Name of student: …… **Stage: First**

Lecture Name: Glucometer (Glucose Meter) **Number: 1**

Date: 10 / 3/ 2025 . 8:30 AM **Place: BC 208**

Glucometer (Glucose Meter)

A blood glucose test measures the glucose levels in your blood. Glucose is a type of sugar. It is your body's main source of energy. A hormone called insulin helps move glucose from your bloodstream into your cells. Too much or too little glucose in the blood can be a sign of a serious medical condition. High blood glucose levels (hyperglycemia) may be a sign of diabetes, a disorder that can cause heart disease, blindness, kidney failure and other complications. Low blood glucose levels (hypoglycemia) can also lead to major health problems, including brain damage, if not treated.

Importance of Glucose in the Body

Glucose is essential for **cellular respiration** and **serves as a primary energy source for cells through both aerobic and anaerobic respiration.** It **plays a vital role in various metabolic functions of the body.** Therefore, blood glucose levels must be monitored regularly.

A glucose meter (also called a glucometer or HBGM – Home Blood Glucose Meter) is a medical device used to measure the approximate concentration of glucose in the blood. It is a key component of home blood glucose monitoring (HBGM) for individuals with Diabetes Mellitus or **Hypoglycemia**.

Working Principle of a Glucometer

A small drop of blood is obtained by pricking the skin using a lancet. This drop is placed on a disposable test strip, which the meter reads to calculate the blood glucose level. The meter then displays the level in mg/dL or mmol/L.

Types of Diabetes

1. Type 1 Diabetes

- **Caused by an autoimmune reaction, where the body's immune system attacks insulin-producing beta cells in the pancreas.**
- **The body is unable to produce insulin, leading to a dependence on insulin injections.**

2. Type 2 Diabetes

- **The body produces insulin**, but either it is **insufficient or the body does not respond properly to it (insulin resistance).**
- **This results in a build-up of glucose in the blood.**

3. Gestational Diabetes

- Occurs in **pregnant women** due to **insulin resistance, leading to high blood glucose levels.**

How to Measure Blood Glucose Levels

Glucose Meter Kit Includes:

✓ **Glucose meter**

✓ **Test strips**

✓ **Lancet or lancing device**

✓ **Alcohol wipes**

Before You Start:

Set the date and time on the meter if necessary.

Wash and dry your hands thoroughly with warm water.

Step 1: Obtain a Blood Sample

✓ **Use the lancing device with a new lancet to get a drop of blood from your fingertip, you may need to squeeze your finger to produce more blood or pick different finger if cannot get enough blood.**

✓ **Some people find it easier to prick the side of the fingertip rather than the top, makes it easier to apply the blood to the test strip.**

Step 2: Apply Blood to the Test Strip

✓ Insert the test strip into the meter.

✓ Wait for the blood drop symbol to appear on the screen.

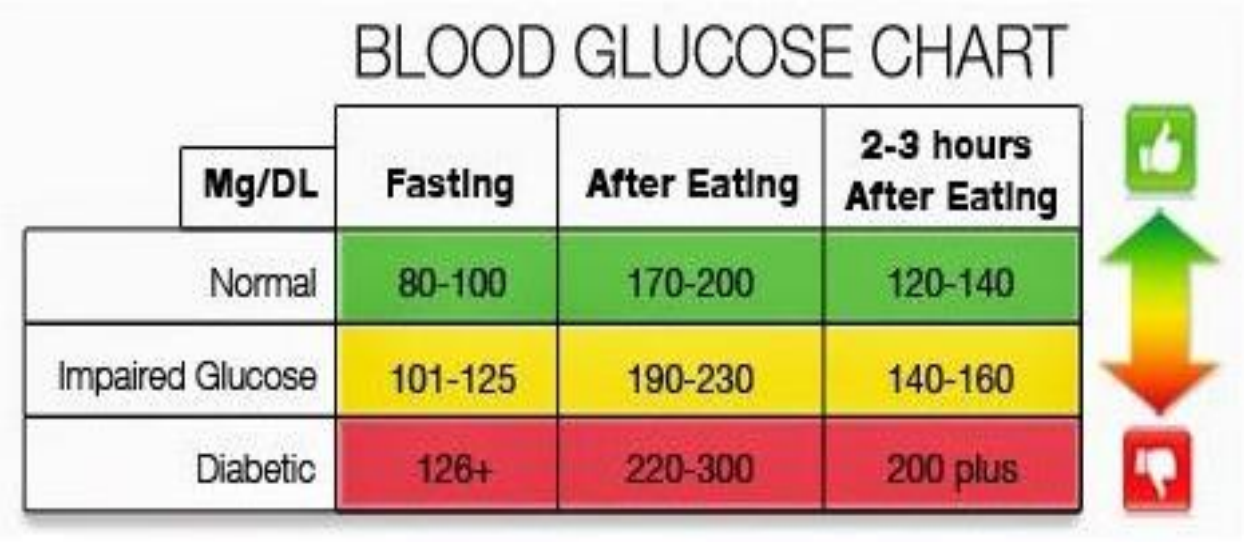
✓ Touch and hold the drop of blood to the narrow channel on the strip's edge.

✓ Ensure that the strip is completely filled for an accurate reading.

✓ If the sample is insufficient, add more blood within 5 seconds **or start with a new strip.**

Step 3: Read the Result

✓ The meter will count down and display the blood glucose level in approximately 40 seconds.



For a blood glucose test, you must fast for 8 to 12 hours **before the test, meaning you should not eat or drink anything except water. This fasting**

helps ensure accurate results. If the glucose test is part of a Comprehensive Metabolic Panel (CMP) or Basic Metabolic Panel (BMP), fasting may also be required.

Common Causes of Errors in Glucose Meter Readings

1. Improper Test Strip Handling

- **Cause:** Using expired or damaged test strips, exposing them to moisture or heat.
- **Fix:** Always use fresh, unexpired test strips stored in a dry, cool place.

2. Insufficient Blood Sample

- **Cause:** Not applying enough blood to the test strip.
- **Fix:** Make sure to apply an adequate blood drop as per the device's requirement.

3. Dirty or Wet Hands

- **Cause:** Residue from food, lotions, or wet fingers can alter readings.
- **Fix:** Wash and dry your hands thoroughly before testing.

4. Incorrect Calibration

- **Cause:** Some glucometers require coding for specific test strips, and incorrect coding can cause errors.
- **Fix:** If your device requires coding, double-check the code on the meter matches the strip bottle.

5. Low Battery or Device Malfunction

- **Cause:** A weak battery or device issues can cause inaccurate readings.
- **Fix:** Replace the battery or reset the device if necessary.

maintenance and care tips:

1. Cleaning

- **Wipe the glucometer** regularly with a soft, dry cloth or alcohol swab (avoid excessive moisture).
- **Clean the test strip port** gently if needed, using a dry cotton swab.
- **Wash hands** before testing to prevent contamination that could affect readings.

2. Storage and Handling:

- Keep the glucometer in a **cool, dry place** (avoid extreme heat or cold).
- Store **test strips in their original container**, tightly sealed to prevent exposure to air and humidity.
- Avoid dropping the device or exposing it to water.

3. Test Strip Care:

- Do **not reuse test strips**—each strip is for **one-time use only**.
- Check the **expiration date** before using a strip; expired strips may give incorrect readings.
- Keep strips away from moisture and direct sunlight.

4. Battery & Calibration:

- Replace batteries as needed to avoid interruptions.
- Some meters require **calibration** with control solution or coding for new test strips follow the manufacturer's instructions.

5. Regular Accuracy Checks:

- Compare readings with a **lab test** occasionally to ensure accuracy.
- Use a **control solution** (available from the manufacturer) to check if the meter is working correctly.