

Management of Diabetes Mellitus

Dr. Pinki Kumari

M.A., Ph.D, Depart. Of Home Science,
(B.R.A.B.U. Muzaffarpur, Bihar)

Abstract :- Diabetes mellitus is a major health problem associated with microvascular and macrovascular complications leading to increase morbidity and more mortality. These include disease of large blood vessels (macrovascular disease, including coronary heart disease and peripheral arterial disease) and small blood vessels (microvascular disease, including retinal and renal vascular disease), as well as disease of the nerves. It is rapidly growing worldwide with a huge economical and social burden. Although prevention and treatment of diabetes and its complications play a key role in reducing its morbidity and mortality, they require an integrated team approach at national and international levels. Early diagnosis, correct treatment, and effective follow-up are essential in any health care system to prevent complications of diabetes and ensure patients well being.

Keywords: - Diabetes, Mellitus, Diseases, Microvascular, Macrovascular, Morbidity, Mortality.

I. Introduction:-

Diabetes also called diabetes mellitus (DM), is a group of chronic metabolic diseases that result in high blood sugar glucose levels. Our body has a hormone called insulin that lowers the blood sugar levels. In diabetes mellitus, the body either doesn't make enough insulin or is unable to effectively use it, resulting in an increase in the blood levels of glucose, if untreated, this can cause damage to nerves, eyes, kidneys, and other organs. An organ in the abdomen called the pancreas produces a hormone called insulin, which is essential to helping glucose get into the body's cells. In a person without diabetes, the pancreas produces more insulin whenever blood levels of glucose rise (for example, after a meal), and the insulin signals the body's cells to take in the glucose. In diabetes, either the pancreas's ability to produce insulin or the cells response to insulin is altered. The two most common are called type 1 diabetes and type 2 diabetes.

Definition:-

- Diabetes mellitus(DM) is a group of disease characterized by high levels of blood glucose resulting from defects in insulin production, insulin action, or both.
- A disease in which the body's ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood.

II. Type of Diabetes Mellitus:-

Type 1 Diabetes Mellitus (IDDM):- Type 1 diabetes is also called insulin dependent diabetes. It used to be called juvenile -onset diabetes, because it often begins in childhood. Type 1 diabetes is an autoimmune condition. It happens when your body attacks your pancreas with antibodies. The organ is damaged and doesn't make insulin. Your genes might cause this type of diabetes. It could also happen because of problems with cells in your pancreas that make insulin. Many of the health problems that can come with type 1 happen because of damage to tiny blood vessels in your eyes (called diabetic retinopathy), nerves (diabetic neuropathy), and kidneys (diabetic neuropathy). People with type 1 also have a higher risk of heart disease and stroke.

Type 1 Diabetes symptoms:-

- Growing thirst
- Frequent hunger
- Unintentional weight loss
- Blurry vision
- Tiredness
- Recurring Urination
- Mood changes

Risk Factors for Type 1 Diabetes Mellitus:-**The presence of damaging immune system cells that make auto antibodies:-**

Sometimes family members of people with type 1 diabetes are tested for the presence of diabetes auto antibodies. If you have these auto antibodies, you have an increased risk of developing type 1 diabetes. But not everyone who has these auto antibodies developed type 1.

Dietary factors:-

A number of dietary factors have been linked to an increased risk of type 1 diabetes, such as low vitamin D consumption; early exposure to cow's milk or cow's milk formula, or exposure to cereals before 4 months of age. However, none of these factors has been shown to cause type 1 diabetes.

Race :- Type 1 diabetes is more common in white than in other races.

Geography:- Certain Countries, such as Finland and Sweden, higher rates of type 1 diabetes.

Type 2 Diabetes Mellitus (NIDDM):- Type 2 diabetes used to be called non-insulin dependent or adult - onset diabetes. But it's become more common in children and teens over the past 20 years, largely because more young people are weigh over or obese. About 90% of people with diabetes have type 2. When you have type 2 diabetes your pancreas usually creates some insulin. But either it's not enough or your body doesn't use it like it should. Insulin resistance, when your cells don't respond to insulin, usually happens in fat, liver, and muscle cell. Type 2 diabetes is often milder than type 1. But it can still cause major health complications, especially in the tiny blood vessels in your Kidneys, nerves, and eyes. Type 2 also raises your risk of heart disease and Stroke. People who are obese-more than 20% Over their target body weight for their height-have an especially high risk of type 2 diabetes and the health problems that can follow. Obesity often cause insulin resistance, so your pancreas has to work harder to make more insulin. But it's still not enough to keep your blood sugar levels where they should be.

Type 2 Diabetes Symptoms:-

- Increased hunger
- Frequent urge to urinate
- Tiredness, fatigue
- Sores that take too long to heal
- Instant thirst

Risk factor type 2 diabetes mellitus:-

- **Obesity:-**

The number one factor for type 2 diabetes is obesity. Greater weight means a higher risk of insulin resistance because it interferes with the body's ability to use insulin. The number of children being diagnosed with type 2 diabetes has also risen.

- **Sedentary lifestyle:-**

Sedentary lifestyle is damaging to health and bears responsibility for the growing obesity problems. Inactivity and being overweight go hand in hand towards a diagnosis of type 2. Muscle cells have more insulin receptors than fat cells, so a person can decrease insulin resistance by exercising. Being more active also lowers blood sugar levels by helping insulin to be more effective.

- **Unhealthy eating habit:-**

People who have been diagnosed with type 2 diabetes are overweight. Unhealthy eating contributes largely to obesity. Too much fat, not enough fiber and too many simple carbohydrates all contribute to a diagnosis of diabetes. Eating right can turn the diagnosis around or prevent type 2.

- **Family history and genetics:-**

If you have a relative who has/had diabetes your risk might be greater. The risk increases if the relative is a close one—if your father or mother has/had diabetes your risk might be greater than if your uncle has/had it.

Gestational Diabetes Mellitus:-

Pregnancy usually causes some form of insulin resistance. If this becomes diabetes, it's called gestational. Doctors often spot it in middle or late pregnancy. Because a woman's blood sugar travels through their placenta to the body, it's important to control gestational diabetes to protect the body's growth and development. Doctors report gestational diabetes in 2% to 10% of pregnancies. It usually goes away after birth. But up to 10% of women who have gestational diabetes get type 2, weeks or even a year later. Gestational diabetes is more of a risk for the baby than the mother. A baby might have unusual weight gain before birth, trouble breathing at birth, or a higher risk of obesity and diabetes later in life. The mother might need a cesarean section because of an overly large baby, or they might have damage to their heart, kidney, nerves and eyes.

Gestational Diabetes symptoms:-

Women with gestational diabetes fail to show any signs and symptoms. Diagnosis of gestational diabetes is done during a routine blood sugar test or oral glucose tolerance test, or it can't be guessed by changes noticed in the body.

Risk factor for gestational Diabetes Mellitus:-

- **Age:-**

Women older than age 25 are at increased risk.

- **Family or Personal History:-**

Your risk increases if you have prediabetes, a precursor to type 2 diabetes— or if a close family member, such as a parent or sibling, has type 2 diabetes you are also at greater risk if you had gestational diabetes during a previous pregnancy, if you delivered a very large baby or if you had an unexplained stillbirth.

Weight:-

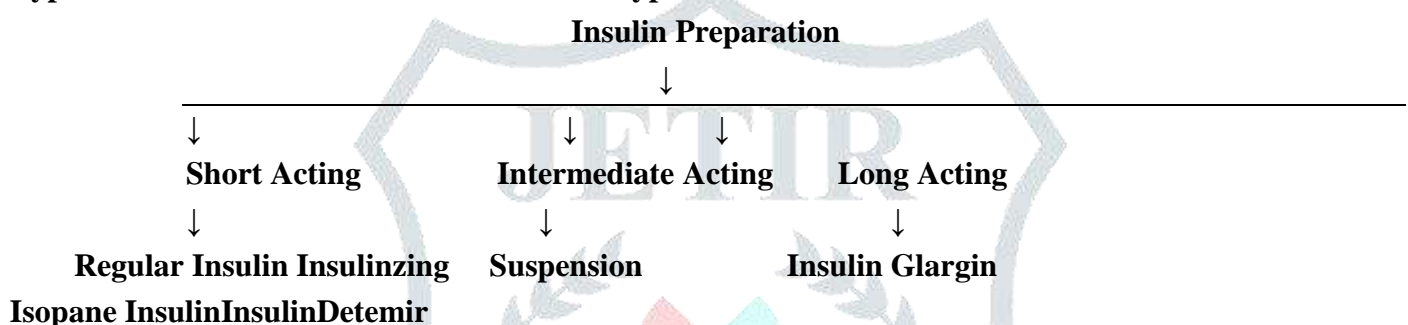
Being overweight before pregnancy increases your risk.

Race:-

For reasons that aren't clear, women who are black, Hispanic, American, Indian or Asian or more likely to develop gestational diabetes.

III. Treatments:-**Treatment for type 1 Diabetes mellitus:-**

Insulin:- People with type 1 Diabetes need insulin therapy to survive, many people with type 2 diabetes or gestational diabetes also need insulin therapy insulin is usually given subcutaneously either by injections or by an insulin pump Research of other routes of administration is underway. In acute-care settings, insulin may also be given intravenously. In general, there are three type of insulin, characterized by the rate which they are metabolized by the body. They are rapid acting insulin's intermediate acting insulins and long acting insulins.

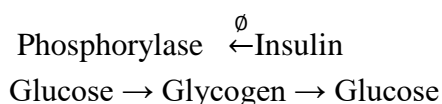
Types of Insulin used in the treatment of the type 1 Diabetes Mellitus:-**Action of Insulin:-**

- It helps in the transportation of glucose across the cell membrane.
- Insulin activate GLUT-4 (Transporter of glucose) as a result of that glucose transportation occur across the cell.
- It helps in the formation of glycogen.

Insulin Stimulate → Glycogen Synthase enzyme

↓
Glucose → Glycogen

- Insulin inhibit the phosphorylase enzyme which convert the glycogen into glucose.

**Treatments for type 2 Diabetes Mellitus:-**

Treatment's for type 2 diabetes involves keeping a healthy weight, eating right, and exercising some people need medication, too. Your doctor might do an A1C test a few times a year to see how well you have been controlling your blood sugar.

Treatment for gestational diabetes:-

- Careful Meal planning to make sure you get enough nutrients without too much fat and calories.
- Daily exercise.
- Keeping weight gain under control.

- Talking insulin to control your blood sugar levels, if needed.

IV. Management

Medical Management :- Here are some medical interventions that are performed to manage Diabetes mellitus.

Normalize insulin activity :- This is the main goal of diabetes treatment-normalization of blood glucose level to reduce the development of vascular and neuropathic complications.

Intensive Treatment :- Intensive treatment is 3 to 4 insulin injections per day or continuous subcutaneous insulin, infusion, insulin pump therapy plus frequent blood glucose monitoring and weekly contacts with diabetes educators.

Exercise caution with intensive treatment:- Intensive therapy must be done with caution and must be accompanied by **through education** of the patient and family and by responsible behavior of patient.

Diabetes management:- Diabetes management has 5 component and involves constant assessment and modification of the treatment plan by health Care professionals and daily adjustment in therapy by the patient.

Natural Management:-

- **The foundations:-** Nutrition, meal planning and weight control are the foundations of diabetes management.
- **Consult a Professional.-**
A registered dietitian who understand diabetes management has the major responsibility for designing and teaching this aspect of therapeutic plan.
- **Health Care team should have the knowledge:-**
Nurses and other healthcare members of the team must be knowledgeable about nutritional therapy and supportive of patient who need to implement nutritional and lifestyle changes.
- **Weight loss:-**This is the key treatment for obese patients with type 2 diabetes.
- **How much weight to lose? :-** A weight loss of as small as 5% to 10% of the total body weight may significantly improve blood glucose levels.
- **Other options for diabetes management:-**
Diet education, behavioral therapy, group support, and ongoing nutritional counselling should be encouraged.

Meal Planning

- **Criteria in meal planning:-** The meal plan must consider the patient's food preferences, lifestyle, usual eating times and ethnic and cultural background.
- **Managing hypoglycemia through meals:**
To help prevent hypoglycemic reactions and maintain overall blood glucose control, there should be consistency in the approximate time intervals between meals with the addition of snacks and needed.
- **Assessment is still necessary:-** The patient's diet history should be thoroughly reviewed to identify his or her eating habits and lifestyle.
- **Educate the Patients:-** Health education should include the importance of consistent eating habits, the relationship of food and insulin, and the provision of an individualized meal plan.
- **The Nurse's role:-**The nurse plays an important role in communication patient information to the dietitian and reinforcing the patients for better understanding.

V. Conclusion:-

Diabetes mellitus is growing to epidemic proportions, leading to devastating complications if not treated well. There are many changes in the successful treatment of diabetes mellitus because of personal and economic costs incurred in diabetes in diabetes therapy. Its long-term consequences translate into enormous human suffering and economic costs. However, compressive diabetes care can delay the progression of complications, maximize the quality of life, and minimize healthcare expenditure. Insulin is indicated for all type of diabetes mellitus.

However, diet, exercise, and diabetes education remain the essential components of diabetes management. The issue of obesity should be addressed aggressive and lifestyle changes should be emphasized.

References:-

- [1] Furlanos S, Perry C, Stein MS, et al. A clinical screening tool identifies autoimmune diabetes in adults. *Diabetes care*. 2006 May; 29(5); 970-5
- [2] Kakleas K, Karayianni C, Critselis E, et al. The prevalence and risk factor for coeliac disease among children and adolescents with type 1 Diabetes Mellitus. *Diabetes Res Clin proct*. 2010 Nov; 90 (2); 202-8.
- [3] Greoley SA, Naylor RN, Philipson LH, et al. Neonatal diabetes: an expanding list of genes allows for improved diagnosis and treatment. *CurrDiab Rep*. 2011 Dec; 11(6): 519-32.
- [4] Chiang. JL, Kirkman MS, Laffel. LM, et Al; Type 1 Diabetes through the span; a position statement of the American diabetes association. *Diabetes care*. 2014 July; 37(7): 2034-54.
- [5] Inzucchi SE, Bergenstal, RM, Buse. JB, et al. Management of Hyperglycemia in type 2 diabetes, 2015. A patient centered approach: Update to a position statement of the American diabetes association for the study of diabetes. *Diabetes Care*. 2015; 38(1): 140-9.
- [6] Farrannini E, Mari A, Nofrate V, Sosenko JM, Skyler JS; DPT-1 Study Group. Progression to diabetes in relatives of type 1 Diabetes patients: mechanisms and mode of onset. *Diabetes*. 2010; 59: 679-685.
- [7] Umpierrez G, Provedano ST, Manghi FP, et al. Efficacy and safety of Dulaglutide Monotherapy Versus Metformin in type 2 diabetes in a randomized controlled Trial (AWARD-3). *Diabetes Care*. 2014 May 19.