



# **Gastroenteritis (Diarrhea, Vomiting, Gastroesophageal Reflux )**

**Prof.Dr. Norhan Zeki Shaker  
Infant ,Child, and Adolescents  
Health Care. 3rd Grad**

**7<sup>TH</sup> weeks  
26 /3/2024**

- Outline
- **Gastroenteritis,**
- **diarrhea,**
- **Vomiting and Gastroesophageal Reflux (GERD).**
- **Constipation**
- **Dehydration**



## Objective (1<sup>st</sup> PART)

After the lecture the student will be able to:

1-To define **Gastroenteritis, diarrhea, vomiting Gastroesophageal Reflux GERD.**

2-To identify signs and symptom of diarrhea vomiting Gastroesophageal Reflux GERD.

4-To provide good nursing intervention to the child.

5-To teach the mother about home care of diarrhea



## Objective (2<sup>nd</sup> part)

After the lecture the student will be able to:

- 1-To define dehydration and ORS.
- 2-To identify type of dehydration
- 3-To assess the dehydration level.
- 4-To teach the mother about home care of diarrhea
- 5-To identify type of electrolyte disturbance



# Definition

## **Gastroenteritis:**

It's a medical condition characterized by inflammation ("-itis") of the gastrointestinal tract that involves both the stomach ("gastro"-) and the small intestine ("entero"-), resulting in some combination of diarrhea, vomiting.



**Diarrhea** : It is an increase in the **frequency** of bowel movements or a decrease in the **form** of stool (greater **looseness** of stool).



# Diarrhea

- Diarrhea is a symptom that results from disorders involving digestive, **absorptive, and secretory** functions.
- Diarrhea is caused by abnormal intestinal **water and electrolyte transport.**



- Worldwide, there are an estimated 1.7 billion episodes of diarrhea each year.
- Approximately 24% of all deaths in children living in developing countries are related to diarrhea and dehydration.





- Diarrheal disturbances involve the stomach and intestines (gastro- enteritis), the small intestine (enteritis), the colon (colitis), or the colon and intestines (enterocolitis). Diarrhea is classified as acute or chronic.



# 1. Acute diarrhea (<14 days' duration)

Is a leading cause of illness in children younger than 5 years of age, is defined as a sudden increase in frequency and a change in consistency of stools, often caused by an infectious agent in the GI tract.

- It may be associated with upper respiratory or urinary tract infections, antibiotic therapy, or laxative use.
- It is caused by a variety of viral, bacterial, and parasitic pathogens.



2. **Chronic diarrhea** is defined as an increase in stool frequency and increased water content with a duration of more than 14 days.
- It is often caused by chronic conditions such as malabsorption syndromes, inflammatory bowel disease (IBD), immunodeficiency, food allergy, lactose intolerance, or chronic nonspecific diarrhea or as a result of inadequate management of acute diarrhea.



### 3. Intractable diarrhea of infancy

is a syndrome that occurs in the first few months of life, persists for longer than 2 weeks with no recognized pathogens, and is refractory to treatment.

The most common cause is acute infectious diarrhea that was not managed adequately.



4. **Chronic nonspecific diarrhea (CNSD)**, also known as irritable colon of childhood and toddlers' diarrhea, is a common cause of chronic diarrhea in children 6 to 54 months of age.
- These children have loose stools, often with **undigested food particles**, and diarrhea lasting longer than **2 weeks' duration**.
  - Children with CNSD grow normally and have no evidence of malnutrition, no blood in their stool, and no enteric infection.



#### 4. Chronic nonspecific diarrhea (CNSD),

- **Dietary** indiscretions and **food sensitivities** have been linked to chronic diarrhea.
- The excessive intake of **juices and artificial sweeteners** such as sorbitol, a substance found in many commercially prepared beverages and foods, may be a factor.



## Etiology

- Most pathogens that cause diarrhea are spread by the fecal–oral route through contaminated food or water or are spread from person to person where there is close contact (e.g., daycare centers).

Worldwide, the most common causes of acute gastroenteritis are infectious agents, **viruses, bacteria, and parasites.**



## Major risk factors

- Lack of clean water
- Crowding
- Poor hygiene
- Nutritional deficiency and
- Poor sanitation





- **Rotavirus** Is the most important cause of serious gastroenteritis among children and a significant nosocomial (hospital-acquired) pathogen.
- *Salmonella, Shigella, and Campylobacter* organisms are the most frequently isolated bacterial pathogens in USA.
- Among children younger than 5 years old, *Salmonella* occurs in approximately 617 out of 100,000 children;
- *Campylobacter* occurs in 409 out of 100,000 children;
- and *Shigella* occurs in 312 out of 100,000 children .
- In **developed** nations, viruses, primarily rotavirus, cause 70% to 80% of infectious diarrhea.



- These organisms are gram- negative bacteria and can be contracted through raw or undercooked food, contaminated food or water, or through the fecal–oral route.



- **Antibiotic administration** is frequently associated with **diarrhea** because antibiotics alter the normal intestinal flora, resulting in an overgrowth of other bacteria.
- *Clostridium difficile* is the most common bacterial overgrowth and accounts for approximately 20% of all antibiotic-associated diarrhea.



# Causes of diarrhea:

causes of diarrhea include the following:

- 1-Bacterial infections:** Salmonella, Shigella, Campylobacter, and Escherichia coli (E. coli). Clostridium difficile, Vibrio cholerae.
- 2-Viral infections.** rotavirus, Norwalk virus, calcivirus, adenovirus, astrovirus, cytomegalovirus, herpes simplex virus, and viral hepatitis.
- 3-Food intolerances.** Some people are unable to digest food components such as artificial sweeteners and lactose—the sugar found in milk.
- 4-Parasites.** Giardia lamblia, Entamoeba histolytica.
- 5-Reaction to medicines.** Antibiotics, blood pressure medications, cancer drugs, and antacids containing magnesium can all cause diarrhea.

# Cont: Causes of diarrhea:



- 6-**Intestinal diseases.** Inflammatory bowel disease, colitis, Crohn's disease, and celiac disease often lead to diarrhea.
- 7-**Functional bowel disorders.** Diarrhea can be a symptom of irritable bowel syndrome.
- 8-**Allergies to certain foods.**
- 9-**Radiation therapy.**
- 10-**Malabsorption:** (where the body is unable to adequately absorb certain nutrients from the diet).
- 11-**Hyperthyroidism.**
- 12-**Some cancers.**
- 13-**Digestive tract surgery.**



# Signs and Symptoms

## Small bowel infections

1. watery diarrhea
2. Large volume
3. Abdominal cramping
4. Bloating, gas
5. Weight loss
6. Fever is rarely a significant symptom
7. Stool does not contain occult blood or inflammatory cells.

## Large intestinal diarrheas

1. Frequent,
2. Regular
3. Small volume
4. Often painful bowel movements.
5. Fever
6. Bloody or mucoid stools are common,
7. Red blood cells and inflammatory cells may be seen routinely on the stool smear.



# Clinical Feature: Cholera

- 1. Rice-watery stool**
2. Marked dehydration
3. Projectile vomiting
4. Hypovolemic shock

# Cont: Clinical Feature: E. Coli Diarrhea



- Watery stools
- Vomiting is common
- Dehydration moderate to severe
- Fever— often of moderate grade



# Rotavirus



- **Rotavirus:**
- Viral gastroenteritis causes approximately 80% of all cases of diarrhea in children younger than 1 year with rotavirus, accounting for 50% of the cases of acute diarrhea in children.



# Rotavirus

- **Rotavirus** Is the most important cause of serious gastroenteritis among children and a significant nosocomial (hospital-acquired) pathogen.
- Rotavirus disease is most severe in children 3 to 24 months of age.
- The virus is spread through the **fecal–oral** route or by person-to-person contact, and almost all children are infected with rotavirus at least once by 5 years old.
- Rotavirus is the most common cause of diarrhea- **associated hospitalization**, with an estimated 2.3 million hospitalizations occurring worldwide in children younger than 5 years old



- The primary transmission of **Rotavirus** is via the fecal–oral route; increasing the risk for transmission through contaminated surfaces or food.

# Clinical Feature: Rotavirus Diarrhea



- **Symptoms of viral infection can include:**
- Watery diarrhea, may be proceeding by vomiting, fever (temperature higher than 38.0°C),
- Vomiting and fever disappear during 2<sup>nd</sup> days of illness but diarrhea continuous 5-7 days,
- Headache, abdominal cramps, lack of appetite, and muscle aches.



# The most differentiating points of rotavirus diarrhea

- (1) diarrhea in very young kids;
- (2) flu-like symptoms before diarrhea;
- (3) stools typically look like **yoghurt mixed in water.**



# Protect the children

- **Protect the children:** in Iraq immunization schedule now currently includes a recommendation for a three dose series of rotavirus vaccine (Rota Teq) 2, 4, 6 months of ages Or Rotavirus (Rotarix<sup>®</sup>) two doses 2 and 4 months.

# CONT: Clinical Feature: Shigellosis



- Frequent passage of scanty amount of stools, mostly mixed with blood and mucus.
- Severe abdominal cramps
- Tenesmus– pain around anus during defecation

# Cont: Clinical Feature: Amebiasis



- **Offensive and bulky stools** containing mostly mucus and sometimes blood
- Lower abdominal cramp
- Mild grade fever



# Lactose intolerance dairrhea



- Lactose intolerance means the body **cannot easily digest lactose**, a type of natural sugar found in milk and dairy products.
- This is not the same thing as a food allergy to milk.
- When lactose moves through the large intestine (colon) without being properly digested, it can cause uncomfortable symptoms such as gas, belly pain, and bloating

# Stool acidity test



The bacteria in the colon, mixed with the lactose, cause acidity in stools.

Stools passed after the ingestion of the lactose are tested for level of acidity. If the stools are acidic, the infant is intolerant to lactose.

**Stool pH in lactose intolerance is less than 5.5.**

# Treatment of Lactose Intolerance.



There is no cure for lactose intolerance.

Treat symptoms by limiting or avoiding milk products.

Some people use milk with reduced lactose, or they substitute soy milk and soy cheese for milk and milk products.

After a week of limiting foods with lactose, mother can add small amounts of milk or milk products back to child's diet.

# Diagnoses of Diarrhea



The diagnosis based on three steps include the following.

**1-History:** bowel movements that are increased in fluidity, frequency, Blood, mucus, or pus in the stool.



# DIAGNOSE S OF DIARRHEA Cont....

**2-Physical examination:** abdominal tenderness ,dry mouth, weakness, lethargy, or confusion.

## **3-Tests:**

A-Stool culture.

B-Blood tests.

C-Fasting tests.

D-Colonoscopy.

E-Imaging tests.

# Complications of diarrhea



The most common complications of diarrhea are the following:

1-Dehydration:acute renal failure .

2-Electrolyte imbalance.

3-Failure to thrive.

4-CVS- shock

5-CNS- seizure



## Treatment of diarrhea

1-Treatment is directed at the underlying **cause** of the diarrhea.

2-Most cases of acute diarrhea **do not require any treatment other than oral fluids** (containing carbohydrates and electrolytes).

3- Temporary **diet modification** (avoiding solid food until diarrhea subsides).

**4-Antibiotic or antimicrobial** therapy may be necessary when severe diarrhea is due to an infectious agent.

5- In chronic diarrhea, intravenous fluid and electrolyte replacement may be required if dehydration is severe.

**6-Antimotility agents** such as Lomotil.

# Zinc and Acute Diarrhea

1. It works in developing countries.
  - decreased stool output
  - decreased duration of disease
2. Use it (in areas with presumed zinc deficiency).
3. Dose:      20 mg/day x 10-14 days if > 6 mo  
                  10 mg/day x 10-14 days if < 6 mo (??)
4. Any of zinc salts e.g., sulphate, gluconate or acetate may be used.

*Curr Opin Clin Nutr Metab Care* 11:711, 2008

*Aliment Pharmacol Ther* 28:713, 2008

*Cochrane Database Syst Rev.* 2012 Jun 13;6:CD005436



## **Nursing intervention (Strategies) of the child with diarrhea:**

### **A-Strategies for breast-fed infants under 6 months include:**

- 1-Continue breast feeding as much as your baby desires.
- 2-Provide additional ORT fluids to supplement breast milk.

### **B-Strategies for bottle-fed infants under 6 months:**

- 1-Give normal amounts of formula.
- 2-Provide as much ORT fluids as the baby desires.
- 3-If vomiting occurs, provide small amounts of ORT fluids every 30-60 minutes.
- 4-Prevent diaper rash by changing diapers frequently and apply thick layer of a zinc oxide diaper rash treatment, such as Desitin Cream, at each diaper change .
- 5-Watch for symptoms of dehydration.



Nursing intervention (Strategies) of the child with diarrhea: Cont.....



## **C-Strategies for children over 6 months:**

1-Provide a balanced diet.

2-Provide as much ORT fluids as your baby desires.

3-If vomiting occurs; provide small amounts of ORT fluids every 30-60 minutes.

4-Prevent diaper rash .

5-Watch for symptoms of dehydration.



## **D-Dietary Therapy:**

there are two important category

1-Foods that may help include:

Applesauce, Bananas, Bread ,Cereal ,Crackers

Mashed potatoes ,Noodles ,Oatmeal, Potatoes ,Rice

Strained carrots ,Wheat ,Yogurt.

2- Items that may worsen include: Alcohol Caffeine Concentrated fruit juices, High-sugar foods. junk food, Cow's milk, Spicy foods, Sugar substitute.

# Prevention of Diarrhea



nutrition

sanitation

vaccination



Thanks....





# Vomiting

# Definition of Vomiting:

**Vomiting** It is rapidly or forcefully expels the gastric contents through the mouth.

**Regurgitation** (also called "**spitting up**") It is passive transfer of small amounts of food come back up through the mouth.





# Causes of vomiting according to the type:

Vomiting may be divided into two categories:

- 1-Projectile vomiting** vomiting that is sudden and so vigorous that the vomitus is forcefully projected to a distance.
- 2- Non projectile vomiting** include infectious, inflammatory, metabolic/endocrinologic .



# Signs and Symptoms of children with vomiting



- They vary according to the causes and origin of the illness.
- Thorough history and assessment must include a description of the **onset, duration, quality and quantity, appearance, presence of undigested food, odor, and evidence of a precipitating event.**
- The relation of the vomiting to the time of day, meals, or other activities, associated symptoms.

# Nursing Care of children with vomiting



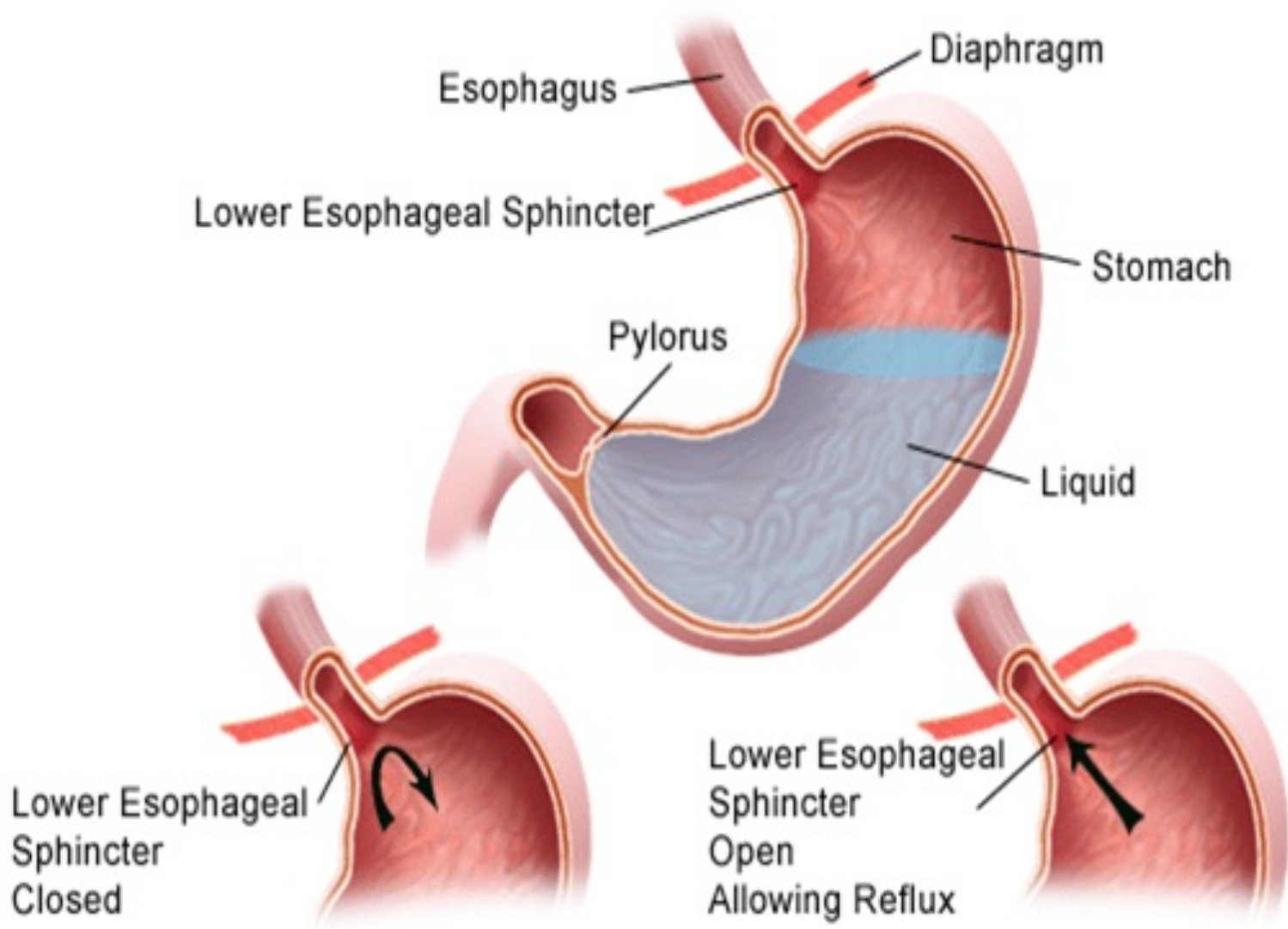
- The degree of dehydration is determined and treated.
- Give anti-emetic drug or B6 as prescribed (Metoclopramide (plasil)).
- Rehydration is generally initiated after 1 to 2 hours with nothing by mouth.
- Plain water, apple juice, soda, milk, and sports drinks are avoided.
- Oral hygiene.

# **Gastroesophageal Reflux DISEASES (GERD),**



- **Gastroesophageal Reflux (GER), the return of gastric contents into the esophagus, is the result of relaxation of the lower esophageal sphincter.**
- **It defined clinically as more than two episodes per day of regurgitation or emesis”.**

# Gastroesophageal Reflux



# Classifications of reflux



- Physiological, Functional
- Pathological



<b>Physiological Gastroesophageal Reflux</b>	<b>Pathological Gastroesophageal Reflux</b>
Infrequent and episodic vomiting	Frequent
Usually resolves by 1 year	Persists beyond 18 months of age



# Signs and Symptoms of GERD

- Vomiting and regurgitation (non-bilious) and includes undigested formula or food
- Fussy
- Refuse to feed
- Respiratory symptoms such as choking, coughing, wheezing, apnea
- Poor weight gain

# Nursing management: OF GERD



1. Healthy, well-nourished infants no need treatment for physiological reflux
2. Caregiver support and anticipatory guidance: that there is no underlying disease.
3. Small, frequent feedings and **burping** frequently.
4. Thickening of feedings with cereal with reducing amount.



# Nursing management:OF GERD

## Cont....



5. Elevate the head of the crib to prevent aspiration.
6. Hold infant in an upright position for 20 to 30 minutes following feedings.
7. Minimize seated positioning.
8. Surgical treatment may be recommended for severe symptoms.



# Constipation

- Definition of Constipation
- Two or fewer stools per week or passage of hard, pellet-like stools for at least 2 weeks duration.
- Constipation peaks between the ages of 2 and 4 years and is more common in males than in females until adolescence.

# Etiology of Constipation:



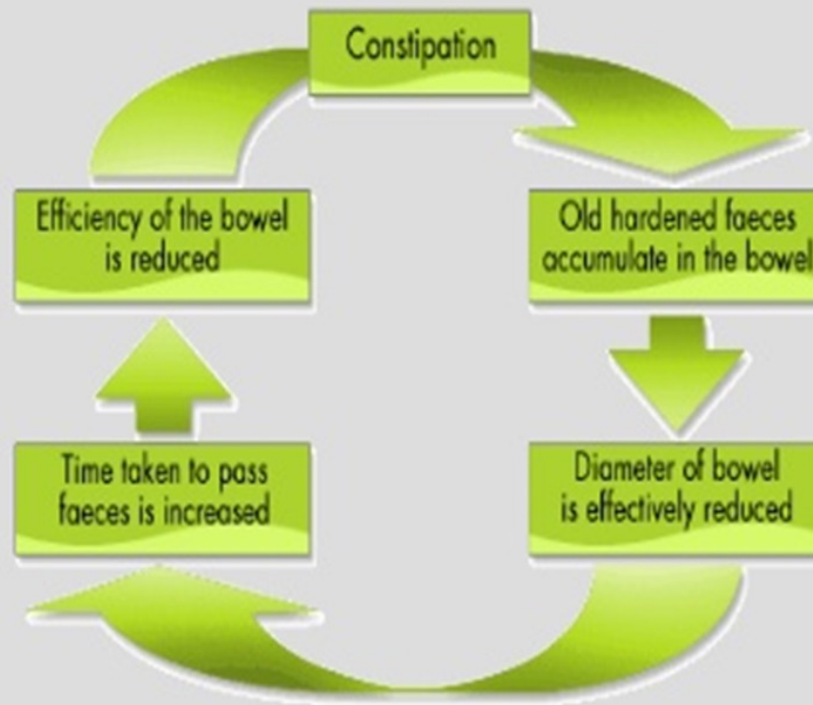
- 1. Withholding:** Children may also experience constipation during toilet training, which is related to not wanting to take time from play or from overenthusiastic toilet training .
- 1. Changes in routine:** such as travel, hot weather, stress or school .
- 1. Changes in diet:** Onset of constipation during infancy is generally associated with dietary causes. Not enough fiber-rich fruits and vegetables or fluid in child's diet.



# Etiology of Constipation: cont....

**4. Medical conditions:** such as Hypothyroidism, Hirschsprung's disease (mega colon) and spinal cord pathology, anal stenosis, stricture, fissure , gluten enteropathy, diabetes insipidus, lead toxicity ...etc

**5. Medications:** Side effects of some Drugs such as antacids, diuretics, iron supplements, opioids, antihistamines, and antiepileptics.



# Chronic Constipation

Occurrence of 2 or more of the following  
(last 2 months > 4 yrs; last 1 month < 4 yrs)

- Frequency of bowel movements < 3 / week
- More than 1 episode of fecal incontinence / week
- Large volume of stool in rectum or palpable in abdomen
- Passing of large diameter stools – may obstruct toilet
- Display of retentive behavior: posturing, withholding maneuvers, on toes, corners
- Painful defecation



# Diagnosis of constipation

- Diagnosis is based on the symptoms.
- An abdominal radiography and barium enema may be ordered for children who do not respond to treatment.

# Nursing Care for Constipation



## **A. Constipation caused by dietary intake can be treated with:**

1. A regular diet, rich in all nutrients coupled with an adequate amount of water and other fluids.
2. Fresh fruit adds fiber and non-absorbed sugars (Juices: Prune, Apple and White grape juice).
3. Limiting dairy products such as cheese.



# Nursing Care for Constipation Cont....



**B. Regular toilet time:** Encourage the child to use the toilet once or twice per day in the morning and after every meal or snack.

## **C. Medication:**

1. Stool softeners or laxatives may be needed to “train” the child and the bowels into a regular pattern of elimination.
2. No medication should be used on a long-term basis without a physician’s prescription or health care provider’s guidance.



# • **Managements**

- **AI dietary fiber intake** recommendations:
- for boys ages 9 to 13 years are 31 g/day and are 26 g/day for girls of the same age and up to age 18 years.

For boys ages 14 to 18 years, the AI for fiber intake is 38 g/day.

- **Stool-softening agents** such as **docusate** or **lactulose** may also be helpful.
- **laxative** , **Polyethylene glycol** ,and **polymer** that has been introduced as a new laxative in recent years.



# Dehydration and electrolyte disturbance



# Dehydration:

Mean loss of body fluid.



# Types of dehydration

## Type of dehydration:

- 1-Isotonic dehydration serum  $\text{Na}^+$  130-150 meq/L
- 2-Hypotonic dehydration serum  $\text{Na}^+$  < 130meq/L
- 3-Hypertonic dehydration serum  $\text{Na}^+$  >150 meq/L

(milliequivalent per liter)

Type of dehydration ↓	Isotonic (isonatremic)	Hypotonic (hyponatremic)	Hypertonic (hypernatremic)
Loses	$\text{H}_2\text{O} = \text{Na}$	$\text{H}_2\text{O} < \text{Na}$	$\text{H}_2\text{O} > \text{Na}$



**Oral Rehydration Therapy (ORT):** It is used for correction or treatment of dehydration associated with diarrhea, particularly gastroenteritis.



## Oral Rehydration Salt (ORS):

An oral rehydration solution is a great way to replace fluids and nutrients lost through vomiting and diarrhea.

An ORS is safe for babies and older children.

An ORS can come in several forms, including a powder that you mix with water, a liquid that is already mixed and as frozen popsicles.

- مصاصة

unicef



**NEW FORMULATION - LOW OSMOLARITY  
ORAL REHYDRATION SALTS IP**

FOR THE TREATMENT OF DEHYDRATION  
DUE TO DIARRHOEA

FOR CHILDREN AND ADULTS

Store in a cool, dry place

**NOUVELLE FORMULE - BASSE OSMOLARITÉ  
SELS DE RÉHYDRATATION ORALE IP**

POUR LE TRAITEMENT D'ÉTATS DE DÉSHYDRATION  
LORS DE DIARRHÉES

POUR ENFANTS ET ADULTES

Conserver au sec et au frais

**NUEVA FÓRMULA - OSMOLARIDAD BAJA  
SALES DE REHIDRATACIÓN ORAL IP**

PARA EL TRATAMIENTO DE LA DESHIDRATACIÓN  
CAUSADA POR LA DIARREA

EN NIÑOS Y ADULTOS

Conservar en lugar seco y frío

Each sachet contains:

Glucose anhydrous Food Grade	13.5 g
Sodium chloride BP 98	2.6 g
Trisodium citrate dihydrate BP 98	2.9 g
Potassium chloride BP 98	1.5 g
Net wt.: 20.5 g	





## Home preparation of ORS:

You can make a rehydration solution with packets from the drug store or by mixing:

- 1 liter of clean water (boil the water 5 minutes if you are not sure it is safe to drink)
- 8 teaspoons of sugar( 40gm)
- 1 teaspoon salt (4gm)
- 1/4 teaspoon of baking soda.

# Assessment of Dehydration Levels



SIGNS	SEVERITY		
	MILD	MODERATE	SEVERE
General condition	Thirsty, restless, agitated	Thirsty, restless, irritable	Withdrawn, somnolent, or comatose; rapid deep breathing
Pulse	Normal	Rapid, weak	Rapid, weak
Anterior fontanelle	Normal	Sunken	Very sunken
Eyes	Normal	Sunken	Very sunken
Tears	Present	Absent	Absent
Mucous membranes	Slightly dry	Dry	Dry
Weight loss	4%-5%	6%-9%	>10%
Skin turgor	Normal	Decreased	Decreased with tenting
Urine	Normal	Reduced, concentrated	None for several hours
Cap R. T.	<2 sec	2-3 sec	>3 sec
Elevated BUN (normal BUN: 8 to 25 mg per dL)	<10 mg per dL	10 to 20 mg per dL	21 to 25 mg per dL
Deep and rapid, acidotic breathing (pH <7.35; decreased bicarbonate)	Normal	Slightly increased respiratory rate	Increased respiratory rate



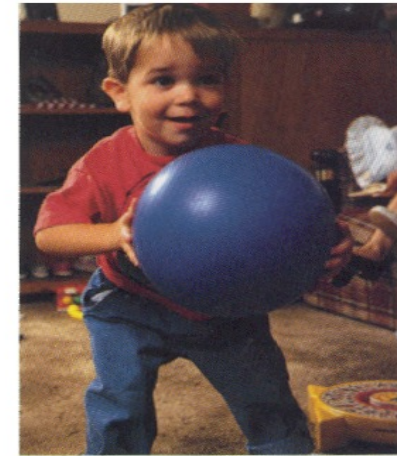
# Electrolyte disturbance

# Fluid composition varies at different ages



75% water

ECF=45%,ICF=30%



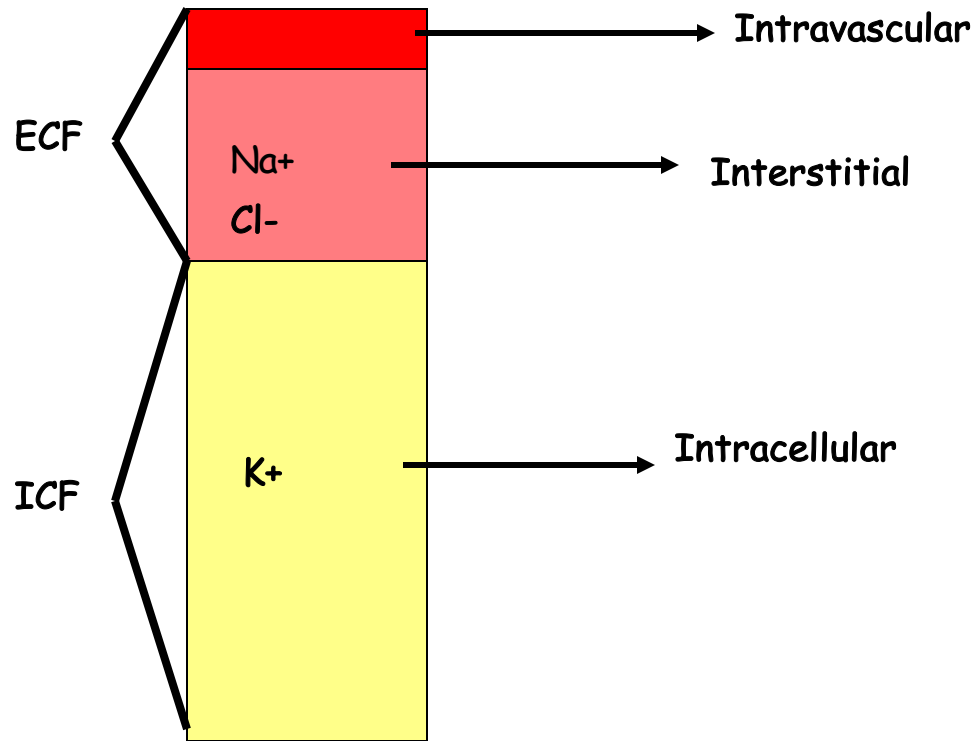
65% water, ECF= 25%,  
ICF = 40%



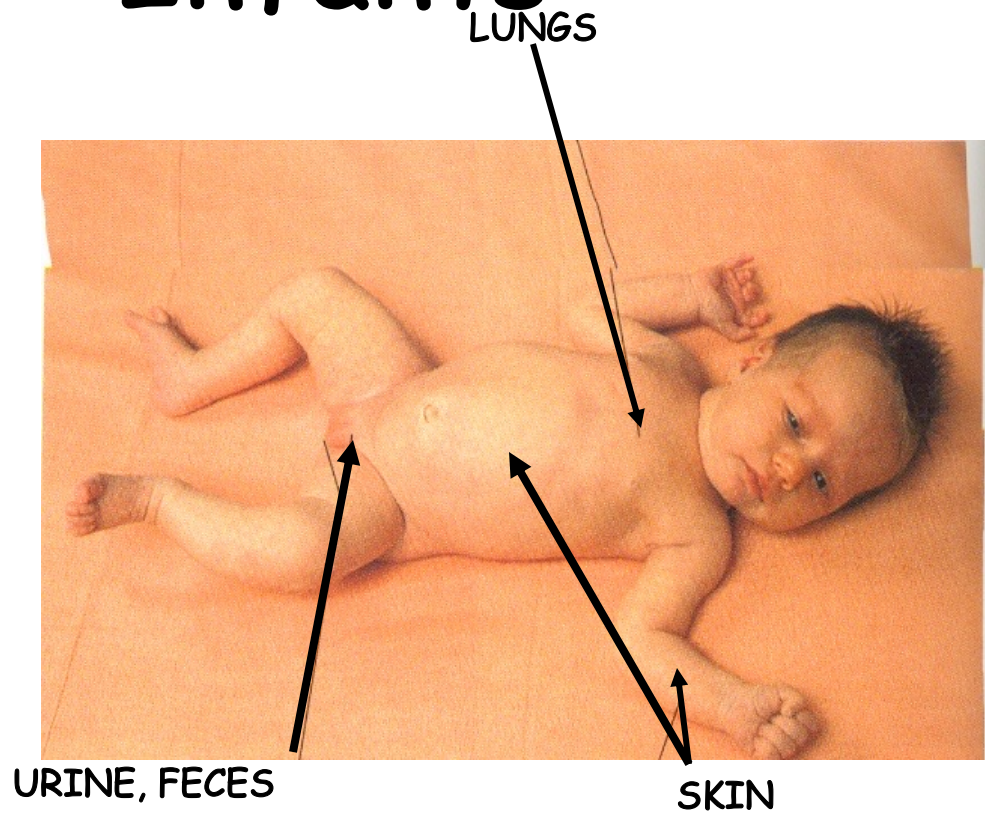
Adult female

50% water, ECF=10-15%,  
ICF=40%

# Distribution of Body Water



# Fluid Losses in Infants



# Treatment of dehydration



## Treatment of dehydration

- 1. Mild dehydration**-plenty of oral home made fluids + ORS (oral rehydration solution). **ORS** --- amount  $> 50\text{ml/kg}$  in 4 – 6 hours
- 2. Moderate dehydration**      **ORS** --- amount  $> 100\text{ml/kg}$  in 4 – 6 hours
- 3. Severe dehydration**      **I.V. fluids**- start by  $20\text{cc/kg/1hr}$  of normal saline or ringer lactate then glucose saline

# Electrolyte Concentrations



<i>Component</i>	<i>ECF</i>	<i>ICF</i>
<i>Na<sup>+</sup></i>	<i>High</i>	<i>Low</i>
<i>K<sup>+</sup></i>	<i>Low</i>	<i>High</i>
<i>Ca<sup>++</sup></i>	<i>Low</i>	<i>Low (higher than ECF)</i>
<i>Proteins</i>	<i>High</i>	<i>High</i>





**Electrolyte disturbance** :results from a profusion or a lack of minerals such as potassium, phosphate, magnesium or calcium. Such an imbalance would lead to hyperkalemia or hypercalcemia.

## **Type of Electrolyte disturbance**

1. Volume status (Dehydration/Hypovolemia/Hypervolemia)
- 2-Electrolyte Na<sup>+</sup> Hybernatriemia ·Hyponatremia (Hypotonic, Isotonic).
- 3-K<sup>+</sup> Hyperkalemia ·Hypokalemia
- 4-Cl<sup>-</sup> Hyperchloremia ·Hypochloremia

Please protect me from dehydration



Thank you for your attention