

Diabetes Mellitus

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Key Points

- Diabetes play a role in spread of COVID-19
- Stress a cause of type 1 diabetes
- MHT improves glucose metabolism in women with T2DM
- Pramlintide is an appealing therapy choice for diabetes

Diabetes mellitus, a chronic metabolic condition, is a rapidly rising global problem with significant social, health, and economic ramifications. In 2010, it was projected that 285 million people worldwide (about 6.4 percent of the adult population) were affected by this condition. In the absence of better control or cure, this figure is expected to rise to 430 million. The rise can be attributed to two factors: an aging population and obesity. Furthermore, nearly half of all putative diabetics are not diagnosed until ten years after the commencement of the disease, implying that the true worldwide diabetes prevalence must be enormous.¹

Diabetes diagnosis

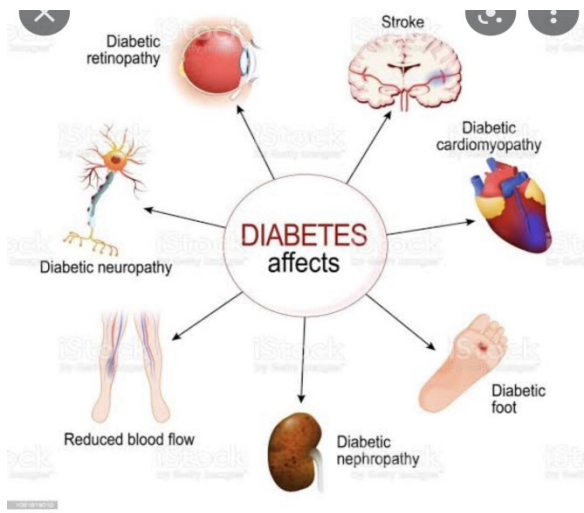
Age, BMI, and blood glucose concentration are the most critical criteria in the diagnosis of diabetes mellitus (DM). Because multiple elements are involved in DM, a doctor's diagnosis is challenging, and the diagnosis is prone to human error. A blood test does not provide enough information to diagnose the condition correctly. Based on the factors listed in patients, a vector support machine (SVM) was used to predict the diagnosis of diabetes. The output variable has three categories: without diabetes, tendency to diabetes, and diabetes. With Colombian patients, an SVM was obtained with an accuracy of 99.2 percent, while with a data set of patients of a different ethnic origin, an accuracy of 65.6 percent was obtained.²

Types of diabetes

Bornstein and Trehwella (in press) investigated the plasma insulin content of 11 diabetics using the sensitive technique of assaying tiny quantities of

insulin reported by Bornstein (1950). Three people had insulin on hand, while the other eight didn't. We've now looked into the available plasma insulin content of two different kinds of human diabetes that have been linked to a shortage of insulin and reasons other than insulin deficiency (Lawrence, 1951). The first kind is usually young and is characterized by fast increasing ketosis and severe weight loss, as well as the need for insulin to survive. The second group comprises primarily of obese middle-aged women with similar levels of hyperglycemia and glycosuria but no ketosis or significant weight loss. Low-carbohydrate diets without insulin can easily control their diabetes, especially if they lose weight.³

Consistently high blood sugar levels are a hallmark indication of diabetes. This is caused by either a complete lack of insulin production (type 1 diabetes), a reduced amount of insulin production (type 2 diabetes), or insulin resistance (both types of diabetes) (inability of body cells to take up glucose). Mature onset diabetes of the young (MODY), a type 2 diabetes, and gestational diabetes, which affects pregnant women mostly in the second or third trimester, are two further kinds of diabetes. Insulin resistance in the brain is now referred to as type-3 diabetes. Aside from environmental and nutritional factors that increase the risk of diabetes, genetic makeup and gene mutations have a role in the disease's expression.⁴



<https://www.arborvitae.com.au/what-is-diabetes-and-how-does-pycnogenol-and-arborvitae-help/attachment/diabetes-affects-complication/>

Stress and diabetes mellitus

Stress may play a role in diabetes-related persistent hyperglycemia, albeit its exact role is unknown. Although retrospective human research imply that stress can trigger Type I diabetes, animal studies contradict this, with certain stressors having either facilitatory or inhibitory effects on disease progression. Human studies in people with diabetes are equally perplexing, with some indicating that stress can cause hyperglycemia, hypoglycemia, or have no effect on glycemic status at all. In animal models of Type II diabetes, there is more consistent data confirming the significance of stress. However, there are few human research on the impact of stress on the progression of Type II diabetes. Behavioral or pharmacologic stress management may help significantly to diabetes therapy, according to intervention studies. (All rights reserved, 2016 APA, PsycINFO Database Record).⁵

Menopause and diabetes mellitus

An increase in and central redistribution of adipose tissue, as well as a decrease in energy expenditure, occur during the menopausal transition.

There is also a decrease in insulin secretion and sensitivity, as well as an increased risk of T2DM. MHT improves glucose metabolism in both women with and without T2DM, and it may even delay the beginning of the disease. MHT should be given to

women with T2DM based on their risk of cardiovascular disease (CVD). Oral oestrogens may be favoured in women with T2DM and minimal CVD risk, but transdermal 17-oestradiol is preferred in women with T2DM and coexisting CVD risk factors, such as obesity. A progestogen having neutral effects on glucose metabolism, such as progesterone, dydrogesterone, or transdermal norethisterone, should be taken in any scenario. T2DM in postmenopausal women should be treated primarily through lifestyle changes, including as diet and exercise. The majority of them will eventually require medication. Antidiabetic drugs should be chosen based on the patient's unique characteristics and comorbidities, as well as the treatments' metabolic, cardiovascular, and bone effects.⁶

Improving Pregnancy outcomes in women with diabetes mellitus

When compared to women who do not have diabetes mellitus (type 1 or type 2), women with diabetes mellitus have a higher risk of pregnancy problems include congenital abnormalities, preeclampsia, and premature birth. Fetal overgrowth complicates around half of pregnancies in women with diabetes mellitus, resulting in overweight infants at delivery who are at risk of birth trauma as well as metabolic syndrome, cardiovascular disease, and type 2 diabetes mellitus later in life. To avoid pregnancy problems, strict glycaemic control with an appropriate diet, insulin, and, if necessary, antihypertensive therapy is the cornerstone of diabetes mellitus management. The use of new technology to manage diabetes mellitus is changing the way these illnesses are treated during pregnancy. In Europe, for example, most women with diabetes are treated with insulin analogues both before and during pregnancy. In addition, many women use insulin pumps while pregnant, and continuous glucose monitoring is becoming more common. Furthermore, smartphone application technology offers a promising educational tool for diabetic pregnant women and their carers. In patients with pre-existing diabetes mellitus, current diabetes care with optimal food, insulin, and antihypertensive therapy can help to reduce the risk of pregnancy

problems like congenital abnormalities, foetal overgrowth, preeclampsia, and preterm birth.⁷

Diabetes epidemiology in the COVID-19 pandemic

In hospitalized patients with coronavirus illness, diabetes has been recognized as a major risk factor for mortality and rates of progression to acute respiratory distress syndrome (ARDS) (COVID-19). Many recent papers on this topic, however, have taken a hasty approach and lack proper epidemiologic design, conduct, and analysis. Prior study characteristics have complicated our knowledge of the genuine role of diabetes and other underlying comorbidities to COVID-19 prognosis. In this Perspective, we explore some of the difficulties in evaluating current diabetes and COVID-19 literature, as well as future epidemiologic study potential. We believe that the COVID-19 pandemic is a watershed moment in epidemiology, and that diabetes epidemiology should play a key role.⁸

Treatment

Role of AMPK In treatment of diabetes

Diabetes affects a huge portion of the global population. This metabolic disorder is caused by lifestyle, obesity, eating choices, and genetic factors. The 5' adenosine monophosphate activated protein kinase (AMPK) signalling pathway is a focus for diabetes control. AMPK is a heterotrimeric protein made up of three subunits and AMPK activation increased glucose absorption into cells and decreased intracellular glucose synthesis in multiple experiments. According to certain research, diabetes causes AMPK activity to be impaired. Drugs that are used to treat diabetes, such as metformin, are known to act through regulating AMPK. As a result, medications that activate and regulate AMPK could be useful in the treatment of diabetes.

Furthermore, many individuals who take allopathic medicines experience serious side effects such as hypoglycemia. As a result, research into plant-derived natural medications with minimal side

effects that treat diabetes is required. Natural compounds such as berberine, quercetin, and resveratrol have showed promise in regulating and activating the AMPK pathway, which may help manage diabetes and its consequences.⁹

Pramlintide in treatment of diabetes mellitus

Pramlintide is an analogue of the peptide hormone amylin and is the first in a new family of pharmaceuticals for the treatment of insulin-using patients with type 2 or type 1 diabetes mellitus. Amylin is a hormone produced by pancreatic cells that slows stomach emptying, suppresses postprandial glucagon secretion, and reduces food intake. These effects work in tandem with insulin's to keep blood glucose levels in check. Amylin deficiency varies depending on the severity of β -cell secretory failure in individuals with type 2 diabetes, and it is almost nonexistent in people with type 1 diabetes. Pramlintide improves overall glycemic control, lowers postprandial glucose levels, and lowers bodyweight in people with diabetes who use mealtime insulin through mechanisms similar to those of amylin. Reduced postprandial glucose and bodyweight are essential because postprandial hyperglycemia is linked to an increased risk of microvascular and macrovascular problems, and obesity is a risk factor for cardiovascular disease on its own. Pramlintide is generally well tolerated, with mild to severe nausea being the most common treatment-emergent side event, which fades over time. Pramlintide medication is also linked to lower oxidative stress and cardiovascular risk indicators, as well as higher patient satisfaction with treatment. These features make pramlintide an appealing therapy choice for postprandial hyperglycemia in diabetics who use mealtime insulin.¹⁰

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