



WHAT IS DIABETES MELLITUS?

Diabetes mellitus, commonly known as diabetes, is a medical problem that affects how your body uses sugar. Your body's cells need sugar to work normally and a hormone called insulin helps get sugar into the cells. In diabetes, a person either does not make enough insulin or can't use the insulin they have. Because of this, diabetes causes high blood sugar, which can damage blood vessels, organs, and nerves over time.

WHAT KINDS OF DIABETES MELLITUS (DM) ARE THERE:

There are 3 main types of diabetes:

Type 1 Diabetes: This happens when the body cannot make insulin. People with type 1 diabetes need insulin and are treated with either insulin injections or an insulin pump. Type 1 DM is the most common form of diabetes in children and is typically diagnosed at a young age.

Type 2 Diabetes: This happens because of a problem called insulin resistance, where the cells do not use the insulin they have very well. People are treated with a combination of diet, exercise and sometimes pills or injections. This form of DM usually happens in adults and older children and can be linked to being overweight.

Type 3: Gestational Diabetes: This type of DM happens during pregnancy and needs careful treatment to protect the mother and the baby.

HOW IS DIABETES MELLITUS DIAGNOSED?

Diabetes may have symptoms in some people, and no symptoms in others. Generally, people with Type 1 DM are very thirsty (polydipsia), pee a lot (polyuria), and have weight loss. Symptoms may show up over weeks to months. If untreated, this problem may cause a person to become very ill, a condition called diabetic ketoacidosis. People with Type 2 DM may have no symptoms or they may have polydipsia and polyuria.

Diabetes is often diagnosed by a blood test to measure the amount of sugar (glucose) in the blood. Hemoglobin A1c, another blood test, gives information about average blood sugar over the past 3 months. Your doctor can help you figure out if you have diabetes.



HOW DOES DIABETES MELLITUS AFFECT THE BODY?

Having diabetes can lead to heart problems, strokes, and problems with blood vessels in the body. Damage to small blood vessels (capillaries) can affect the eyes, kidneys and nerves.

HOW CAN DIABETES MELLITUS AFFECT THE EYES?

1. **Blurred vision**- If a person's blood sugar is very high, the lens within the eye can swell and temporarily cause blurred vision. This type of blurred vision will usually get better after the blood sugar comes back to normal.
2. **Retinopathy**- Diabetes may cause blood vessels in the retina (the layer lining the inside of the back of the eye) to become leaky, blocked, or grow abnormally [Figure 1]. This is called diabetic retinopathy (DR). The longer you have diabetes, the more likely you are to get more severe DR, called proliferative diabetic retinopathy. Severe DR can cause permanent vision loss when untreated. Regular eye exams can help catch DR in the early, nonproliferative stages. In early forms of DR, called nonproliferative diabetic retinopathy, good blood sugar control can sometimes help. In more severe disease, injections and lasers are sometimes needed. All people with diabetes are at risk for developing retinopathy, but the risk is higher for those with worse blood sugar control and longer disease duration.
3. **Cataract**- A cataract is when the lens of the eye gets cloudy. It usually happens in older people but can occur at a younger age in people with diabetes. Surgery may be needed if it causes very blurry vision.
4. **Glaucoma**– Glaucoma is a condition where the optic nerve due to high eye pressure, and it can lead to vision loss. People with diabetes are more likely to get glaucoma compared to others.
5. **Strabismus from Cranial Nerve Palsies** - Sometimes diabetes can damage the nerves control eye movements, leading to eyes not tracking together and double vision.



Fig. 1: Retinopathy may cause blood vessels in the retina to become damaged or grow abnormally.

HOW OFTEN SHOULD I HAVE MY EYES CHECKED IF I HAVE DIABETES?

For people with type 2 DM, the first eye exam is recommended at the time of diagnosis. For those with type 1 DM who are older than 9 years, the first eye exam is recommended 3-5 years after diagnosis. Follow-up eye exams are based on what is seen on the first exam. As people get older and the duration of the DM gets longer, eye exams are recommended each year. The goal of regular eye exams is to catch problems early and treat patients before they lose vision.

WHAT SHOULD I EXPECT DURING THE EYE EXAM?

The eyes will be dilated during the eye exam. Eye drops are placed to make the pupils (dark spot in the center of the colored part of the eye) larger in order to see the retina and look for DR. Your doctor may take pictures of the retina as well to help look for DR.

WHAT ARE THE RISK FACTORS FOR EYE DISEASE IN DM?

- **Disease duration:** The longer a person has diabetes the higher the risk for diabetic complications of the eye, particularly diabetic retinopathy. Most people do not get diabetic retinopathy before 8-10 years from time of diagnosis.
- **Age:** Older people with DM have a higher risk of eye problems due to having DM for a longer amount of time. Children younger than 10 years old rarely get significant eye problems from diabetes.
- **Puberty:** Hormonal changes in puberty can cause higher blood sugars and may increase the risk of diabetic eye problems.



- **Pregnancy:** Being pregnant can increase a person's risk of developing diabetic eye problems due to changes in the body during pregnancy.

Some risk factors can be lessened with the following: monitoring blood sugar, good blood sugar control, quitting smoking, and losing weight when recommended by your doctor. Other risk factors cannot be changed including age, how long disease has been present, puberty and pregnancy.

HOW IS DIABETES MELLITUS TREATED?

Diabetes mellitus is a chronic problem that has no known cure but can be managed. The goal of treatment is to keep blood sugar levels as close to normal as possible. This is done with regular blood sugar checks, a healthy diet, exercise, and sometimes insulin or pill or liquid medicine. People with type 1 diabetes may need to stay in the hospital right after they are diagnosed to get their blood sugar levels controlled, especially if they have diabetic ketoacidosis.

HOW IMPORTANT IS IT TO CONTROL BLOOD SUGAR LEVELS?

Controlling blood sugar is extremely important in managing diabetes and all of its complications. Studies show that good control of blood sugar decreases the risk of complications from diabetes. Patients with better blood sugar control have lower rates of eye disease, kidney disease, and nerve disease. It is important to check blood sugar regularly and work closely with the doctor who treats the diabetes to set a goal for hemoglobin A1C and blood sugar.

WHERE CAN I FIND MORE INFORMATION ABOUT DIABETES IN CHILDREN?

- [Juvenile Diabetes Research Foundation https://www.jdrf.org](https://www.jdrf.org)
- American Diabetes Association <https://www.diabetes.org/diabetes>
- Endocrine Society <https://www.endocrine.org/topics/diabetes>
- Beyond Type 1 <https://beyondtype1.org/>
- [American Academy of Pediatrics policy statement](#): Eye examination in infants, children, and young adults by pediatricians
- EyeWiki - https://eyewiki.org/Diabetic_Retinopathy

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