**Group 1**

**Topic: Complications Of Diabetes**

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**Definition And Types Of Diabetes**

**Definition:** Diabetes mellitus can be define as an endocrine disorder in which there is deficiency/lack of insulin production leading to disorders of CHO, fats and proteins. It is characterised by hyperglycaemia, degenerative vascular changes and neuropathy. Its risk factors include; family history, obesity, race (African and Asians), age (45), hypertension, history of gestational diabetes.

**Types;**

1. **Type 1- insulin-dependent diabetes mellitus (IDDM)** with beta cell destruction or defect in function:

• Immune mediated- presence of islet cell or insulin antibodies that identify the autoimmune process leading to beta cell destruction

• Sometimes- Idiopathic

• Regardless of the specific cause, beta cells destruction causes decrease insulin production, unchecked glucose production by the liver, and fasting hyperglycemia

• Glucose from food cannot be stored in the liver instead remains in the blood stream causing hyperglycemia

2. **Type 2- non-insulin dependent DM (NIDDM),** insulin resistance with relative insulin deficiency, Common among people of 30 years and above and obese.

2 main problems related to type 2 DM- insulin resistance and impaired insulin secretion

• Insulin resistance- decrease tissue sensitivity to insulin, normally insulin binds to special receptors on cell surfaces and initiates a series of reactions involved in glucose metabolism.

3. **Gestational (GDM)-** Is any degree of glucose intolerance with the onset during pregnancy

Hyperglycemia occurs in pregnancy- secretion of placental hormones which causes insulin resistance

• **At risk clients-** obesity, personal history of GDM, glycosuria, family history- check blood glucose during the 1st ANC visit, if negative recheck between 24-28 weeks

**Short Term Complication Of Diabetes**

**Hypoglycemia:** Diabetic hypoglycemia occurs when someone with diabetes doesn't have enough sugar (glucose) in his or her blood. Glucose is the main source of fuel for the body and brain, so you can't function well if you don't have enough.

Low blood sugar (hypoglycemia) is defined as a blood sugar level below 70 milligrams per deciliter (mg/dL), or 3.9 millimoles per liter (mmol/L).

**Pay attention to the early warning signs of hypoglycemia,** and treat low blood sugar promptly. You can raise your blood sugar quickly by eating or drinking a simple sugar source, such as glucose tablets or fruit juice

Symptoms

• Shakiness

• Dizziness

• Sweating

• Hunger

• Fast heartbeat

• Inability to concentrate

• Confusion

• Irritability or moodiness

• Anxiety or nervousness

• Headache

**Excessive thirst and increased urination:** They are common diabetes signs and symptoms. When you have diabetes, excess glucose — a type of sugar — builds up in your blood. Your kidneys are forced to work overtime to filter and absorb the excess glucose.

When your kidneys can't keep up, the excess glucose is excreted into your urine, dragging along fluids from your tissues, which makes you dehydrated. This will usually leave you feeling thirsty. As you drink more fluids to quench your thirst, you'll urinate even more.

**Fatigue and weakness:** Fatigue and tiredness are not the same. When a person is tired, they usually feel better after resting. When a person has persistent fatigue, rest may not relieve feelings of exhaustion and lethargy.

Hyperosmolar hyperglycemia non ketonic syndrome:

Periods of illness can significantly raise blood glucose levels, which could lead to Hyperosmolar Hyperglycaemic State (HHS) if medication is not sufficient to lower sugar levels.

Having blood glucose levels above 33 mmol/l (600 mg/dl) for extended periods of time presents a risk of HHS occurring.

Some serious complications of diabetes, such as Hyperosmolar Hyperglycemic Non ketonic Syndrome (HHNS), usually manifest themselves amongst older people, who may be less aware of high blood glucose levels and how to treat them.

**Polyuria:** Polyuria is usually the result of drinking excessive amounts of fluids (polydipsia), particularly water and fluids that contain caffeine or alcohol.

It is also one of the major signs of diabetes mellitus. When the kidneys filter blood to make urine, they reabsorb all of the sugar, returning it to the bloodstream.

In diabetes, the level of sugar in the blood is abnormally high. Not all of the sugar can be reabsorbed and some of this excess glucose from the blood ends up in the urine where it draws more water.

This results in unusually large volumes of urine.

**BEDWETTING IN CHILDREN:**

Having high blood glucose levels can cause the body to excrete excess glucose via the urine. In this instance, more sugar appears in the urine and simulates extra volumes of urine to be produced.

If you regularly have high blood glucose levels, you may increase the risk of picking up a urinary tract infection which can also increase the need to urinate through the night.

**WEIGHT LOSS:** In people with diabetes, insufficient insulin prevents the body from getting glucose from the blood into the body’s cells to use as energy. When this occurs, the body starts burning fat and muscle for energy, causing a reduction in overall body weight.

**Long Term Complications Of Diabetes**

1. **Diabetic Retinopathy :**Diabetic retinopathy is a condition that may occur in people who have diabetes. It causes progressive damage to the retina, the light-sensitive lining at the back of the eye. Diabetic retinopathy is a serious sight-threatening complication of diabetes.

**Symptoms:** You might not have symptoms in the early stages of diabetic retinopathy. As the condition progresses, diabetic retinopathy symptoms may include:

* Spots or dark strings floating in your vision (floaters)
* Blurred vision
* Fluctuating vision
* Impaired color vision
* Dark or empty areas in your vision
* Vision loss
* Diabetic retinopathy usually affects both eyes.

**Pathophysiology:**Diabetic retinopathy results from the damage diabetes causes to the small blood vessels located in the retina. These damaged blood vessels can cause vision loss:

Fluid can leak into the macula, the area of the retina responsible for clear central vision. Although small, the macula is the part of the retina that allows us to see colors and fine detail. The fluid causes the macula to swell, resulting in blurred vision.

In an attempt to improve blood circulation in the retina, new blood vessels may form on its surface. These fragile, abnormal blood vessels can leak blood into the back of the eye and block vision.

**Treatment:** Treatment for diabetic retinopathy depends on the stage of the disease. The goal of any treatment is to slow or stop the progression of the disease.

1. **Diabetic Nepropathy:** Diabetic nephropathy(DN), also known as diabetic kidney disease, is the chronic loss of kidney function occurring in those with diabetes characterized by the following:

* Persistent albuminuria (>300 mg/d or >200 μg/min) that is confirmed on at least 2 occasions 3-6 months apart
* Progressive decline in the glomerular filtration rate (GFR)
* Elevated arterial blood pressure

**Stages:** stages of kidney disease, depending on the GFR, which also represents the percentage of effective kidney function. **Stage 1:** Kidney damage present but normal kidney function and a GFR of 90% or above.

**Stage 2:** Kidney damage with some loss of function and a GFR of 60–89%.

**Stage 3:** Mild to severe loss of function and a GFR of 30–59%.

**Stage 4:** Severe loss of function and GFR of 15–29%.

**Stage 5:** Kidney failure and a GFR of under 15%.

**Symptoms:** A person with stage 4 or 5 nephropathy may notice symptoms such as dark urine.

In the early stages, a person may not notice any symptoms. At stage 4 or 5, they may feel unwell and experience the following symptoms:

* swollen ankles, feet, lower legs, or hands due to water retention
* darker urine due to blood in the urine
* shortness of breath
* fatigue due to lack of oxygen in the blood
* nausea or vomiting
* a metallic taste in the mouth
* Complications of late-stage kidney disease include cardiovascular disease.

**Treatment:**

Early treatment can delay or prevent the onset of diabetic nephropathy.

1. **Diabetic neuropathy:** Diabetic neuropathy is nerve damage that is caused by diabetes. Over time, high blood glucose levels, also called blood sugar, and high levels of fats, such as triglycerides, in the blood from diabetes can damage the nerves. Symptoms depend on which type of diabetic neuropathy a patient has.

* Peripheral Neuropathy: is a type of nerve damage that typically affects the feet and legs and sometimes affects the hands and arms. This type of neuropathy is very common.
* Autonomic Neuropathy: is damage to nerves that control internal organs, leading to problems with heart rate and blood pressure, digestive system, bladder, sex organs, sweat glands, and eyes.
* Focal Neuropathies: are conditions in which typically leads to damage to single nerves, most often in the hand, head, torso, or leg. The most common types of focal neuropathy are entrapment syndromes, such as carpal tunnel syndrome. Other types of focal neuropathy are much less common.
* Proximal Neuropathy: Proximal neuropathy is a rare and disabling type of nerve damage inthe hip, buttock, or thigh. The damage typically affects one side of the body and may rarely spread to the other side. Symptoms gradually improve over a period of months or years.

**Treatment:** Diabetic neuropathy has no known cure. The goals of treatment are to:

* Slow progression of the disease
* Relieve pain
* Manage complications and restore function
* Pain-relieving prescription treatments

1. **Heart and Blood Vessel Disease:** People with diabetes have a higher risk of developing certain cardiovascular diseases, including heart attack (caused by a blockage of the blood vessels supplying blood to the heart); stroke (caused by a blockage of the blood vessels supplying the brain); and blockage of blood vessels in the legs and feet, which can lead to foot ulcers, infections, and even loss of a toe, foot, or lower leg.

Blood sugar problems probably play a role in these problems, although the connection to cardiovascular disease isn’t as clear as it is for some of the eye, kidney, and nerve complications of diabetes. It is known, though, that whether a person has diabetes or not, the risk for these problems is greater if someone smokes, is obese, or has abnormal levels of blood lipids (triglycerides or cholesterol), hypertension, or a family history of heart attack or stroke before age 50.

**Complications Of Gestational Diabetes:**

Gestational diabetes that's not carefully managed can lead to high blood sugar levels. High blood sugar can cause problems for you and your baby, including an increased likelihood of needing a C-section to deliver.

Complications that may affect your baby

**If you have gestational diabetes, your baby may be at increased risk of:**

* **Excessive birth weight.** Higher than normal blood sugar in mothers can cause their babies to grow too large. Very large babies — those who weigh 9 pounds or more — are more likely to become wedged in the birth canal, have birth injuries or need a C-section birth.
* **Early (preterm) birth.** High blood sugar may increase women's risk of early labor and delivery before the due date. Or early delivery may be recommended because the baby is large.
* **Serious breathing difficulties.** Babies born early to mothers with gestational diabetes may experience respiratory distress syndrome — a condition that makes breathing difficult.
* **Low blood sugar (hypoglycemia).** Sometimes babies of mothers with gestational diabetes have low blood sugar (hypoglycemia) shortly after birth. Severe episodes of hypoglycemia may cause seizures in the baby. Prompt feedings and sometimes an intravenous glucose solution can return the baby's blood sugar level to normal.
* **Obesity and type 2 diabetes later in life.** Babies of mothers who have gestational diabetes have a higher risk of developing obesity and type 2 diabetes later in life.
* **Stillbirth.** Untreated gestational diabetes can result in a baby's death either before or shortly after birth.

Complications that may affect the mother

**Gestational diabetes may also increase the mother risk of:**

* **High blood pressure and preeclampsia.**Gestational diabetes raises the mother risk of high blood pressure, as well as preeclampsia — a serious complication of pregnancy that causes high blood pressure and other symptoms that can threaten the lives of both mother and baby.
* **Having a surgical delivery (C-section).** The mother is more likely to have a C-section if she have gestational diabetes.
* **Future diabetes.** If the mother have gestational diabetes, she is more likely to get it again during a future pregnancy. She also have a higher risk of type 2 diabetes as you get older.

**Nursing Management of Diabetes Mellitus**

* Advice patient about the importance of an individualized meal plan in meeting weekly weight loss goals and assist with compliance.
* Assess patients for cognitive or sensory impairments, which may interfere with the ability to accurately administer insulin.
* Demonstrate and explain thoroughly the procedure for insulin self-injection. Help patient to achieve mastery of technique by taking step by step approach.
* Review dosage and time of injections in relation to meals, activity, and bedtime based on patients individualized insulin regimen.
* Instruct patient in the importance of accuracy of insulin preparation and meal timing to avoid hypoglycemia.
* Explain the importance of exercise in maintaining or reducing weight.
* Advise patient to assess blood glucose level before strenuous activity and to eat carbohydrate snack before exercising to avoid hypoglycemia.
* Assess feet and legs for skin temperature, sensation, soft tissues injuries, corns, calluses, dryness, hair distribution, pulses and deep tendon reflexes.
* Maintain skin integrity by protecting feet from breakdown.
* Advice patient who smokes to stop smoking or reduce if possible, to reduce vasoconstriction and enhance peripheral flow.

**Personal Management of Diabetes Mellitus:**

**Food:**

* Learn about carbohydrate counting and portion sizes.
* Learn what portion size is appropriate for each type of food.
* Make every meal well-balanced. As much as possible, plan for every meal to have a good mix of starches, fruits and vegetables, proteins and fats.
* Coordinate your meals and medications. Too little food in proportion to your diabetes medications — especially insulin — may result in dangerously low blood sugar (hypoglycemia). Too much food may cause your blood sugar level to climb too high (hyperglycemia).
* Avoid sugar-sweetened beverages. Sugar-sweetened beverages — including those sweetened with high fructose corn syrup or sucrose — tend to be high in calories and offer little in the way of nutrition.

**Exercise:** Physical activity is another important part of your diabetes management plan. When you exercise, your muscles use sugar (glucose) for energy. Regular physical activity also helps your body use insulin more efficiently.

* Talk to your doctor about an exercise plan. Ask your doctor about what type of exercise is appropriate for
* Keep an exercise schedulecoordinated with your meal and medication schedules.
* Know your numbers, know what blood sugar levels are appropriate for you before you begin exercise.
* Check your blood sugar level before, during and after exercise, especially if you take insulin or medications that lower blood sugar.
* If you use insulin and your blood sugar level is below 100 milligrams per deciliter (mg/dL), or 5.6 millimoles per liter (mmol/L), have a small snack before you start exercising to prevent a low blood sugar level.
* Stay hydrated while exercising because dehydration can affect blood sugar levels.
* Be prepared. Always have a small snack or glucose tablets with you during exercise in case your blood sugar level drops too low. Wear a medical identification bracelet when you're exercising.
* Adjust your diabetes treatment plan as needed. If you take insulin, you may need to reduce your insulin dose before exercising, or wait awhile after exercise to inject insulin.

**Medication:**

* Store insulin properly. Insulin that's improperly stored or past its expiration date may not be effective. Insulin is especially sensitive to extremes in temperature.
* If your diabetes medications cause your blood sugar level to drop too low or if it's consistently too high, the dosage or timing may need to be adjusted.
* Be cautious with new medications.
* Liquid medications may be sweetened with sugar to cover their taste. Sometimes an alternate medication may be recommended.
* Always check with your doctor before taking any new over-the-counter medication, so you know how it may impact your blood sugar level.

**Alcohol:** Alcohol can result in low blood sugar shortly after you drink it and for as many as 24 hours more.

* Get your doctor's OK to drink alcohol.
* Don't drink alcoholic beverages on an empty stomach
* Choose your drinks carefully. Light beer and dry wines have fewer calories and carbohydrates than do other alcoholic drinks.
* Tally your calories. Remember to include the calories from any alcohol you drink in your daily calorie count.
* Check your blood sugar level before bed.

**PHARMACOLOGICAL MANAGEMENT OF PATIENTS WITH DIABETES MELLITUS**

Listed below are commonly used medications in the treatment of diabetes mellitus and their implications:

• Insulin

• Pramlintide

• Metformin

• Sulfonylureas

**Educating Patient With Diabetes** Is a collaborative process

Develop knowledge and skills needed to change behaviour

Successfully self-manage the disease and it's related conditions

**Goals of education**

* Improve health
* Better quality of life
* Reduce the need of costly healthcare.
* Patient should be educated to practice self care. This allows the patient to assume responsibility and control of his/her own diabetes management.

**Self care should include;**

* Blood glucose monitoring
* Body weight monitoring
* Foot care
* Personal hygiene
* Healthy lifestyle/diet or physical activity
* Quitting smoking.
* Patients should be advised to keep tight control of their blood sugar level because this reduces the risk of most complications.
* Patients should be educated on the complications and should ensure that they pay a visit to the hospital once they notice any change from normal. They should ensure;
* Proper skin and foot care to prevent diabetic neuropathy
* Proper eye exam to prevent diabetic retinopathy
* Proper diet and fluid to prevent diabetic gastroparesis