

Diabetes: prevalence, causes, effects, physiology and risk of cardiovascular diseases

Short communication

Introduction: understanding diabetes and correlation with cardiovascular diseases

People who experience the prediabetic symptoms or leaning towards diagnostic threshold towards diabetes may have a risk of cardiovascular disease and may experience death. Patients with diabetes are also prone for cardiovascular risk factors and there is a clear correlation between these disease conditions as they share similar pathogenic process. More study on this aspect is still being studied. National Diabetes Statistics Reports, in 2020, 34.2million Americans live with diabetes, with 1 in 10 people battling this chronic disease. This article serves as a guide to help better understand what the condition is about and how diabetes can affect our daily lives.

Minority population, ethnic background and diabetes

In ethnic minorities in the U.S., a combination of a lack of access to health care, socioeconomic status can create roadblocks in preventing diabetes and having effective management once diagnosed. Biomedical disciplines often interpret such disparities as evidence of fundamental genetic differences between socially constructed race categories. However, growing research suggests that health disparities originate from inequalities in power and socioeconomics. Research by Dr. Creary suggests that health disparities start with racism and white supremacy, class oppression, gender discrimination, exploitation. These deeply rooted items create a ripple effect of profound power, wealth imbalances, globalization, deregulation, labor markets, housing policy, education systems. In short, power distributes the social and environmental determinants of health differently. In the U.S., this tends to fall primarily along with 1. Race. 2. Class. 3. Gender lines, and those who hold multiple marginalized identities. All things combined can cause diabetes to progress faster in minority populations. This rapid progression can be compounded by a poor diet, obesity, and sedentary life. National Health Interview Survey by the Centers for Disease Control and Prevention and the U.S. Census Bureau, following data, is available:

1. 14.7% of American Indians/Alaska natives B .12.5% of HispanicsC.11.7% of non-Hispanic blacks
2. 9.2% of Asian Americans
3. 7.5% of non-Hispanic whites 18 and older having health issues.

Diabetes in simple terms

There are different types of diabetes, with Type 2 being the most common. Diabetes affects our body and controls how food turns into energy. During the digestion process, carbohydrates are metabolized into sugar, known as glucose, and released into the bloodstream. When the blood sugar increases in a healthy individual, it sends a signal to the pancreas to release Insulin, which aids in allowing blood sugar into cells to be utilized for energy. If the body cannot make enough Insulin or cannot use Insulin, it can result in serious health complications, including heart disease, vision loss, and kidney disease. Diabetes Type

Volume 15 Issue 2 - 2022

Pratibha Gupta,¹ Danielle Cieslak²¹Department of Food Nutrition and Health, Central State University, USA²Department of Biology, Central State University, USA

Correspondence: Pratibha Gupta, Department of Food Nutrition and Health, Central State University, USA, Tel 937-376-6626, Fax 937-376-6682, Email Pgupta@CentralState.edu

Received: January 20, 2022 | **Published:** March 11, 2022

1 is an autoimmune response and usually happens in childhood where the targeted cells attack the Insulin-producing cells resulting in the inability to process the sugar by the body.

Symptoms

The most common symptoms of diabetes include increased thirst, increased hunger, excessive fatigue, increased and frequent urination, especially at night, blurry vision. There are no symptoms for many patients with Prediabetes or gestation diabetes; however, when symptoms are present, they include the following: In Prediabetes, many people have no symptoms. In Gestation diabetes, no symptoms are visible, although a blood sugar test during pregnancy is used for diagnosis. These Symptoms could be the alarming sign of diabetes: frequent and excessive urination, loss of weight, nerve damage, blurred vision, fatigue, frequent infections, poor wound healing, and thirst. If any of the above symptoms are experienced, the best and important action plan would be to follow up with a primary care physician to diagnose the onset of diabetes. According to American Diabetes Association, Type 2 diabetes can be assessed through the following tests.

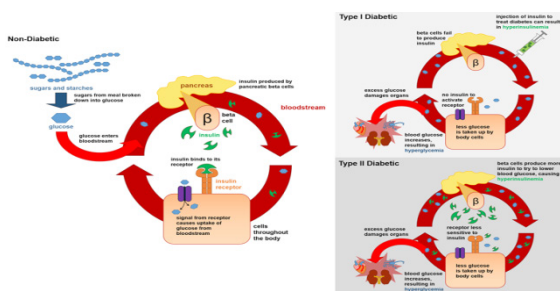
Hemoglobin A1c: this test measures the average glucose in the blood for the past three months and if the number is 6.5 or above, it is declared as diabetes.

Fasting plasma glucose (FPG) this test measures the fasting glucose or blood sugar level. If the level is 126 mg/dl then it is considered as diabetic condition. 3. Oral Glucose Tolerance Test (OGTT). This test measures the sugar level before and two hours after consuming glucose drink provided by physician for diagnosis. Glucose level in this range 199 mg /dl -200 mg/dl is considered diabetic condition.

Complications of undiagnosed diabetes: Type 2 Diabetes in majority of cases may be ignored and may not show any obvious symptoms to be recognized. If not well attended, diabetes may affect heart nerves, blood vessels eyes and kidneys leading into major health issues such as 1. Eye or retina damage. 2. Hearing impairment. 3. Nerve damage Neuropathy. 4. Foot damage. 5. Kidney damage (Nephropathy). 6. Cardiovascular diseases, stroke, atherosclerosis, high blood pressure, angina.

Simple ways to manage diabetes

To prevent diabetes, simple plan can be adopted 1. Adding fiber in daily meals. 2. Whole grains food, 3. Manage body weight, 4. Avoid FAD diets 5. Healthier meal choices. 5. Daily physical activity.



This Photo by Unknown Author is licensed under CC BY-SA-NC

Prevention-intervention

In 2010, the Centers for Disease Control launched the National Diabetes Prevention Program to address the increasing number of prediabetic and battling type 2 diabetes patients. The 6-month program offers low-cost interventions that help prevent type 2 diabetes, which includes 1. A healthy diet. 2. Increased physical activity. 3. Achieving a healthy weight. All of which help improve blood pressure, cholesterol, and risk of heart disease. Simple plan for managing the Diabetes.

Diabetes type II: 1. Diet Plan. 2. Exercise Daily. 3. Medication on time. 4. Insulin therapy if required.

Diabetes type I: 1. Regular monitoring of blood sugar. 2. Insulin therapy. 3. Diet. 4. Exercise.

Prediabetes: 1. Lifestyle modifications 2. Weight management.

Gestational diabetes: 1. Daily blood sugar monitoring. 2. A healthy low carb diet. 3. Monitoring the fetus. 4. Medication, suggested if blood sugar is too high. 5. Appropriate mild exercise. Although people suffering from Type I Diabetes may benefit from proper diet and exercise. However, their conditions cannot be reversed compared to Type II diabetes, showing possible results.

While medicine and lifestyle changes are the most common treatments for diabetes, less common treatments, include bariatric surgery, an artificial pancreas, or pancreatic islet transplantation.

Family history

We inherit diet and exercise habits from our family, and these habits are likely to be linked to causing Type II Diabetes. It is more likely that if any of the family members had diabetes. In that case, it is more likely that you may have chances of getting diabetes unless you develop a different healthy lifestyle to avoid it.

Pancreas disease

During the digestion process, essential enzymes and hormones released from the pancreas, including Insulin, are vital for carbohydrate metabolism. *Insulin*, a vital hormone secreted by the pancreas, regulates glucose metabolism. Glucose is needed for the body to produce energy. Insulin enters the cells of the body to allow glucose in for energy usage. If the pancreas does not produce enough Insulin, glucose accumulates in the body resulting in feelings of thirstiness, nausea, and shortness of breath, also known as hyperglycemia. On the opposite spectrum, the low glucose level causes hypoglycemia, which shows symptoms, including shakiness, dizziness, and loss of consciousness. Infection Higher levels of certain hormones such

as adrenaline or cortisol are produced in various conditions such as pneumonia, urinary tract infections, or other illnesses. These hormones counter the effects of Insulin, triggering an onset of diabetic ketoacidosis. Ketosis is a complication of diabetes that results from increased levels of ketones in the blood.

Obesity

New research suggests that being overweight stresses the internal composition of individual cells, specifically the endoplasmic reticulum (E.R.). When the E.R. has too many nutrients to process, it sends out a signal to slow down the insulin receptors on each cell's surface, resulting in insulin resistance and a buildup of glucose in the blood.

Diabetes and covid-19

While there is not enough evidence to prove that people with diabetes are more likely to get COVID-19, they are at a higher risk of developing more severe complications, including death resulting from contracting the virus. If diabetes is managed correctly, the risk of becoming severely sick from COVID-19 decreases. Nevertheless, medicines for diabetes are taken routinely as usual, and blood sugar can keep track of the results, as directed by the healthcare provider.

Diabetes and vitamin in nutrition

B vitamins are water-soluble and the most common vitamin in human nutrition and required for normal cell function, energy production, metabolism, cellular replication, cell repair, and nerve function. The B vitamins are 1. Vitamin B1 Thiamine. 2. Vitamin B2 Riboflavin. 3. Vitamin B3 Niacin. 4. Vitamin B5 Pantothenic acid. 5. Vitamin B6 Pyridoxine. 6. Vitamin B 8 Biotin. Vitamin B9 folic acid, Vitamin B12 Cobalamin B12.

In diabetic patients' frequent urination is experienced due to osmotic effects of excessive sugar content in blood and excretion of Vit B may increase, resulting in a deficiency resulting in weakness and lethargy. Vit B12 is often valuable for diabetic peripheral neuropathy. Niacin NADPH Nicotinamide Adenine Dinucleotide Phosphate is a ubiquitous cofactor responsible for cellular energy production, beneficial for everyday functions. Biotin also is essential for the enzyme action of Pyruvate Decarboxylase involved in carbohydrate metabolic reactions.

Heart diseases and stroke is of concern in diabetic patients, so avoiding saturated fat becomes essential and should be avoided. The foods rich in saturated fat should be avoided: meat, butter, cheese, egg yolk, fast foods, and cookies. Maintaining normal weight reduces the risk of diabetes. All carbohydrates convert into sugar, so including fiber which is also carbohydrate has the added benefits. Foods with whole grains such as amaranth, buckwheat, brown rice, quinoa, pearled barley, hulled barley, whole wheat are recommended to consume as a source of complex carbohydrate. Sweetened beverages, soft drinks with excessive sugars should not be the part of the diet as it raises the blood sugar level. Most fast foods are rich in calories; therefore, it is not a wise choice for considering as a daily meal. Ideally, fruits could be used wisely as a snack with portion control, not a whole meal. Although fruits are rich in sugar and can raise blood sugar levels, they are also a source of vitamins, minerals, fibers, and antioxidants. The best solution for managing diabetes is to properly maintain a daily routine and create a pattern of food habits exercise based on the lifestyle of individuals.

Acknowledgment

None.

Conflicts of interest

Author declares there are no conflicts of interest.

Funding

There was no funding for this report.

References

1. <https://lpi.oregonstate.edu/book/export/html/45>
2. Center for Disease Control. What is Diabetes? USA: Center for Disease Control; 2020.
3. <https://www.diabetes.co.uk/diabetes-types.html>.
4. Dansinger M. What Increases My Risk of Diabetes?. USA: WebMD; 2020.
5. Diabetes prevention: 5 tips for taking control. 15 March. USA: Mayo Clinic; 2020.
6. www.healthline.com/health/diabetes-symptoms
7. www.niddk.nih.gov/health-information/diabetes/overview/insulin-medicines-treatments
8. <https://yourdiabetesinfo.org/familyhistory/>
9. <https://www.healthline.com/health/diabetes-and-pancreas>
10. Diabetic ketoacidosis. USA: Mayo Clinic; 2020.
11. <https://www.medicinenet.com/script/main/art.asp?articlekey=39840>
12. <https://www.instituteforhealingandjustice.org/section-1-racism-not-race-causes-health-disparities>
13. Food and Drug Administration (FDA). Fighting Diabetes' Deadly Impact on Minorities. USA: Food and Drug Administration (FDA); 2020.
14. <http://https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html#diabetes>
15. Parsons P. Pregnant healthcare workers weigh COVID-19 vaccine risks. USA: CBC News; 2021.
16. Types of Health Behaviors - 609 Words. USA: Bartleby; 2013.
17. American Diabetes Association Alert Month. USA: Ivinson; 2021.
18. <https://www.ivinsonhospital.org/vitals/american-diabetes-association-alert-month>
19. Fetters AK. 6 Foods That Tend to Spike Blood Sugar. USA: Everyday Health; 2020.
20. Diabetic ketoacidosis - Symptoms and causes. USA: Mayo Clinic; 2022.
21. Gastrointestinal Cancer - Mesothelioma Symptoms. 2020.
22. Aviles C. Healthy Ways to Help Prevent Type 2 Diabetes. USA: Amwell; 2015.
23. <https://www.honestdocs.id/kad-ketoacidosis-diabetik>
24. Pagoto S. The current state of lifestyle intervention implementation research: where do we go next? *Translational Behavioral Medicine*. 2011;1: 401.
25. <https://tosecretewithin.weebly.com/pancreas.html>
26. Diabetes and Family History: How Much Risk is Genetic. USA: Your Diabetes Info; 2021.
27. Pregnant healthcare workers weigh COVID-19 vaccine risks. CBC New, 2021.
28. Gastrointestinal Cancer - Mesothelioma Symptoms.
29. <https://www.mesotheliomasymptoms.com/gastrointestinal-cancer>
30. What Are Racial Health Disparities and Why Do They Exist. USA: Issuu; 2020.
31. Food and Drug Administration (FDA). Fighting Diabetes' Deadly Impact on Minorities. USA: Food and Drug Administration (FDA). FDA; 2020.