

# Diabetes and You: Lifestyle Issues



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**D**iabetes is a condition in which blood sugar levels are elevated due to inability of available insulin to lower blood glucose (insulin resistance) or due to a lack of adequate insulin in the body. The most common form of diabetes (85 to 90%) is called 'type II' diabetes which is associated with insulin resistance. There are two other types of diabetes: type I is an autoimmune condition in which the immune system destroys the beta (insulin-producing) cells of the pancreas, and gestational diabetes occurs during pregnancy. This article will explore type II diabetes more than the others. Type II diabetes was earlier called adult onset diabetes until children started getting it. Please be aware that the content of this article is meant to complement your understanding of diabetes and is not an alternative to medical care.

### Prevalence of diabetes in India

According to the Diabetes Atlas 2006 published by the International Diabetes Federation,

the number of people with diabetes in India in 2006 was around 41 million and is expected to rise to 70 million by 2025 unless urgent preventive steps are taken. Certain unique biochemical and clinical abnormalities in Indians including increased insulin resistance and higher waist circumference make Indians more prone to diabetes and premature coronary artery disease. According to the group of doctors headed by Dr V. Mohan in Chennai, the primary driver of the epidemic is the rapid transition associated with changes in dietary patterns and decreased physical activity as evident from the higher prevalence of diabetes in the urban population.

### Risk factors for diabetes

Poor diet, obesity, and lack of exercise are major risk factors for type II diabetes. Diet and lifestyle can alter the course of type II diabetes though you may need the services of a personal nutritionist. Eating foods slowly and adding fibre to the diet is an easy and powerful intervention. A mix of soluble fibres in specific ratios ampli-

Diabetes is the single most important metabolic disease, which can affect nearly every organ system in the body. It has been projected that 300 million individuals would be affected with diabetes by the year 2025. In India it is estimated that presently 41 million individuals are affected by this deadly disease, which is likely to go up to 70 million by the year 2025. As Indians eat more and exercise less, the spectre of the diabetes epidemic looms large.

fies their viscosity and lowers after-meal blood-sugar levels by approximately 20 to 40 percent. Soluble fibre also lowers insulin secretion by about 40 percent and increases insulin sensitivity.

### Blood tests for diabetes

If you are using the "One Touch Basic" machine for testing blood sugar level from Lifescan (Johnson & Johnson), the normal range of sugar level (doctorndtv.com) for Fasting and Post Prandial on this machine are: Fasting: 70-120 mg%; Post Prandial: 100-180 mg%. Lower levels would be required for pregnant women. Some devices for home tests for blood sugar are listed below with pricing.

Trade Name	Cost
Accu-Chek Active	Rs 1790
Accu-Chek Integra	Rs 2890
Contour TS	Rs 2500
One Touch Ultra	Rs 2800

Periodically have a reliable laboratory repeat your blood sugar measures for Fasting and Post Prandial conditions. A longer term laboratory test is glycosylated haemoglobin (HbA1c) which measures the percentage of red blood cell haemoglobin that has reacted chemically with glucose. HbA1c values greater than 6% are a cause for concern.

### Glycemic Index

The glycemic index (GI) is a numerical system of measuring how much rise in circulating blood sugar a carbohydrate triggers—the higher the number, the greater the blood sugar response. A low GI food will cause a small rise, while a high GI food will trigger a dramatic rise. A GI of 70 or more is high, a GI of 56 to 69 is medium, and a GI of 55 or less is low. White (refined wheat flour) bread has a much higher glycemic index than

whole grain bread. Similarly white rice has a higher glycemic index than brown rice. Therefore, the diabetic patient would do well to prefer whole grains over refined grains. Be aware that the glycemic index by itself does not determine the goodness of a food for a diabetic as the micronutrient profile of the food also plays a role.

### Dietary fibre: Both soluble and insoluble

The role of dietary fibre in slowing the elevation of blood sugar following a meal is well-established. Viscous and gel-forming properties of soluble dietary fibre slow down macronutrient absorption, reduce postprandial blood sugar elevation, and beneficially influence certain fats in the blood. However, studies have shown that it is primarily insoluble cereal dietary fibre and whole grains, and not soluble dietary fibre, that is consistently associated with reduced diabetes risk, suggesting that this topic needs further investigation.

### Bitter melon

Long known to Ayurveda, a study from the University of Mumbai has demonstrated that bitter melon or *karela* is useful for lowering blood glucose in diabetic



rats. The aqueous extract powder of fresh unripe whole fruits at an oral dose of 20mg/kg body weight was found to reduce fasting blood glucose by 48%, an effect comparable to that of glibenclamide, a known synthetic drug. The extract did not show any signs of kidney or



liver toxicity as judged by histological and biochemical parameters.

### Herbs for diabetes

Besides bitter melon (*karela*), there is good evidence for the role of cinnamon (*dalchini*) in regulating blood sugar. Cinnamon powder can be added to hot water and taken as a tea. Further, there is evidence to suggest that the herbs holy basil and fenugreek (*methi* seeds e.g. as sprouts) have a glucose-lowering effect and deserve further study. Raw *amla*, the resin *guggul*, *neem*, and the chinese herb *fo-ti* also have been reported to help diabetic individuals. An ayurvedic formulation by Divya Chikitsalaya called *Madhunashini* may also serve well.

### Turmeric and vitamin C

A study from Bangkok, Thailand has shown that curcumin (the active ingredient in turmeric) might increase the effect of vita-

Such is the prominence of diabetes in global healthcare issues, that the United Nations General Assembly decided to designate 14 November, the World Diabetes Day, as a United Nations Day, to be observed every year beginning 2007.

## India and diabetes

Diabetes is the single most important metabolic disease, which can affect nearly every organ system in the body. It has been projected that 300 million individuals would be affected with diabetes by the year 2025. In India it is estimated that presently 41 million individuals are affected by this deadly disease, which is likely to go up to 70 million by the year 2025. The reasons for this escalation are due to changes in lifestyle, people living longer than before (ageing) and low weight at birth. Diabetes related complications are coronary artery disease, peripheral vascular disease, neuropathy, retinopathy, nephropathy, etc. People with diabetes are 25 times more likely to develop blindness, 17 times more likely to develop kidney disease, 30-40 times more likely to undergo amputation, two to four times more likely to develop myocardial infarction and twice as likely to suffer a stroke than non-diabetics. Lifestyle modifications, inclusive of dietary modification, regular physical activity and weight reduction are indicated for prevention of diabetes.

min C in protecting the function of endothelial cells through its antioxidant effects combined with blood glucose lowering and blood lipid lowering actions. The right dosage of vitamin C may range from 150 mg a day to 500 mg a day but it should be taken at a time of day separated by 4 or more hours from any mineral supplement.

### Vitamin B1 and B12

Thiamine (vitamin B1) deficiency has been associated with dysfunction of beta-cells and impaired glucose tolerance indicating that thiamine therapy may have a future role in prevention of type II diabetes. Even mild thiamine deficiency in diabetes should be avoided and B1 supplementation to high dose (about 50 mg a day) should be considered as adjunct nutritional therapy to prevent dyslipidemia and the development of vascular complications in clinical diabetes. Cyanocobalamin (vitamin B12) supplementation (in the range of 50 to 250 mcg a day) also may prevent neuropathy associated with advanced glycation end-products (AGE's).



### Magnesium

According to a meta-analysis from Stockholm, Sweden conducted on studies from the Medline database from 1966 till 2007, it has been confirmed that magnesium deficiency plays a role in type II diabetes. Increased consumption of magnesium-rich foods such as whole grains, beans, nuts, and green leafy vegetables may therefore reduce the risk of type II diabetes. Magnesium in India is available only as milk of magnesia (an antacid and bowel regulator to reduce constipation) and not in other supplemental forms. Chlorophyll, the green plant pigment is rich in magnesium but cooking destroys its natural transport molecules. The standard dose of Mg is 400 mg a day but the optimum dose may be higher and depends on various factors such as tissue storage. If you have a kidney disorder, consult your physician before taking magnesium supplements.

### Chromium

Chromium picolinate or polynicotinate (the preferred form) is known to improve glucose tolerance in many patients. The recommended dose varies from 200 mcg to 500 mcg a day. The work of Dr Richard Anderson from the US Dept of Agriculture is notable here. However, the US Food and Drug Administration does not approve of product labels stating its efficacy in reducing insulin resistance, or in

the treatment of diabetes. Supplements in the stated dose are considered safe.

### Manganese

Researchers at the University of Michigan have pointed out that elevated blood sugar-induced oxidative stress is an inciting event in the development of diabetic complications such as diabetic neuropathy. Their observations of significant oxidative stress and shape abnormalities in the human cell's powerhouses (mitochondria) led them to examine manganese superoxide dismutase (SOD2), the enzyme responsible for mitochondrial detoxification of oxygen radicals. They demonstrated that over-expression of SOD2 decreases superoxide in certain neurons and subsequently prevents cellular injury. Manganese supplementation is not possible as yet in India and its levels need to be monitored professionally.

### Lecithin

Lecithin is a phospholipid that emulsifies fats and may help obese individuals who are diabetic. Lecithin also favours the health of the nervous system as it contains the building blocks of the memory neuro-transmitter acetylcholine. However, lecithin may not be easily available in the Indian retail market.

### Sugar substitutes

The safety of sugar substitutes like aspartame is highly questionable as there are reports that it is a neurotoxin and is carcinogenic

(<http://www.sweetpoison.com>). Do your own research before using a synthetic sugar substitute. Some of these are listed below.

are acceptable. Avoid inflammation causing foods such as fried foods, meats, dairy, refined wheat, sugar in any form. Eat

Practice *yoga* and brisk walking at least one hour each day.

In summary, the management of type II diabetes is as much the

Trade Name	Main Ingredients	Pills per box	Cost
Dr Shugar	Stevia leaf extract	90	Rs 69
Equal	Aspartame, croscarmellose, lactose	300	Rs 138
Splenda	Sucralose 11%, leucine, lactose	300	Rs 450
Sugar Free Gold	Aspartame, croscarmellose, lactose	330	Rs 130
Sugar Free Natura	Sucralose	200	Rs 110

### Miscellaneous

Green and leafy vegetables in *salad* form such as dandelion leaves, beet leaves, spinach, chard, kale, arugula, radicchio and other *salads* regulate blood sugar. Essential fatty acids from raw or soaked nuts and seeds

smaller meals to lower your glycemic load. Prefer water over fruit juices. Drink water half an hour before the meal or 1-2 hours after the meal, but not with the meal. Stress also aggravates diabetes as blood sugar rises to meet the challenge.

patient's responsibility as it is the doctor's. Stay in charge of your diet, supplement, exercise and stress management programme to keep diabetes at bay.

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