THE PRAKASAM DISTRICT DIABETES PREVENTION PROGRAM

Booklet on Diabetes

Supported by World Diabetes Foundation

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Why is sugar important for our body, how sugar is produced?

- Insulin is a natural protein hormone made by the pancreas that controls the level of the sugar (glucose) in the blood.
- When the food is consumed, it gets digested and broken down into glucose which is the main source of energy for all body functions.
- Cells in our body cannot utilize glucose without insulin.
- When the body cannot make enough insulin, insulin is taken by injection or through an insulin pump.

What should be the blood sugar level in our body?

- Blood sugar level (also known as blood glucose level) is the amount of glucose (sugar) in the blood.
- Glucose, transported via the bloodstream, is the primary source of energy for the body's cells.
- Normally, blood sugar levels stay within narrow limits throughout the day (4 to 8mmol/l). But they are higher after meals and usually lowest in the morning. If a person has diabetes, their blood sugar levels sometimes move outside these limits.
- Even with good control of diabetes, the blood sugar level will still at times drift outside this normal range.
- Our body has to desire blood glucose to be maintained between 70 mg/dl and 110 mg/dl (mg/dl means milligrams of glucose in 100 milliliters of blood). Below 70 is termed "hypoglycemia". Above 110 can be normal if you have eaten within 2 to 3 hours. That is why your doctor wants to measure your blood glucose while you are fasting...it should be between 70 and 110. Even after you have eaten, however, your glucose should be below 180. Above 180 is termed "hyperglycemia" (which translates to mean "too much glucose in the blood"). If you have two blood sugar measurements above 200 after drinking a sugar-water drink (glucose tolerance test), then you are diagnosed with diabetes.
Why control blood sugar levels?
When the blood sugar levels fluctuates very often and if its very high level of blood glucose are present for years, it leads to damage of the small blood vessels, which increases a diabetic's risk of developing late-stage diabetes complications like eye disease, kidney disease, nerve disease and cardiovascular diseases, such as heart attack, hypertension, heart failure, stroke and problems caused by poor circulation. Keeping the blood sugar levels stable significantly reduces the risk of these complications.

Diabetes
Diabetes is a disorder in which the body is not able to properly control the amount of sugar in the blood. As a result, the level of sugar in the blood is too high. This disease occurs when the body does not produce enough insulin or does not use it properly.
Types of diabetes
There are three major types of diabetes.
1. Insulin dependent diabetes (Type I)
2. Non-insulin dependent diabetes (Type II)
3. Gestational diabetes

Type 1 - Insulin dependent diabetes.
1. People with this type of diabetes make little or no insulin in their body, and need regular insulin injections for survival and management of diabetes. It usually starts in childhood, but can occur at any age.

Type 2 - Non-insulin dependent diabetes.
1. This is the most common form of diabetes, and is strongly associated with genetic tendency and obesity.
2. The body produces normal or even high levels of insulin, but certain factors make its utilization ineffective ("insulin resistance").
3. Sedentary lifestyle, unhealthy dietary patterns, and the consequent obesity are common causes.
4. It usually starts in adulthood, but is beginning to be seen in obese adolescents also.
5. In subjects with this type of diabetes, diet, exercise or oral antidiabetic drugs may be enough to control the raised blood sugar, however, insulin maybe required in some cases.

Gestational diabetes mellitus or pregnancy-induced diabetes:
1. Diabetes developed during pregnancy is described as gestational diabetes.
2. Gestational diabetes increases the diabetes-related complication during pregnancy, and also subsequent development of diabetes after the delivery.
3. Pregnant women who have family history of diabetes or bad obstetric history should be screened for gestational diabetes.
Sings and symptoms:
If any of the following symptoms exist, it's better to check the diabetic status of the individual

**Frequent urination:** People with diabetes will go for passing urine more frequently

**Increased thirst:** If a person feels more thirsty and wants to keep drinking more water (beyond what was the usual pattern for the person)

**Increased appetite:** Diabetic persons may feel more hungry and consume more snacks

**Tingling or numbness in hands and feet:** Diabetic people will feel too much of tiredness and some may feel numbness in their feet and hands.

**Excessive fatigue:** Feeling tired

**Sudden changes in vision:** If there is a sudden change in the vision such as dimness, blurred and black spots on the images seen

**Non-healing of wounds:** Any wound takes longer time to heal or not healing for long time

**Risk factors for Diabetes:**
- A family history of diabetes
- Overweight / Obese
- Not physically active on a regular basis
- 40 years of age or older
- Women who have had Diabetes during pregnancy are at a greater risk for developing Type 2 Diabetes later in life.
Diagnosis and treatment available:

1. Different kinds of test:
Urine glucose estimation can be done by uristicks. This is very simple procedure as dip the uristick in the midstream urine for 30 seconds. Indicator is color. If the color changes, we can estimate as it at abnormal glucose levels. It can be done randomly as well as fasting and posting.

Blood glucose estimation test:
Blood glucose estimation is the confirmatory test and regular testing is essential to monitor how the blood glucose level is controlled?

When to test the blood glucose?
- **Fasting blood glucose:** In this test, a person is asked to fast overnight, at least 8 hours, and the level of glucose in the blood is then checked.
- **Post prandial (PP) blood glucose:** This is tested two hours after having a meal. It serves as a challenge for the body to regulate the blood sugar after a meal.
- **Random blood sugar or glucose test:** is done at any time.

Treatment available:
1. Managing blood glucose levels should be planned with a qualified health care team.
2. The main goal is to keep blood-sugar levels with in a normal range.
3. Treatment requires attention to weight control, exercise and diet.
4. Oral drugs and/or insulin
5. Do not change or start medications without medical advice

Is there a cure of diabetes?
Diabetic is a chronic condition that has no cure. However, complications of diabetes can be prevented
Prevention and control of diabetes:

**Controllable:** It can be controlled and prevented through the following changes in life style and good health promoting methods.

1. Regular physical exercises including Yoga
2. Proper diet with advice of the doctor
3. Regular medical check ups and compliance with medications
4. Reduce stress –meditation
5. Reduce/stop alcohol consumption
6. Reduce/stop smoking

**Consequences:**
1. Cardiac diseases
2. Kidney failure
3. Eye
4. Neuropathy
5. Brain stroke
2. Brain

3. Central nervous system.
Diabetes and Eye:

Diabetes is recognized as a cause for blindness in India. Diabetes causes changes in all the organs of the body but mainly affects the Retina in eye, nervous system, the Kidneys and blood vessels.

Are you aware?

- Diabetic are twice as likely to develop eye problem than non-diabetics.
- The most common eye complications in diabetes are diabetic retinopathy.
- Most of the diabetic persons develop some degree of diabetic eye disease.
- The risk of blindness is 25 times higher in diabetics.
- Early detection and timely treatment of diabetic eye diseases significantly reduce risk of vision loss.
- Diabetic retinopathy is often occurs with no symptoms in the early stages. Only eye doctor can detect early sings of diabetic retinopathy, all diabetics should have their eye examined at least once a year.
- Laser treatment is very successful in treating diabetic retinopathy.
- Vision lost due to diabetes cannot be restored. Treatment is done to reduce further vision loss.
**Eye:** It is the part of the body that helps us see

**Eyeball:** The eyeball measuring 2.5 cm in diameter and a normal adult eyeball is almost spherical and its volume is about 7m.

**Eyelids:** the upper and lower eyelids also project and shield the eye.

**Conjunctiva:** Conjunctiva overlies the sclera and the inner surface of the eyelids.

**Cornea:** it is clear and transparent “window” at the front of the eye through which iris and pupil is visible.

**Iris and pupil:** the colored part of the eye is called the iris. The round opening in the center of the iris is called the pupil. It controls light entering the eye.

**Lens:** The lens is crystalline clear part of the eye that directs and focuses light on the retina

**Retina:** This is the portion within the eye that receives light rays and transmits them to the brain through the optic nerve

**Common eye disorders:**
There are certain common eye disorders are cataract, refractive error, glaucoma, night blindness and squint
**Cataract:** a cataract is the clouding of the transparent lens due to ageing, which is located inside the eye. Cataract leads to blindness, which is treatable.

**Treatment:**
The only treatment for cataract is surgery, where the clouded lens is removed and replaced by an artificial lens. Glasses may also be prescribed.

**Refractive error:** Refractive error are the disorder of the eye, they are not eye diseases.

**Symptom:** A person who has a refractive error may complain of
1. Difficult seeing up close
2. Difficulty in reading
3. Blurred vision
4. Eye fatigue
5. headache

**Treatment:** Spectacles, contact lenses or refractive surgery

**Glaucoma:**
Glaucoma is one of the major causes of blindness in India. Glaucoma is a disease affecting the optic nerve of the eye. It is can occur at all ages.
Symptoms in adults:
Loss of peripheral vision: this is often not noticed until considerable damage has occurred.
Blurred and defect vision
Pain and redness of the eye.

Symptoms in infants and children’s:
Redness and watering and enlargement of the eyes.

Treatment:
1. Glaucoma is chronic disease. It cannot be cured but medication helps in slowing progress of the disease.
Early detection, proper management, and frequent follow-ups can prevent blindness due to glaucoma.

Night blindness:
Vitamin A deficiency is a serious health problem in India. Diseases due to vitamin A deficiency include night blindness and bitot spots.

Symptoms:
Night blindness: The first symptom of night blindness is inability to see after dark or in a dark room.
Bitot spots: They often occur in association with night blindness. Bitot’s spots differ in size, location and shape but they have a similar appearance.

**Treatment:**

1. Vitamin A deficiency can be prevented in children by giving Vitamin A supplements and Vitamin A rich food.
2. Eat vitamin A rich diet, such as dark green leafy, vegetables, yellow vegetables, fruits like carrots, pumpkin, sweet potato, papaya and mango.
3. Between the age of four to six months, the child should be introduced to semisolid foods rich in vitamin A, such as dark green leafy vegetables, yellow vegetables and fruits.
4. Consumption of food rich in vitamin A is essential during pregnancy.
5. Colustrum and breast milk are rich in Vitamin A.

**Squint:**

Squint is a condition in which the eyes are not properly aligned. The condition is usually present in birth but can occur later in life also.

**Symptoms:**

Both the eyes point in different directions. One eye may focus straight ahead while the other may turn inward, outward, upward or downward.
Treatment:
Early treatment can help and save the child vision. Glasses, medication or surgery may be required. If treatment is delayed, the child may lose vision in the eye.

Immunization:
Immunization is a process that protects against the development of certain diseases in future. This protection can be achieved by vaccination. Vaccinating children as per schedule will help protect children from getting these diseases in future. Contact your nearest Primary Health Center or Village Health Nurse for more details on immunization.

Immunization schedule:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Age</th>
<th>Type of vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At birth</td>
<td>BCG and oral polio</td>
</tr>
<tr>
<td>2</td>
<td>At 6 weeks</td>
<td>DPT1 and OPV</td>
</tr>
<tr>
<td>3</td>
<td>At 10 weeks</td>
<td>DPT2 and OPV</td>
</tr>
<tr>
<td>4</td>
<td>At 14 weeks</td>
<td>DPT3 and OPV</td>
</tr>
<tr>
<td>5</td>
<td>At 9 months</td>
<td>Measles</td>
</tr>
<tr>
<td>6</td>
<td>At 16 – 24 months</td>
<td>DPT and OPV</td>
</tr>
<tr>
<td>7</td>
<td>At 5 – 6 years</td>
<td>DT</td>
</tr>
<tr>
<td>8</td>
<td>At 10 and at 16 years</td>
<td>TT</td>
</tr>
<tr>
<td>9</td>
<td>For pregnant woman Early in pregnancy</td>
<td>TT1</td>
</tr>
<tr>
<td></td>
<td>One month after TT1</td>
<td>TT2</td>
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