



DIABETES MELLITUS: A HISTORICAL AND MEDICAL PERSPECTIVE

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Annotation: *Diabetes mellitus is a chronic metabolic disorder characterized by insulin deficiency or resistance, leading to elevated blood glucose levels. This article explores the historical background of diabetes, its symptoms, traditional treatments, and modern medical approaches. The discussion includes insights from historical medical texts, such as those by Abu Ali ibn Sina (Avicenna), and examines contemporary research on diabetes management.*

Keywords: *Diabetes mellitus, insulin, Avicenna, metabolic disorder, hyperglycemia, traditional medicine, modern treatment.*

Introduction

Diabetes mellitus, commonly known as diabetes, is one of the oldest known diseases, with historical records dating back to ancient civilizations. The term "diabetes" originates from the Greek word meaning "to pass through," referring to excessive urination—a hallmark symptom. The disease was described in early medical texts, including those by the Persian polymath Abu Ali ibn Sina (Avicenna), who noted its association with increased thirst and weight loss.

Today, diabetes is a global health concern, affecting millions worldwide. It is classified into Type 1 (autoimmune destruction of insulin-producing cells) and Type 2 (insulin resistance). This article examines diabetes from historical, physiological, and therapeutic perspectives, comparing traditional and modern treatments.

Analysis and Discussion

Diabetes mellitus is a complex metabolic disorder with deep historical roots and significant modern medical implications. Understanding its development,



progression, and treatment requires an exploration of its pathophysiology, historical context, diagnostic methods, and therapeutic approaches. This section provides an in-depth analysis of diabetes, comparing traditional perspectives with contemporary scientific advancements.

Historical Context and Early Understanding

The earliest documented descriptions of diabetes date back to ancient civilizations. Egyptian manuscripts from 1500 BCE mention a condition causing excessive thirst and urination. Ancient Indian Ayurvedic texts referred to it as "*Madhumeha*" (honey urine), recognizing the sweet taste of diabetic urine. However, one of the most detailed historical accounts comes from the Persian polymath Abu Ali ibn Sina (Avicenna), who described diabetes in *The Canon of Medicine* (1025 AD).

Avicenna observed that diabetes led to severe dehydration and wasting of the body. He attributed the disease to an imbalance in bodily humors, particularly an excess of "heat," and recommended cooling therapies such as sour yogurt, mint infusions, and a controlled diet. His approach was rooted in the traditional medical theories of his time, yet some of his observations align with modern understandings of hyperglycemia and its effects.

Pathophysiology: How Diabetes Develops

Diabetes mellitus is primarily characterized by chronic hyperglycemia (elevated blood sugar) due to defects in insulin secretion, insulin action, or both. The disease manifests in several forms, with the most common being Type 1 and Type 2 diabetes.

Type 1 Diabetes: Autoimmune Destruction of Beta Cells

Type 1 diabetes (T1D) results from an autoimmune attack on pancreatic β -cells, which produce insulin. Genetic predisposition and environmental triggers (such as viral infections) contribute to this condition. Without insulin, glucose cannot enter cells, leading to high blood sugar levels. Patients require lifelong insulin therapy to survive.

Type 2 Diabetes: Insulin Resistance and Beta-Cell Dysfunction



Type 2 diabetes (T2D) is more prevalent and is strongly linked to obesity, sedentary lifestyles, and genetic factors. In this form, the body becomes resistant to insulin, and the pancreas gradually loses its ability to produce sufficient insulin. Unlike T1D, T2D can often be managed with lifestyle changes, oral medications, and, in advanced cases, insulin.

Other Forms of Diabetes

- **Gestational diabetes** occurs during pregnancy due to hormonal changes that induce insulin resistance.
- **Monogenic diabetes** (e.g., MODY) is caused by single-gene mutations affecting insulin production.
- **Secondary diabetes** results from other conditions (e.g., pancreatitis, Cushing's syndrome).

Symptoms and Clinical Presentation

The classic symptoms of diabetes stem from hyperglycemia and its metabolic consequences:

- **Polyuria (excessive urination):** High blood glucose spills into urine, drawing water with it.
- **Polydipsia (excessive thirst):** Dehydration from frequent urination triggers intense thirst.
- **Polyphagia (increased hunger):** Cells starved of glucose signal the brain to eat more.
- **Unexplained weight loss:** Without insulin, the body breaks down fat and muscle for energy.
- **Fatigue and weakness:** Cells cannot efficiently use glucose for energy.
- **Blurred vision:** High glucose levels cause osmotic changes in the eye lenses.

If untreated, diabetes leads to severe complications, including neuropathy (nerve damage), nephropathy (kidney disease), retinopathy (vision loss), and cardiovascular diseases.

Diagnostic Methods



Modern medicine uses several tests to diagnose diabetes:

- **Fasting Plasma Glucose (FPG):** Measures blood sugar after an 8-hour fast.
- **Oral Glucose Tolerance Test (OGTT):** Assesses blood sugar before and after consuming a glucose solution.
- **Hemoglobin A1c (HbA1c):** Reflects average blood glucose levels over 2-3 months.
- **Random Blood Glucose Test:** Used in symptomatic patients.

Diagnostic thresholds are set by organizations like the American Diabetes Association (ADA) and the World Health Organization (WHO).

Traditional vs. Modern Treatment Approaches

Traditional Medicine: Insights from Avicenna and Herbal Remedies

Historically, diabetes was managed with dietary modifications and herbal treatments. Avicenna recommended:

- **Cooling foods and drinks** (sour yogurt, mint tea) to counteract "excess heat."
- **Bitter herbs** to reduce sugar levels.
- **Physical activity** to balance bodily humors.

Some traditional remedies, such as bitter melon, fenugreek, and cinnamon, have been studied for their potential hypoglycemic effects. While not a substitute for modern medicine, they may offer complementary benefits.

Modern Medical Treatments

Current diabetes management includes:

- **Insulin therapy** (for Type 1 and advanced Type 2 diabetes).
- **Oral hypoglycemics** (e.g., metformin, sulfonylureas, SGLT2 inhibitors).
- **GLP-1 receptor agonists** (improve insulin secretion and suppress appetite).
- **Lifestyle interventions** (low-carb diets, regular exercise, weight management).



Technological advancements, such as continuous glucose monitors (CGMs) and insulin pumps, have revolutionized diabetes care.

Genetic and Environmental Risk Factors

Diabetes arises from a combination of genetic susceptibility and environmental influences:

- **Family history** increases risk, particularly for Type 2 diabetes.
- **Obesity and sedentary lifestyle** are major contributors to insulin resistance.
- **Poor diet** (high sugar, processed foods) accelerates metabolic dysfunction.
- **Age and ethnicity** (higher prevalence in African, Hispanic, and South Asian populations).

Emerging Research and Future Directions

Scientists are exploring:

- **Stem cell therapy** to regenerate insulin-producing cells.
- **Artificial pancreas systems** for automated insulin delivery.
- **Gene editing (CRISPR)** to correct genetic defects in monogenic diabetes.
- **Microbiome studies** investigating gut bacteria's role in glucose metabolism.

Conclusion

Diabetes mellitus remains a significant global health challenge, with deep historical roots and evolving treatment strategies. While traditional medicine, as described by Avicenna, emphasized dietary and cooling therapies, modern medicine relies on insulin, pharmacotherapy, and lifestyle interventions. Further research is needed to explore integrative approaches combining traditional knowledge with scientific advancements for better diabetes management.

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