



## COMPREHENSIVE REVIEW OF PREDIABETES

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**ABSTRACT** Prediabetes a condition characterized by slightly elevated blood glucose levels, regarded as indicative that a person is at risk of progressing to Type 2 diabetes. Prediabetes and Type 2 Diabetes is a preventable disease through diet, life style, medicine or it is a reversible disease. But once it is established, it become incurable and continues to its progressive stage. Its complication gets progress even if BSL are controlled by medication. When disease is established, it is difficult to treat even though a lot of potent allopathy antidiabetes drugs are available. Today Diabetes Mellitus has become a challenging health problem as rate of conversion from Prediabetic to Diabetic is enormous. So it is important to reduce this rate of conversion.

**Conclusion:** Treatment of prediabetes should be done along with Diet and lifestyle modification.

**KEYWORDS :** Prediabetes.

**Prediabetes:**

Prediabetes etymology: Pre + diabetes

The state in which blood glucose levels are above normal but have not reached those of diabetes.

**Word Origin:**

1. A condition in which carbohydrate metabolism is mildly abnormal but other criteria indicating diabetes mellitus are absent.
2. A condition in which the development of diabetes mellitus is expected.

**Definition:**

The condition of having a hereditary tendency or high probability for developing diabetes mellitus, although neither symptoms nor test results confirm the presence of the disease. Ref. THE AMERICAN HERITAGE® STEDMAN'S MEDICAL DICTIONARY.

MEANING:

**Prediabetes**

is a "pre-diagnosis" of diabetes—you can think of it as a warning sign. This condition arises when your blood glucose level (blood sugar level) is higher than normal but it's not high enough to be considered diabetes. Ref: [www.endocrineweb.com/conditions/pre-diabetes/pre-diabetes](http://www.endocrineweb.com/conditions/pre-diabetes/pre-diabetes).

**ORIGIN OF PREDIABETES:**

First recorded in 1935–40; pre- + diabetes

**Prediabetes.** R73.03 is a billable/specific ICD-10-CM code that can be used to indicate a diagnosis for reimbursement purposes. The 2019 edition of ICD-10-CM R73.03 became effective on October 1, 2018. Ref:

<https://www.icd10data.com/ICD10CM/Codes/R73.03> Prediabetes  
Diagnosis: R73.09

If a person has prediabetes, the recommended ICD-10 code for abnormal glucose is R73.09, but this code also covers abnormal fasting glucose, abnormal glucose tolerance, or an elevated A1C in the prediabetes range. Ref: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5669129/>

**Prevalence of Prediabetes:**

<http://www.ijmr.org.in/article.asp?issn=0971-5916;year=2018;volume=148>.

It is estimated that 84 million adults in the USA have prediabetes in 2015 and 70 per cent of these persons will develop diabetes in the long term. According to National Urban Diabetes Survey, the estimated prevalence of prediabetes is 14 per cent in India. The question that may be raised is as to how one may identify these individuals, so as to have an early therapeutic impact.

**Prediabetes**

is the precursor stage before diabetes mellitus in which not all of the

symptoms required to diagnose diabetes are present, but blood sugar is abnormally high. This stage is often referred to as the "grey area" Prediabetes should not be viewed as a clinical entity in its own right but rather as an increased risk for diabetes and cardiovascular disease (CVD). Prediabetes is associated with obesity (especially abdominal or visceral obesity), dyslipidemia with high triglycerides and/or low HDL cholesterol, and hypertension. Impaired fasting blood sugar and impaired glucose tolerance are two forms of prediabetes that are similar in clinical definition (glucose levels too high for their context) but are physiologically distinct. Insulin resistance, the insulin resistance syndrome (metabolic syndrome or syndrome X), and prediabetes are closely related to one another and have overlapping aspects.

**Causes:**

Prediabetes develops when the body becomes insulin resistant or unable to use insulin.

Some risk factors for diabetes are family history of diabetes, cardiovascular disease, increased triglyceride levels, low levels of HDL (good cholesterol), obesity, elevated blood pressure, elevated fasting plasma glucose, women who have had gestational diabetes, had high birth weight babies (greater than 9 lbs.), and/or have polycystic ovarian syndrome (PCOS)

The exact cause of prediabetes is unknown. But family history and genetics appear to play an important role. Inactivity and excess fat especially abdominal fat also seem to be important factors. People with prediabetes don't process sugar (glucose) properly anymore. As a result, sugar accumulates in the bloodstream instead of doing its normal job of fueling the cells that make up muscles and other tissues.

**Risk factors**

These factors include:

- **Weight.** Being overweight is a primary risk factor for prediabetes. The more fatty tissue you have — especially inside and between the muscle and skin around your abdomen — the more resistant your cells become to insulin.
- **Waist size.** A large waist size can indicate insulin resistance.
- **Dietary patterns.** Eating red meat and processed meat, and drinking sugar-sweetened beverages, is associated with a higher risk of prediabetes. A diet high in fruits, vegetables, nuts, whole grains and olive oil is associated with a lower risk of prediabetes.
- **Inactivity.** The less active you are, the greater your risk of prediabetes. Physical activity helps you control your weight, uses up glucose as energy and makes your cells more sensitive to insulin.
- **Age.** Although diabetes can develop at any age, the risk of prediabetes increases after age 45.
- **Family history.** Your risk of prediabetes increases if you have a parent or sibling with type 2 diabetes.
- **Gestational diabetes.** If you developed gestational diabetes while

pregnant, you and your child are at higher risk of developing prediabetes.

- **Polycystic ovary syndrome.** This common condition — characterized by irregular menstrual periods, excess hair growth and obesity — increases women's risk of prediabetes.
- **Sleep.** People with a certain sleep disorder (obstructive sleep apnea) have an increased risk of insulin resistance. People who work changing shifts or night shifts, possibly causing sleep problems, also may have an increased risk of prediabetes

Other conditions associated with prediabetes include:

- High blood pressure
- Low levels of high-density lipoprotein (HDL) cholesterol, the "good" cholesterol
- High levels of triglycerides — a type of fat in your blood

When these conditions occur with obesity, they are associated with insulin resistance. The combination of three or more of these conditions is often called metabolic syndrome.

#### Pathophysiology:

Normal glucose homeostasis is controlled by three interrelated processes. These processes include gluconeogenesis (glucose production that occurs in the liver), uptake and utilization of glucose by the peripheral tissues of the body, and insulin secretion by the pancreatic beta islet cells. The presence of glucose in the bloodstream triggers the production and release of insulin from the pancreas' beta islet cells. The main function of insulin is to increase the rate of transport of glucose from the bloodstream into certain cells of the body, such as striated muscles, fibroblasts, and fat cells. It also is necessary for transport of amino acids, glycogen formation in the liver and skeletal muscles, triglyceride formation from glucose, nucleic acid synthesis, and protein synthesis.

Insulin enters cells first by binding to target insulin receptors. DM and some of those with prediabetes have impaired glucose tolerance in these individuals, blood glucose rises to abnormally high levels. This may be due to a lack of pancreatic hormone release or failure of targeted tissues to respond to the insulin present or both.

#### Pre Diabetes Symptoms & Signs

- Frequent urination.
- Blurred vision.
- Constant thirst.
- Fatigue.
- Frequent infections.
- Cuts and bruises that heal slowly.
- Tingling or numbness in the hands or feet.

Types: There are two pre-diabetes conditions: Ref: <https://www.diabetesaustralia.com.au/pre-diabetes>

- Impaired glucose tolerance (IGT) is where blood glucose levels are higher than normal but not high enough to be classified as diabetes.
- Impaired fasting glucose (IFG) is where blood glucose levels are escalated in the fasting state but not high enough to be classified as diabetes.

#### Diagnosis:

<https://www.mayoclinic.org/diseases-conditions/prediabetes/diagnosis-treatment/drc-20355284>.

Fasting blood sugar (glucose) level of:

- 110 to 125 mg/dL (6.1 mM/L to 6.9 mM/L) – WHO criteria
- 100 to 125 mg/dL (5.6 mM/L to 6.9 mM/L) – ADA criteria

Post Prandial blood glucose: A blood sugar level from 140 to 199 mg/dL (7.8 to 11.0 mmol/L) is considered prediabetes. This is sometimes referred to as impaired glucose tolerance.

#### Glycated hemoglobin (A1C) test

- An A1C level between 5.7 and 6.4 percent is considered prediabetes.

#### Complications:

The most serious consequence of prediabetes is progression to type 2 diabetes. That's because type 2 diabetes can lead to:

- High blood pressure, High cholesterol, Heart disease, Stroke, Kidney disease, Blindness, Amputations

Research indicates that prediabetes is often associated with unrecognized heart attacks and can damage your kidneys, even if you haven't progressed to type 2 diabetes.

#### Prevention:

Healthy lifestyle choices can help you prevent prediabetes and its progression to type 2 diabetes even if diabetes runs in your family. Eat healthy foods, Get more physical activity, Lose excess pounds, Control your blood pressure and cholesterol.

The rationale behind treatment of prediabetes includes, prevention of development of diabetes, prevention of consequences of diabetes and prevention of the consequences of prediabetes itself. Several research studies have shown success of interventions designed for treatment of prediabetes with sustained reduction in incidence of diabetes

#### Treatment:

Healthy lifestyle choices can help you bring your blood sugar level back to normal, or at least keep it from rising toward the levels seen in type 2 diabetes.

To prevent prediabetes from progressing to type 2 diabetes, try to:

- **Eat healthy foods.** Choose foods low in fat and calories and high in fiber. Focus on fruits, vegetables and whole grains. Strive for variety to help you achieve your goals without compromising taste or nutrition.
- **Be more active.** Aim for 30 to 60 minutes of moderate physical activity most days of the week.
- **Lose excess weight.** If you're overweight, losing just 5 to 10 percent of your body weight — only 10 to 20 pounds (4.5 to 9 kilograms) if you weigh 200 pounds (91 kilograms) — can reduce the risk of developing type 2 diabetes.
- **Stop smoking.**
- **Take medications as needed.** If you're at high risk of diabetes, your doctor might recommend metformin (Glucophage, others). Medications to control cholesterol and high blood pressure might also be prescribed.

#### Prediabetic Diet:

A diet that can help to lose weight and manage prediabetes will normally include foods that are:

- Low in fat, low in calories and high in fiber.

#### DISCUSSION:

Prediabetes is a misnomer since it is an early stage of diabetes. It now is known that the health complications associated with type 2 diabetes often occur before the medical diagnosis of diabetes is made.

Seventy percent of patients with prediabetes will progress to type 2 diabetes in their lifetime. Despite this, prediabetes frequently goes undiagnosed and untreated.

It would be interesting to assess whether using combination pharmacological approaches plus or minus lifestyle interventions have any additive benefit. Future research should assess whether using combination pharmacological approaches plus very intensive lifestyle interventions have an additive benefit.

It is very possible to prevent prediabetes from developing into type 2 diabetes. Eating healthy whole food, addressing overweight and staying at a healthy weight, and committing to some physical activity and Ayurvedic Drug is enough to help get your blood glucose level back into the normal range. That's the key to assuring you avoid not only the onset of diabetes but all the related complications including heart disease, vision, loss, nerve damage, and kidney failure.

#### CONCLUSION:

Pharmacotherapy is used to treat prediabetes, such treatment plan should be initiated with predefined goals and end points by the physician. Research should be carried out to assess using pharmacological treatment and very intensive lifestyle interventions.

#### REFERENCE:

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