

University of Baghdad

Nursing College



Adult Nursing /first semester 2019-2020

Management of Patients

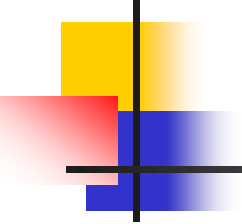
With Diabetes Mellitus (DM)

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LEARNINGOBJECTIVES

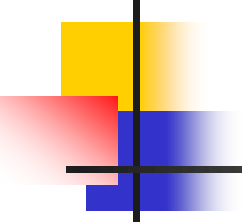
1. Differentiate between the types of diabetes.
2. Describe etiologic factors associated with diabetes.
3. Relate the clinical manifestations of diabetes to the associated pathophysiologic alterations.



4. Identify the diagnostic and clinical significance of blood glucose test results.

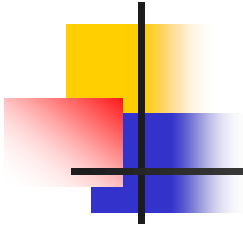
5. Explain the dietary modifications used for management of people with diabetes.

6. Describe the relationships among diet, exercise, and medication (i.e., insulin or oral antidiabetic agents) for people with diabetes.

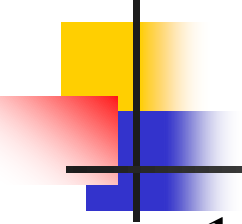


7. Develop an education plan for insulin self-management.

8. Identify the role of oral antidiabetic agents in therapy for patients with diabetes.



9. Use the nursing process as a framework for care of
patients who
have hyperglycemia with diabetic ketoacidosis or
hyperglycemic hyperosmolar syndrome.
10. Describe management strategies for a person with
diabetes to use during “sick days.”



11. Outline the major complications of diabetes
and the self-care

behaviors that are important in their prevention.

12. Identify the programs and community
support groups available for people with
diabetes.



Definitions

- **Diabetes:** a group of metabolic diseases characterized by
- hyperglycemia resulting from defects in insulin secretion, insulin
- action, or both



Diabetic ketoacidosis (DKA): a metabolic

derangement in type 1

diabetes that results from a deficiency of insulin;

highly acidic

ketone bodies are formed, resulting in acidosis.



Diabetic Ketoacidosis

- Caused by profound deficiency of insulin (severe insulin deficiency).
- Most likely occurs in type 1
- Signs and symptoms
 - Lethargy/weakness
 - Early symptoms



Dehydration

Poor skin turgor

Dry mucous membranes

Kussmaul respirations

Rapid deep breathing

Sweet fruity odor



Nursing management: DKA

- Patient closely monitored

- Administration

- IV fluids

- Insulin therapy

- Electrolytes

- Cardiac monitoring



Assessment

Renal status

Cardiopulmonary status

Level of consciousness

Patient closely monitored

Signs potassium imbalance



Hyperosmolar hyperglycemic syndrome (HHS)

- Life-threatening syndrome
- Less common than DKA
- Often occurs in patients over 60 years with type 2
- Medical emergency
- High mortality rate
- Therapy similar to DKA



Hypoglycemia: low blood glucose level.

■ **Symptoms:**

■ **Mild:**

- sweating, tremor, tachycardia, palpitations, nervousness, hunger

■ **Moderate:**

- low concentration, headache, lightheadedness, confusion, memory loss, numbness, double vision, drowsiness

■ **Severe:**

- seizures, sleepy, loss of consciousness



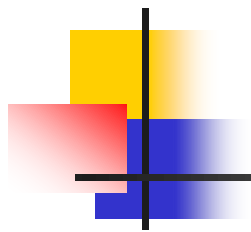
Treatment of Hypoglycemia

- **Mild & moderate**

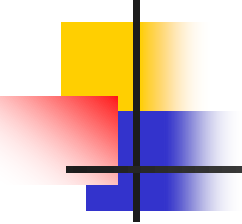
- 10-15 gm of fast acting sugar orally
- Repeat treatment after 15 minute if symptoms persists
- Avoid high caloric and high fat diet

- **Severe:**

- Inject glucagon 1mg sc/IM
- 25-50 D/W IV

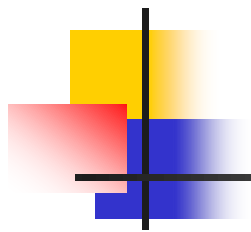


Insulin: a hormone secreted by the beta cells of the islets of Langerhans of the pancreas that is necessary for the metabolism of carbohydrates, proteins, and fats; a deficiency of insulin results in diabetes.

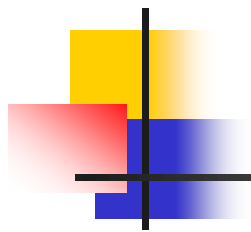


Insulin pump: a continuous subcutaneous
insulin infusion device that delivers insulin on a
24-hour basis

ketone: a highly acidic substance formed when
the liver breaks down
free fatty acids in the absence of insulin.



Type 1 diabetes: a metabolic disorder
characterized by an absence of
insulin production and secretion from autoimmune
destruction of the
beta cells of the islets of Langerhans in the
pancreas; formerly called
insulin-dependent diabetes, or juvenile diabetes

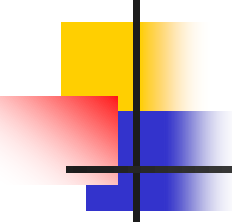


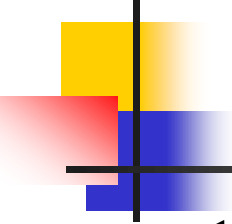
Type 2 diabetes: a metabolic disorder
characterized by the relative
deficiency of insulin production and a decreased
insulin action and
increased insulin resistance.



Insulin: is an anabolic, or storage, hormone.

When a person eats a meal, **insulin** secretion increases and moves glucose from the blood into muscle, liver, and fat cells. In those cells, insulin has the following actions:

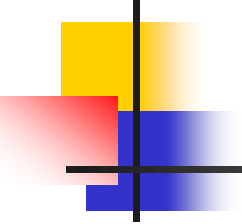
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1. Transports and metabolizes glucose for energy.
 2. Stimulates storage of glucose in the liver and muscle
(in the form of glycogen).
 3. Signals the liver to stop the release of glucose.

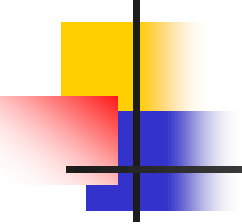
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1. Enhances storage of dietary fat in adipose tissue.
 2. Accelerates transport of amino acids (derived from dietary protein) into cells.
 3. Inhibits the breakdown of stored glucose, protein, and fat.



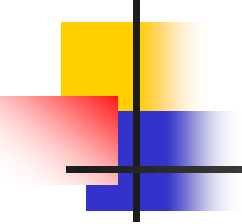
Diabetes Risk factors:

1. Family history of diabetes (e.g., parents or siblings with diabetes)
2. Obesity (i.e., $\geq 20\%$ over desired body weight or body mass index ≥ 30 kg/m²)
3. Race/ethnicity (e.g., African Americans, Hispanic Americans, Native Americans, Asian Americans, Pacific Islanders)

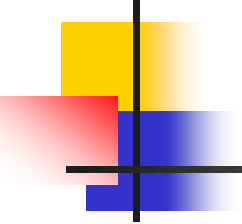
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4. Age equal to or greater than 45 years.
 5. Previously identified impaired fasting glucose or impaired glucose tolerance.
 6. Hypertension ($\geq 140/90$ mm Hg)



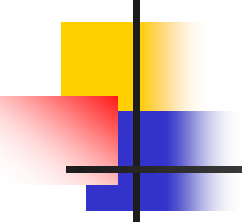
Diabetes is a leading cause of death from disease, primarily because of the high rate of cardiovascular disease (myocardial infarction [MI], stroke, and peripheral vascular disease) among people with diabetes.



Hospitalization rates for people with diabetes
are 2.4 times greater for adults and 5.3 times
greater for children than for the general
population.



The economic cost of diabetes continues to increase because of increasing health care costs and an aging population. The U.S. Department of Health and Human Services (HHS) has identified diabetes as an important topic area.



Nationwide efforts are needed to decrease its occurrence and to increase the quality of life of those people who have the disease.



Classification

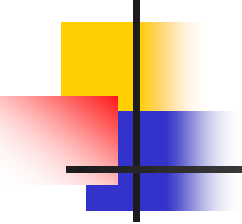
The major classifications of diabetes are type 1 diabetes, type 2 diabetes, gestational diabetes, latent autoimmune diabetes of adults (LADA), and diabetes associated with other conditions or syndromes



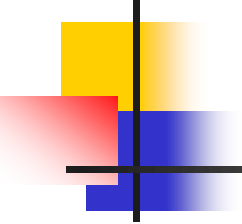
Type 1 Diabetes

affects approximately 5% of adults with the disease, it is characterized by the destruction of the pancreatic beta cells. Combined genetic, immunologic, and possibly environmental (e.g., viral) factors are thought to contribute to beta-cell destruction.

it is generally accepted that a genetic susceptibility is a common underlying factor in the development of type



Diabetic ketoacidosis (DKA) is a metabolic derangement that occurs most commonly in persons with type 1 diabetes and results from a deficiency of insulin; highly acidic ketone bodies are formed, and metabolic acidosis occurs. The three major metabolic derangements are hyperglycemia, ketosis, and metabolic acidosis



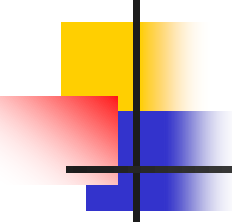
DKA is commonly preceded by a day or more of polyuria, polydipsia, nausea, vomiting, and fatigue with eventual stupor and coma if not treated.

The breath has a characteristic fruity odor due to the presence of ketoacids.

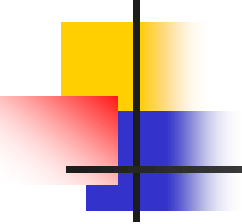


Type 2 Diabetes

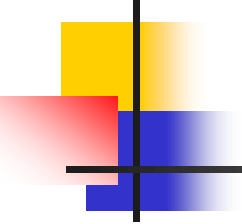
Type 2 diabetes affects approximately 95% of adults with the disease. It occurs more commonly among people who are older than 30 years and obese, although its incidence is rapidly increasing in younger people because of the growing epidemic of obesity in children, adolescents, and young adults



The two main problems related to insulin in type 2 diabetes are insulin resistance and impaired insulin secretion. Insulin resistance refers to a decreased tissue sensitivity to insulin.

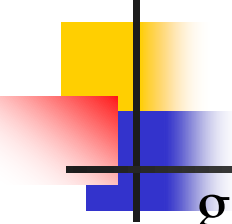


Normally, insulin binds to special receptors on cell surfaces and initiates a series of reactions involved in glucose metabolism. In type 2 diabetes, these intracellular reactions are diminished, making insulin less effective at stimulating glucose uptake by the tissues and at regulating glucose release by the liver.



Gestational diabetes: is any degree of glucose intolerance with its onset during pregnancy.

Hyperglycemia develops during pregnancy because of the secretion of placental hormones, which causes insulin resistance. Gestational diabetes occurs in as many as 18% of pregnant women and increases their risk for hypertensive disorders during pregnancy.



Women who are considered to be at high risk for gestational diabetes and should be screened by blood glucose testing at their first prenatal visit are those with marked obesity, a personal history of gestational diabetes, glycosuria, or a strong family history of diabetes. High-risk ethnic groups include Hispanic Americans, Native Americans, Asian Americans, African Americans, and Pacific Islanders.



Clinical Manifestations

Clinical manifestations depend on the patient's level of hyperglycemia. Classic clinical manifestations of diabetes include the “three Ps”: polyuria, (increased urination) Glucose is hypertonic and depletes the body of large amounts of water (from extra cellular fluid) as it is excreted by the kidneys causing Polyuria
Polydipsia , Loss of Na and K



Glucose is then not available for cellular nutrition, so
develop

Polyphagia

Fat and protein stores are broken down and used
for energy; fatty acids and triglycerides accumulate
causing ketone build up with

1. Ketoacidosis

2. Ketonuria

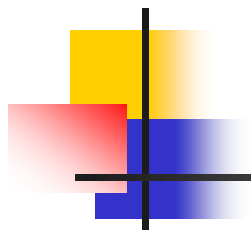
3. weakness



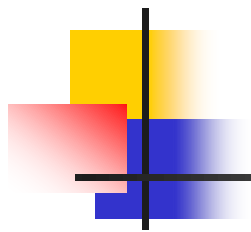
Assessment and Diagnostic Findings

An abnormally high blood glucose level is the basic criterion for the diagnosis of diabetes.

1. Fasting plasma glucose (FPG) (blood glucose determination obtained in the laboratory after fasting for at least 8 hours)



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2. Random plasma glucose.
 3. Glucose level Two-hour Postprandial blood glucose (2-hour post load) may be used.
 4. The intravenous (IV) glucose tolerance test (GTT) is no longer recommended for routine clinical use.



5. Glycosylated Hemoglobin (HbA1C)

6. Finger Stick Blood Sugar (FSBS)

7. Urine testing

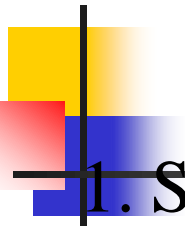


Nursing Assessment for the Patient with **Diabetes**

History

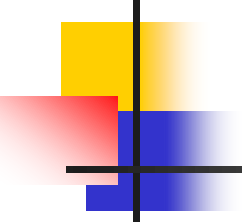
Symptoms related to the diagnosis of diabetes:

1. Symptoms of hyperglycemia.
2. Symptoms of hypoglycemia.
3. Frequency, timing, severity, and resolution.
4. Results of blood glucose monitoring.



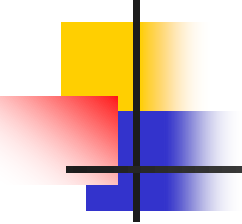
1. Status, symptoms, and management of chronic complications of diabetes:

Eye; kidney; nerve; genitourinary and sexual, bladder, and Gastrointestinal Cardiac; peripheral vascular; foot complications associated with Diabetes Adherence to/ability to follow prescribed dietary management plan Adherence to prescribed exercise regimen.



Adherence to/ability to follow prescribed
pharmacologic treatment (insulin or oral antidiabetic
agents)

Use of tobacco, alcohol, and prescribed and over-the-
counter medications/drugs



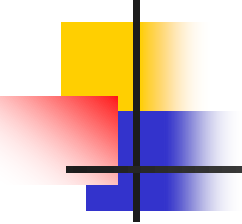
Lifestyle, cultural, psychosocial, and economic
factors that may affect diabetes treatment

Effects of diabetes or its complications on functional
status (e.g., mobility, vision)



Physical Examination

1. Blood pressure (sitting and standing to detect orthostatic changes)
2. Body mass index (height and weight).
3. Funduscopic examination and visual acuity.
4. Foot examination (lesions, signs of infection, pulses).



5. Skin examination (lesions and insulin injection sites).

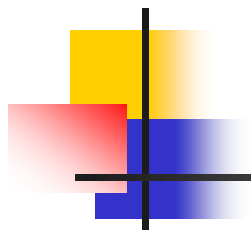
6. Neurologic examination.

7. Vibratory and sensory examination.

8. Deep tendon reflexes.

9. Oral examination.

10. Laboratory Examination



11. Fasting lipid profile

12. HgbA1c

13. Test for microalbuminuria.

14. Serum creatinine level.

15. Urinalysis.

16. Electrocardiogram.



NOTE:

Early detection is important but may be challenging because symptoms may be absent or nonspecific. A glucose tolerance test is more effective in diagnosis than urine testing for glucose in older patients due to the higher renal threshold for glucose.



Nursing Diagnosis

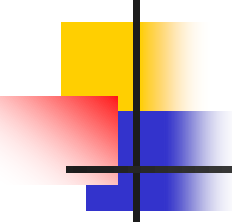
- . Alteration in Nutrition r/t insulin deficiency
- . Knowledge deficit r/t newly diagnosed disease
 - . Fluid volume deficit.
 - . Impaired skin integrity



Medical Management

The main goal of diabetes treatment is to normalize insulin activity and blood glucose levels to reduce the development of complications such as:

- **retinopathy** (damage to small blood vessels that nourish the retina)
- **nephropathy** (damage to kidney cells)
- **neuropathy** (damage to nerve cells).



Intensive treatment is defined as 3 or 4 insulin injections per day or **an insulin pump** (i.e., a continuous subcutaneous insulin infusion) plus frequent blood glucose monitoring and weekly contacts with diabetes educators.



Medical Management

1. Drug Therapy

2. Insulin---short, intermediate, long-acting

3. Oral hypoglycemic agents

4. Diet

Based on age, sex, weight, life style

Exercise

Self Care



Prevention

The Diabetes Prevention type 2 diabetes can be
prevented by:

= Appropriate changes in lifestyle.

= focused on weight reduction and physical activity of
moderate intensity.



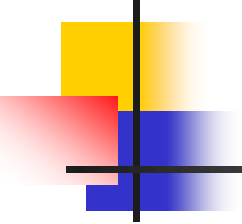
Complications of Insulin Therapy

Local Allergic Reactions. A local allergic reaction (redness, swelling, tenderness, and induration or a 2- to 4-cm wheal) may appear at the injection site 1 to 2 hours after the administration of insulin. Reactions usually resolve in a few hours or days. If they do not resolve, another type of insulin can be prescribed.



Systemic Allergic Reactions.

Systemic allergic reactions to insulin are rare. When they do occur, there is an immediate local skin reaction that gradually spreads into generalized urticaria (hives). These rare reactions are occasionally associated with generalized edema or anaphylaxis. The treatment is desensitization, with small doses of insulin given in gradually increasing amounts.



Insulin Lipodystrophy. Lipodystrophy refers to a localized reaction, in the form of either lipoatrophy or lip hypertrophy occurring at the site of insulin injections.



Lipoatrophy : is the loss of subcutaneous fat

Lip hypertrophy: the development of fibrofatty
masses at the injection site.

caused by the repeated use of an injection site.





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Management : types of insulin

Comparison	Short acting	Intermediate	Long acting
Onset	0.5-2hrs	3-4hrs	6-8hrs
Peak	2-6hrs	8-12hrs	14-20hrs
Duration	6-12hrs	20-40hrs	>32hrs
Appearance	Clear	Whit milky	Vary
Administration	20-30min after meals	0.5 hr before meal	At any time



Chronic complications

- **Angiopathy**

- **Macrovascular**

- Diseases of large and medium-sized blood vessels

- **Microvascular**

- Result from thickening of vessel membranes in capillaries and arterioles
 - areas most noticeably affected:
 - Eyes (retinopathy)
 - Kidneys (nephropathy)



Diabetic Retinopathy

- **Non-proliferative**

- Most common form
- Partial occlusion of small blood vessels in retina

- **Proliferative**

- Involves retina and vitreous
- When retinal capillaries become occluded body forms new blood vessels that are fragile and hemorrhage easily
- **Treatment :**
 - Photocoagulation (Laser destroys ischemic areas of retina) and vitrectomy (Aspiration of blood, membrane, fibers from inside eye)



Nephropathy

- Associated with damage to small blood vessels that supply the glomeruli of the kidney
- Treatment: Tight glucose control and blood pressure management



Neuropathy

- Sensory neuropathy
 - Affects hands and/or feet bilaterally
 - Characteristics include: loss of sensation, abnormal sensations, pain, and paresthesias
- Autonomic
 - Can affect nearly all body systems
 - Complications
 - Sexual function
 - Stroke

Complications of foot and lower extremity/ Diabetic foot



- Result from combination of vascular and neuropathy effects
- Foot care
- Proper bathing and drying
- Lubrication: don't use alcohol
- Inspection daily
- Wear well-fitting, closed toe shoes
- No walking with bare foot, no shaving or using heat pads
- Trim toenails a straight across
- Decrease smoking and fat.
- Control hyperglycemia