



# THE GREAT REVIEW ON DIABETES MELLITUS

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Diabetes Mellitus Abstract :

In that review paper we speak about different types of diabetes. Today almost around 366 million of people around the world are victims of diabetes. They could be Type 1, Type 2, and Gestational or pre diabetes. The diabetes can be diagnosed by measuring the level of glucose in your blood can have different ways that you can check.

- 1] An A1C test, a fasting glucose test,
- 2] a random glucose test
- 3] **oral glucose tolerance test** are some examples of testing.

Fatigue, Blurred vision, dried & itchy skin, frequent urination are the symptoms of diabetes. There are more symptoms will be discussed in this review. Smoking, alcohol, stress, hypertension and more other things can lead to diabetics. A brief discussion is provided under risk factors late in this review those things that will bring you diabetes. The high glucose level in your blood will lead to lots of side effects to your body, including your death. Once you have either type 1 or type 2 diabetes it will be there for the rest of your life. So if you are pre-diabetes you must always eat healthy e.g bitter melon, avoid carbs, sugar contained food in your meals and exercise every day. Those are good habits for even people who have diabetics, but there are more activities that we discussed in this review.

## 1. Introduction

Review on Diabetes Mellitus The term diabetes mellitus describes a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both. The effects of diabetes mellitus include long term damage, dysfunction and failure of various organs Diabetes mellitus may present with characteristic symptoms such as thirst, polyurea, blurring of vision, and weight loss. In its most severe forms, ketoacidosis or a non-ketotic hyperosmolar state may develop and lead to stupor, coma and, in absence of effective treatment, death. Often symptoms are not severe, or may be absent, and consequently hyperglycemia sufficient cause pathological and functional changes may be present for a long time before the diagnosis is made. Diabetes mellitus is a group of metabolic disorders characterized by hyperglycemia; associated with abnormalities in carbohydrate, fat and protein metabolism, and resulting in chronic complications including micro vascular and neuropathic.<sup>1,2</sup>

## 2. Pathophysiology:

**Type 1.** (Insulin dependent DM-IDDM)

**Type 2** (Non insulin dependent DM-NIDDM)

Type I Diabetes Mellitus

Type 1 DM is a chronic autoimmune disease associated with selective destruction of insulin-producing pancreatic cells. The onset of clinical disease represents the end stage of cell destruction leading to type I DM.<sup>4</sup>

**Several features characterize type 1 DM as an autoimmune disease:**

- a. Presence of immuno-competent and accessory cells in infiltrated pancreatic islets, b. Association of susceptibility to disease with the class II (immune response) genes of the major histo-compatibility complex (MHC; human leukocyte antigens HLA). e Presence of islet cell specific auto-antibodies
- d. Alterations of T cell mediated immuno-regulation, in particular in CD-4 T cell compartment
- e. The involvement of monokines and TH1 cells producing interleukins in the disease process.<sup>5</sup>

## 3. Signs and symptoms of diabetes:

- a Excessive urination (polyurea) and dehydration
- b. Excessive hunger or appetite (poly-phagia)
- e. Unexplained weight loss

- d. Blurred vision, nearsightedness or other vision problems
- e. Frequent infections, including skin infections, thrush, gingivitis, urinary tract infections and yeast infections
- f. Slow healing of sores
- g. Skin problems, such as itchiness
- h. Fatigue, lethargy or drowsiness
- j. Dizziness or fainting
- k. Numbness, tingling or pain in the feet, legs or hands.<sup>6</sup>

#### 4. Factors contribute in DM:

Diabetes involves chronic levels of abnormally high glucose (hyper-glycemia). Many patients, especially those with type 2 diabetes, also have elevated blood (hypertension), chronic high levels of insulin (hyper-insulinemia) and unhealthy levels of cholesterol and other blood fats (hyper-lipidemia). pressure All of these factors contribute to the long-term complications of diabetes, which include:

**a. Vascular disease (Diabetic Angiopathy)**, atherosclerosis, heart conditions and stroke: These cardiovascular disorders are the leading cause of death in people with diabetes. Myocardial infarction is the major cause of death in diabetes. Peripheral vascular disease is associated with foot problems. Cerebrovascular events may also occur. Hypotension occurs in association with both macro vascular and micro vascular disease. A further risk factor for cardio vascular disease is dyslipidaemia.

**b. Kidney disease (Diabetic Nephropathy):** Diabetes is the chief cause of end-stage renal disease, which requires treatment with dialysis or a kidney transplant.. Nephropathy is one of the potentially life-threatening complications of diabetes

#### **c. Eye diseases:**

These include diabetic retinopathy, glaucoma and cataracts. Diabetes is a leading cause of visual impairment and blindness. Blurring of vision is usually a benign occurrence associated with rapid changes in blood control. Open-angle glaucoma is more common in patients with diabetes.<sup>3</sup>

#### **d. Nerve damage (Diabetic Neuropathy):**

This includes peripheral neuropathy, which often causes pain or numbness in the limbs, and autonomic neuropathy, which can impede digestion (gastro paresis) and contribute to sexual dysfunction and incontinence. Neuropathy may also impair hearing and other senses.

### e. Impaired thinking:

Many studies have linked diabetes to increased risk of memory loss, dementia, Alzheimer's disease and other cognitive deficits. Recently some researchers have suggested that Alzheimer's disease might be "type 3 diabetes," involving insulin resistance in the brain.

### f. Cancer:

Diabetes increases the risk of malignant tumors in the colon, pancreas, liver and several other organs.

**1. Musculoskeletal disorders:** conditions ranging from gout to osteoporosis to restless legs syndrome to myofascial pain syndrome are more common in diabetic patients than non diabetics.<sup>8</sup>

### 2. Pregnancy complications:

Diabetes increases the risk of preeclampsia, miscarriage, stillbirth and birth defects.<sup>9</sup>

### 3. Emotional difficulties:

Many but not all of the studies exploring connections between diabetes and mental illness have found increased rates of depression, anxiety and other psychological disorders in diabetic patients.<sup>7</sup>

### 5. Risk factors of Diabetes Mellitus:

- A] Genetic and family history
- B] Weight and body type
- C] Sex
- D] Level of physical activity
- E] Diet
- F] Other disease
- G] Hormones
- H] Medical treatment
- I] Other chemicals
- J] Viruses
- K] Smoking
- L] Alcohol

## 6. THE DIAGNOSIS OF DIABETES MELLITUS:

### Diagnosis and diagnostic tests

The body usually is able to keep glucose concentrations stable. The normal fasting blood sugar is usually between 3.5-6.7mmol/l. After a meal it would rarely exceed 8mmol/l. Normally there is no glucose in urine since the normal threshold above which glucose would appear in the urine would be 10mmol/l. Below a concentration of 10mmol/l the kidneys reabsorbs glucose back into the blood stream and so glucose does not appear in the urine unless the blood concentration of glucose is high. Dip- sticking urine for the presence of glucose is therefore often used as a screening test for diabetes mellitus. The diagnosis of diabetes mellitus is made by finding fasting blood glucose of over 6.7mmol/l or a random glucose of >10mmol/l. If a patient presents with symptoms of diabetes and is found to have a single very high glucose measurement c.g. >15mmol/l then this can be diagnostic. More commonly it would be appropriate to ask the patient to fast overnight and attend for fasting blood glucose to be taken the next morning. Ideally this should be performed on two occasions before diagnosing diabetes. there is any doubt about the diagnosis then a further test can be performed. This test is called the oral glucose tolerance test and it measures how the body responds to a glucose load. The patient is asked to fast overnight and then attends for the test. <sup>10,11</sup>

### HERBAL SUPPORT FOR DIABETES MANAGEMENT:

Before the advent of insulin injections and other pharmaceutical preparations, healers relied heavily upon herbs to treat diabetes. Although numerous herbs are reported to possess some degree of anti-diabetic activity, a significant amount of research, as well as tradition

nal usage, suggests that gurmar leaf (*Gymnema sylvestre*), bitter melon fruit (*Momordica charantia*), and fenugreek seeds (*Trigonella foenum-graecum*) may be among the best in terms of efficacy and safety. These, as well as several other valuable herbs such as garlic and ginseng represent safe, useful adjuncts to conventional therapeutic approaches to diabetes management. Also, it is plausible that the insulin and glucose normalizing effects of some of these herbs may benefit the non-diabetic with insulin resistance; however, research in this area is needed.

It is important to note that as with any change of diet, medication, or lifestyle with the diabetic, the administration of herbal supplements requires close monitoring of blood glucose levels, as these agents may reduce requirement for insulin or oral hypoglycemic drugs, and may cause hypoglycemia in some individuals.



### **Bitter Gourd:**

**Bitter Gourd** (*Momordica charantia*), also known as balsam pear, is a tropical vegetable widely cultivated in parts of Asia, Africa, and South America, which has been extensively used in folk medicine as a remedy for diabetes. In recent years, the anti-diabetic action of the fresh juice or extract of the unripe fruit has been established in both animal and human studies.

Although the precise mechanism of action remains to be fully elucidated, preliminary evidence suggests that *Momordica charantia* may help to stimulate insulin release or possibly glycogen synthesis in the liver. Additionally, the plant is believed to contain several anti-diabetic principles.

For instance, an insulin-like protein, known as insulin-P or polypeptide-P, has been extracted from *Momordica charantia* fruit and has demonstrated hypoglycemic effects when injected subcutaneously into Type I diabetics. Also, *Momordica charantia* contains charantin, a mixed steroid compound isolated through alcohol extraction, which was found to be a more

### **CLINICAL STUDY:**

An aqueous extract of *Momordica charantia* (100 g reduced to a 100 ml volume dose) given once per day was found to be highly effective in lowering blood sugar levels in Type II diabetics over a period of 7 weeks. In addition to hypoglycemic effects, the subjects showed a significant delay in the appearance of cataracts compared to the control group.

Administration of *Momordica charantia* has also been shown to improve the outcome of the oral glucose tolerance test in Type II diabetics. In one study, the administration of 100 ml of *Momordica charantia* fruit juice improved glucose tolerance in 73% of test subjects following an oral glucose tolerance test. Similar improvements in glucose tolerance were observed following the administration of 50 ml of *M. charantia* fruit juice

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