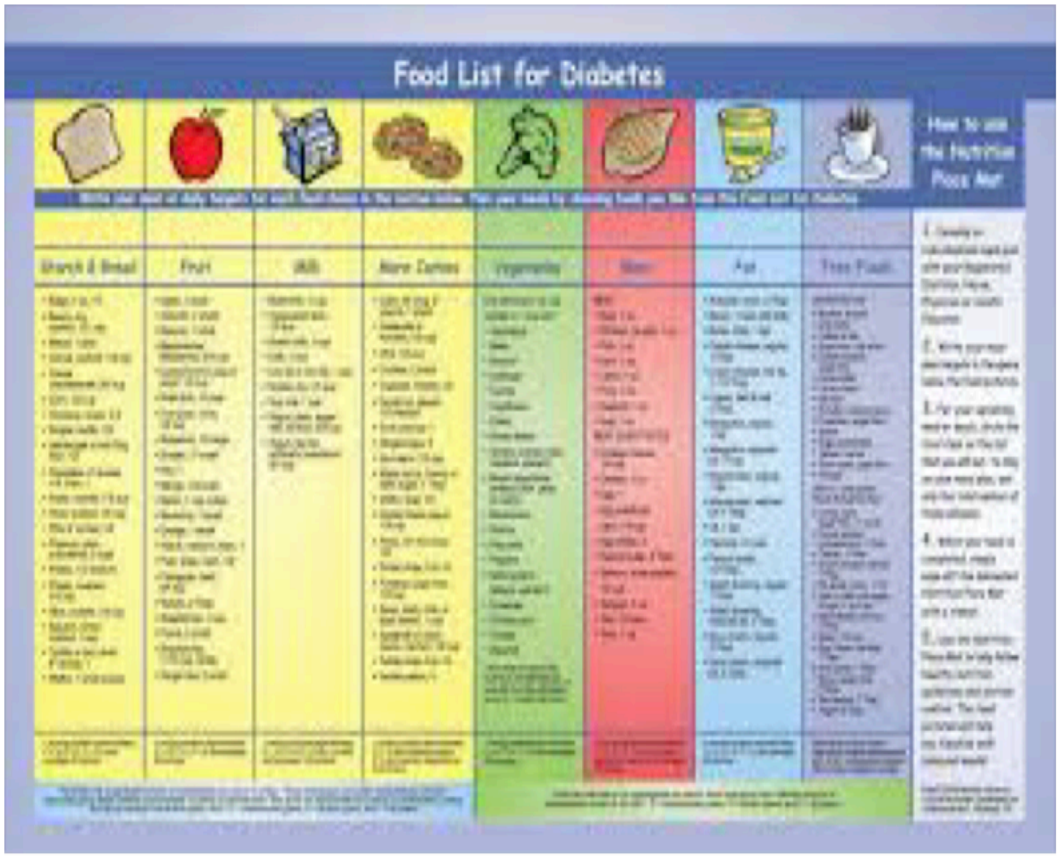
As per studies it is important to have controlled lifestyle



NUTRITIONAL CHART

CALORIE RANGE	1,300 to 1,500	1,600 to 1,900	2,000 to 2,300
by Food Groups	Servings/Exchanges	Servings/Exchanges	Servings/Exchanges
Starches	5 to 7	7 to 10	10 to 12
Fruits	3	3	4
Milk & Yogurt	2	2	2
Vegetables (non starchy)	3	4	4
Meat (and substitutes)	5 oz.	6 oz.	7 oz.
Fats	5 to 7	7 to 9	9 to 11
by Nutrients			
Carbohydrates	160 to 170	190 to 240	255 to 285
Protein	70 to 75	85 to 95	100 to 110
Fat	40 to 45	55 to 65	65 to 75

The diabetic exchanges for DineWise foods and meals are calculated according to the guidelines published by the American Diabetic Association and the American Dietetic Association.

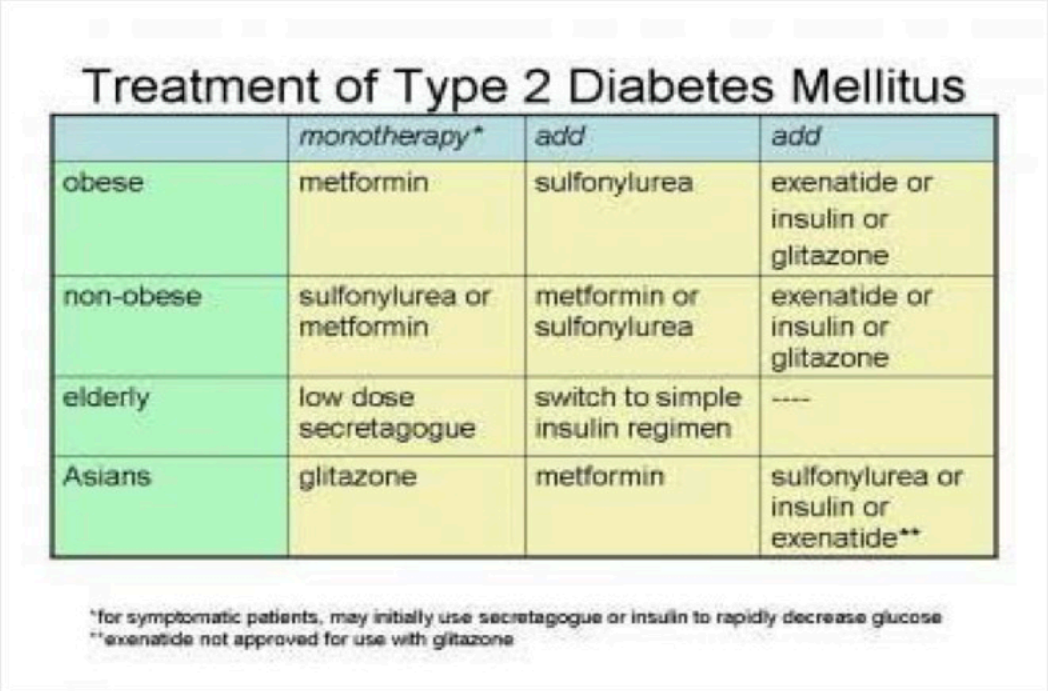


Popular Alternative Remedies and Treatments for Diabetes

Be aware of the complementary and alternative therapies diabetes patients may be using.

Food	Herbal Supplements	Other Supplements	Activities
Bitter melon	Aloe vera	Alpha-lipoic acid	Acupuncture
Black plum	American ginseng	Chromium	Biofeedback
Brewer's yeast	Bilberry leaves	Coenzyme Q10	Chiropractic
Broccoli	Binola seeds	Magnesium	Guided imagery
Buckwheat	Cinnamon	Omega-3s	Massage therapy
Cloves	Curry leaves	Polyphenols	Meditation
Coffee	Drumstick leaves (moringa)	Vanadium	Spiritual healing
Flaxseeds	Fenugreek	Vitamin C	Yoga
Garlic	Green tea	Vitamin D + Calcium	
Ginger	Hawthorn		
Guava	Holy basil (tulsi) leaves		
Indian gooseberry (amla)	Mango leaves		
Leafy greens	Milk thistle		
Okra	Neem oil		
Prickly pear cactus (nopal)	Nettle		
Sweet potato	Psyllium husk (isabgol)		
Vinegar	Sage		

— JCT



Diabetes is a progressive disease. In the prediabetic stage, a patient's metabolic compensatory mechanisms may be able to avoid significant periods of hyperglycemia. When people with T2DM no longer have the ability to keep their blood glucose levels within a near to normal range, adequate glycemic control can usually be maintained with a healthy diet, weight reduction, and increased physical exercise.

The early Greek physicians recommended treating diabetes with exercise, if possible, on horseback.

They believed that this activity would reduce the need for excessive urination.

Type 1 diabetes isn't preventable because it's caused by a problem with the immune system. Some causes of type 2 diabetes, such as your genes or age, aren't under your control either.

Yet many other diabetes risk factors are controllable.

Most diabetes prevention strategies involve making simple adjustments to your diet and fitness routine.

Treatment for T2DM typically begins with therapeutic lifestyle changes:

- An education program for patient self-management
- A weight reduction plan
- An individualized plan for medical nutrition
- An individualized exercise regimen
- A schedule of regular follow-up and monitoring visits

7 strategies for improving glycemic control

- Get at least 150 minutes per week of aerobic exercise,such as walking or cycling
- Cut saturated and trans fats, along with refined carbohydrates,out of your diet.
- Eat more fruits,vegetables, and whole grains.
- Eat smaller portions.
- Try to lose 7 % trusted source of your body weight if you're overweight or obese Balance diet treat

Hence all steps should be done on priority basis to protect from Diabetes and the urgency to develop and implement multi-sectoral strategies to combat the growing epidemic .

Prevention

Lifestyle changes can help prevent the onset of type 2 diabetes, the most common form of the disease.

Prevention is especially important if , at an increased risk of type 2 diabetes because of excess weight or obesity, high cholesterol, or a family history of diabetes.

Lose extra weight

Losing weight reduces the risk of diabetes,with changes in exercise and diet. The American Diabetes Association recommends that people with prediabetes lose at least 7% to 10% of their body weight to prevent disease progression. More weight loss will translate into even greater benefits.

Set a weight-loss goal based on current body weight, about reasonable short-term goals and expectations, such as a losing 1 to 2 pounds a week.

2. Be more physically active

There are many benefits to regular physical activity.

Exercise can help you:

- Lose weight
- Lower your blood sugar
- Boost your sensitivity to insulin — which helps keep your blood sugar within a normal range

Goals for most adults to promote weight loss and maintain a healthy weight include:

- Aerobic exercise. Aim

for 30 minutes or more of moderate to vigorous aerobic exercise — such as brisk walking, swimming, biking or running — on most days for a total of at least 150 minutes a week.

- Resistance exercise. Resistance exercise — at least 2 to 3 times a week — increases your strength, balance and ability to maintain an active life. Resistance training includes weightlifting, yoga and calisthenics.
- Limited inactivity. Breaking up long bouts of inactivity, such as sitting at the computer, can help control blood sugar levels. Take a few minutes to stand, walk around or do some light activity every 30 minutes.

3. Eat healthy plant foods

Plants provide vitamins, minerals and carbohydrates in your diet. Carbohydrates include sugars and starches — the energy sources for your body — and fiber.

Dietary fiber, also known as roughage or bulk, is the part of plant foods your body can't digest or absorb.

Fiber-rich foods promote weight loss and lower the risk of diabetes. Eat a variety of healthy, fiber-rich foods, which include:

- Fruits, such as tomatoes, peppers and fruit from trees
- Nonstarchy vegetables, such as leafy greens, broccoli and cauliflower
- Legumes, such as beans, chickpeas and lentils
- Whole grains, such as whole-wheat pasta and bread, whole-grain rice, whole oats, and quinoa

The benefits of fiber include:

- Slowing the absorption of sugars and lowering blood sugar levels
- Interfering with the absorption of dietary fat and cholesterol
- Managing other risk factors that affect heart health, such as blood pressure and inflammation
- Helping you eat less because fiber-rich foods are more filling and energy rich

Avoid foods that are "bad carbohydrates" — high in sugar with little fiber or nutrients: white bread and pastries, pasta from white flour, fruit juices, and processed foods with sugar or high-fructose corn syrup.

4. Eat healthy fats

Fatty foods are high in calories and should be eaten in moderation. To help lose and manage weight, your diet should include a variety of foods with unsaturated fats, sometimes called "good fats."

Unsaturated fats — both monounsaturated and polyunsaturated fats — promote healthy blood cholesterol levels and good heart and vascular health.

Sources of good fats include:

- Olive, sunflower, safflower, cottonseed and canola oils
- Nuts and seeds, such as almonds, peanuts, flaxseed and pumpkin seeds
- Fatty fish, such as salmon, mackerel, sardines, tuna and cod

Saturated fats, the "bad fats," are found in dairy products and meats. These should be a small part of your diet. You can limit saturated fats by eating low- fat dairy products and lean chicken and pork.

5. Skip fad diets and make healthier choices

Many fad diets — such as the glycemic index, paleo or keto diets — may help you lose weight.

dietary goal should be to lose weight and then maintain a healthier weight moving forward. Healthy dietary decisions, therefore, need to include a strategy that can maintain as a lifelong habit. Making healthy decisions that reflect some of your own preferences for food and traditions may be beneficial for you over time.

One simple strategy to help you make good food choices and eat appropriate portions sizes is to divide up your plate. These three divisions on your plate promote healthy eating:

- One-half: fruit and no starchy vegetables
- One-quarter: whole grains
- One-quarter: protein- rich foods, such as legumes, fish or lean meats

Results:

45 % patients where treated with modern medicines and alternative medicine and were found with decreased sugar levels in 3 -6 months and rest 55% were only on medication and they long period to get their sugar levels decreased

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