

Contemporary & Classical Overview On Prediabetes And Its Approach Of Management

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Abstract

Pre-diabetes is the precursor stage of Type-2 Diabetes Mellitus and often referred as 'Grey area' between diabetes and normal one. In recent years, the incidence of Prediabetes is rising with an alarming rate globally. It is also known as borderline diabetes, chemical diabetes & touch of diabetes. Obesity and insulin resistance are considered as it's the main culprit and in due course of time it may lead to develop Type-2 Diabetes Mellitus. Its management is still evolving in modern medicine. It is one of the clinical entities, which is well conceived in Ayurveda. The diathesis and management of Pre-diabetes can be correlated with diathesis of Apathyanimittaja Prameha/Madhumeha as described in Ayurvedic lexicons. A strong emphasis have been laid down on correction Medas, Ojas, Agni along with use of numbers of herbal, mineral and herbo-mineral formulations along with Panchakarma measures for its management.

Key words: Ayurveda, Madhumeha, Pre-diabetes, Prameha, Panchakarma

Introduction

Prediabetes is a condition in which blood sugar level is higher than it should be but not high enough to diagnose Type-2 Diabetes. Prediabetes is also called as Impaired Fasting Glucose or Impaired Glucose Tolerance and it is the early stage of Type-2 Diabetes Mellitus. Prediabetes develops when our body begins to have trouble using the hormone insulin. Insulin is necessary to transport glucose, what our body uses for energy, into the cells via the bloodstream. In Prediabetes, our body either doesn't make enough insulin or it doesn't use it well (that's called Insulin resistance).

Worldwide more than 300 million people are at increased risk of developing Diabetes mellitus but they are unaware of it. It is the state in which some but not met all the diagnostic criteria for Diabetes. Numerous terms are given such as, borderline diabetes, chemical diabetes, touch of diabetes etc. The US Department of Health and Human Services and ADA on 27th march 2002 with an intention to create awareness and convey seriousness of the condition gave the term Prediabetes. Such types of patients are at risk for not only developing Type-2 Diabetes mellitus, but also risk for macro & micro-vascular complications. The progression into Diabetes mellitus from Prediabetes is approximately 25% over 3 to 5 years.

What Are the Symptoms?

Diabetes develops very gradually, so Prediabetics may not have any symptoms at all. However, Prediabetics may notice that:

- have to go to the bathroom more frequently
- thirstier than normal
- hungrier than normal
- losing weight, despite eating more
- more tired than usual

Common Causes and Risk Factors:

These are the same risk factors related to the development of Prediabetes:

- **Weight:** If you're overweight (have a Body Mass Index (BMI) of higher than 25), you're at high risk for developing Prediabetes.
- **Lack of physical activity:** If you aren't physically active, you're more likely to develop Prediabetes.

- **Family history:** Prediabetes has a hereditary factor. If someone in your close family has (or had) it, you are more likely to develop it.
- **Race/ethnicity:** Certain ethnic groups are more likely to develop Prediabetes, including African-Americans, Hispanic Americans, Native Americans, and Asian Americans.
- **Age:** The older you are, the more at risk you are for developing Prediabetes. At age 45, your risk starts to rise, and after age 65, your risk increases exponentially.
- **Gestational diabetes:** If you developed diabetes while you were pregnant, that increases your risk for developing Prediabetes later on.

Other health problems: High blood pressure (hypertension) and high cholesterol (the “bad” LDL cholesterol) increase your risk of getting Type-2 Diabetes.

Polycystic Ovary Syndrome (PCOS) also raises the risk of Prediabetes because it’s related to insulin resistance. In PCOS, many cysts form in your ovaries, and one possible cause is insulin resistance. If you have PCOS, that means you may be insulin resistant and therefore at risk for developing Prediabetes.

If you have Hypothyroidism (low thyroid function; not enough circulating thyroid hormone), and you have Prediabetes, then your risk of developing Type-2DM more than doubles in comparison to individuals with normal thyroid function.

Diagnosis

The American Diabetes Association (ADA) recommends that diabetes screening for most adults begin at age 45 yrs. The ADA advises diabetes screening before age 45 yrs if you're overweight and have additional risk factors for Prediabetes or Type-2 Diabetes.

There are several blood tests for Prediabetes.

I. Glycated hemoglobin (HbA1C) test

This test shows your average blood sugar level for the past three months. The test measures the percentage of blood sugar attached to the oxygen-carrying protein in red blood cells called hemoglobin. The higher your blood sugar levels, the more hemoglobin you will have with sugar attached.

In general:

- A HbA1C level below 5.7% is considered normal
- A Hb1C level between 5.7% and 6.4% is considered Prediabetes
- A HbA1C level of 6.5% or higher on two separate tests indicates Type-2 diabetes

Certain conditions can make the HbA1C test inaccurate, such as if you're pregnant or have an uncommon form of hemoglobin.

II. Fasting blood sugar test

A blood sample is taken after you fast for at least eight hours or overnight.

In general:

- A fasting blood sugar level below 100 milligrams per deciliter (mg/dL) (5.6 mmol/L), is considered normal.
- A fasting blood sugar level from 100 to 125 mg/dL (5.6 to 7.0 mmol/L), is considered Prediabetes.
- A fasting blood sugar level of 126 mg/dL (7.0 mmol/L) or higher indicates Type-2 Diabetes.

III. Oral glucose tolerance test

This test is usually used to diagnose Diabetes only during pregnancy. A blood sample is taken after you fast for at least eight hours or overnight. Then you'll drink a sugary solution, and your blood sugar level will be measured again after two hours.

In general:

- A blood sugar level less than 140 mg/dL (7.8 mmol/L) is considered normal.
- 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.
- A blood sugar level of 200 mg/dL (11.1 mmol/L) or higher indicates Type-2 Diabetes.

Children and Prediabetes testing

Type-2 Diabetes is becoming more common in children and adolescents, likely due to the rise in childhood obesity. The ADA recommends Prediabetes testing for children who are overweight or obese and who have one or more other risk factors for Type-2 Diabetes.

These other risk factors include:

- Family history of Type-2 Diabetes.
- Race - Children who are African American, Hispanic, Native American, Asian American and Pacific Islander are at higher risk.
- Low birth weight.
- Being born to a mother who had gestational diabetes.

The ranges of blood sugar level considered normal, Prediabetic and Diabetic are the same for children and adults.

Prediabetes, An Ayurvedic Approach

The incidence of Prediabetes and its progression to Type-2 Diabetes Mellitus is rising with an alarming rate world over, particularly in India. At present, many diabetologist and research scholars believed that Prediabetes is a progressive clinical disorder; it may lead to develop Type-2 Diabetes mellitus and its complications. Therefore, it is largely a preventable disease through non-pharmacological measures i.e. diet, life style etc. However, once Prediabetes has been progressed to Type-2 Diabetes, it mostly takes an incurable course and continues to develop many progressive complications. This fact has been clearly conceived in *Ayurvedic* lexicons.

Prediabetes is one of the major clinically entity, which have been vividly described in *Ayurvedic* classics in the context of *Prameha* striking resemblance with the available latest knowledge in this field. The causes of Prediabetes are comparable to the disease entity *Prameha/Madhumeha* in *Ayurveda*. Life style errors are the major etiological categories described for *Prameha*, which is closely resemblance with the etiology of Prediabetes. The *Ayurvedic* text also describes the pathogenesis of *Prameha/Prediabetes* an extremely evolved manner, involving the 3 *Doshas* and 10 *Dushyas*. Although it is a *Tridoshika* disorders but *Kapha Dosha* is the main initiating factors in the genesis and diathesis of Prediabetes/*Prameha*. The involvement of a wide range of *Dushyas* (ranging from *Rasa* to *Ojas*) indicates that *Prameha* is a systemic disease involving the whole body. When such clinical condition really established in the body for prolong duration, it may lead to *Madhumeha* vis a vis Diabetes mellitus. Due to wide spread pathogenic involvement this phase of disease is deeply rooted and it is difficult to be cure.

The *Ayurvedic* texts reflect two major categories of *Prameha* 1. *Sahaja Prameha* and 2. *Apathyanimittaja Prameha*, out of these two, *Apathyanimittaja Prameha* is closely resemblance with the contemporary concepts of Prediabetes/Type-2 Diabetes Mellitus. On this basis, *Ayurveda* has described *Sthula Pramehi*, which clearly corresponds to the current concepts of obese and its role in the genesis of Diabetes Mellitus. For the category of *Sthula Pramehi* *Ayurveda* advocates *Apatarpana* approach for their management. The etiology, classification, pathogenesis, clinical features, prognosis, and management of *Apathyaja Nimittaja Prameha* are very near to contemporary concept of Prediabetes. *Ayurveda* has been claimed that the management *Sthula Pramehi* is based on *Apatarpana* measures, which signifies the wisdom of ancient *Acharyas*.

Ayurvedic text vividly described the clinical feature of *Vataja*, *Pittaja* and *Kaphaja Prameha*, which indicates the preclinical stage/early stage/ subclinical features of Diabetes mellitus. The texts also deliberate on the three major clinical category of *Prameha* namely *Kaphaja*, *Pittaja*, and *Vataja*. However, if these three clinical stages of *Prameha/Prediabetes* are not managed in due time it may lead to the chronic stage of *Madhumeha/* Type-2 Diabetes mellitus. Variety of pharmacological and Non pharmacological measures have been described for the management of different kind of *Prameha/Prediabetes* with a wide range of life style modification, herbal, mineral and herbo-mineral formulation for the treatment of *Prameha* including *Madhumeha*.

It is the fact that conventional management of Prediabetes and Type-2 Diabetes mellitus is still not satisfactory. Therefore, the highly evolved description of *Ayurvedic* therapeutics in the line of prevention and management of *Prameha/Prediabetes*, it seems to explore the possibilities of developing an *Ayurveda*- inspired line of dietary regimens and *Panchakarma* therapy in the

management of Prediabetes and prevention of Type-2 Diabetes mellitus for contemporary use today. Such type exercise through *Ayurvedic* approach not only provides a new dimension for the management of Prediabetics but up to some extent it also checks Prediabetics progression to Diabetics.

Scholars and researchers of biomedical sciences have recently conceived the idea of *Medas* as the principal *Dushya* of *Ayurveda*, opines that central obesity and deranged lipid metabolism are considered as the main pathogenic component of Prediabetes and Type-2 Diabetes mellitus. It is suggested that the major focus of research and development of Diabetes mellitus should be around Prediabetes and metabolic syndrome as a preventive measure. Overall the *Ayurvedic* approach of management of Prediabetes is based on following measures.

1. *Nidan Parivarjana*: Avoidance of high calorie diet and sedentary habits.
2. Improve status of *Ojas* (immune strength): Use of drugs like *Nisha-amalaki* & *Shilajatu* and follow the regimens of good conduct.
3. Improve status of *Agni* (biofire): Use of *Pippali*, *Maricha*, *Shunthi*, *Chitraka* as *Agni* promoter and lightening therapy.
4. Correction of *Medas* (fat component): By practicing regular exercise and use of fat regulator drugs such as *Pushkarmula*, *Vrikshamla*, *Guggulu* etc.
5. Improve mental competence: By Meditation, counselling, assurance and use of *Medhya* drugs such as *Madhuyashthi*, *Brahmi*, etc.
6. Regular practice of *Asanas* such *Bhujangasana*, *Gomukhasana*, *Pavanamuktasana*, *Muyurasana* etc in day to day life.

Conclusion:

It seems that issues depicted above can be tackled with the holistic approach of *Ayurvedic* therapeutics by utilizing the package of exercise, dietary control, and bio-purificatory measures of *Ayurveda*, which may not only control the lipid and sugar metabolism in the system but also control its progression to Type-2 DM. The *Panchakarma* therapy (cellular biopurificatory measures) of *Ayurveda* is claimed to produce cellular cleansing effect, promoting mobilization of essential nutritional pool and immune enhancing effect. Such a line of management is preferred in *Ayurveda* because of *Srotodushti* and accumulation of metabolic waste products (*Ama*) are the main culprit in the diathesis of disease, which is of great significance in case of Prediabetes and Diabetes mellitus.

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