

- A significant proportion of diarrhoeal disease can be prevented:
- >Through safe drinking-water
- >Adequate sanitation
- >And hygiene

- Globally, there are nearly 1.7 billion cases of diarrhoeal disease every year
- Diarrhoea is a leading cause of malnutrition in children under five years old
- In developing countries, children under three years old experience on average three episodes of diarrhoea every year

 Diarrhoea is defined as the passage of three or more loose stools per day (or more frequent passage than is normal for the individual)

Types of diarrhoea

- There are three clinical types of diarrhoea:
- Acute watery diarrhoea lasts several hours or days, and includes cholera
- >Acute bloody diarrhoea also called dysentery
- Persistent diarrhoea lasts 14 days or longer

Causes

- Infection of the gut is the common cause of acute diarrhoea
- Virus
- A virus is the common cause of infective diarrhoea
- Rotavirus is common and adenovirus is second most common virus cause diarrhoea

- Water contaminated by bacteria or other germs is another common cause of infective diarrhoea, particularly in countries with poor sanitation
- Bacteria
- E.coli, Campylobacter, salmonella
- Food poisoning (eating food infected with microbes)
 causes some cases of diarrhoea

Symptoms of acute infectious diarrhoea

- Symptoms can range from a mild stomach upset for a day or two with slight diarrhoea, to severe watery diarrhoea for several days or longer
- Blood or mucus can appear in the stools with some infections

- Pains may ease each time when some diarrhoea is passed
- Vomiting, high temperature (fever), aching limbs and headache may also develop

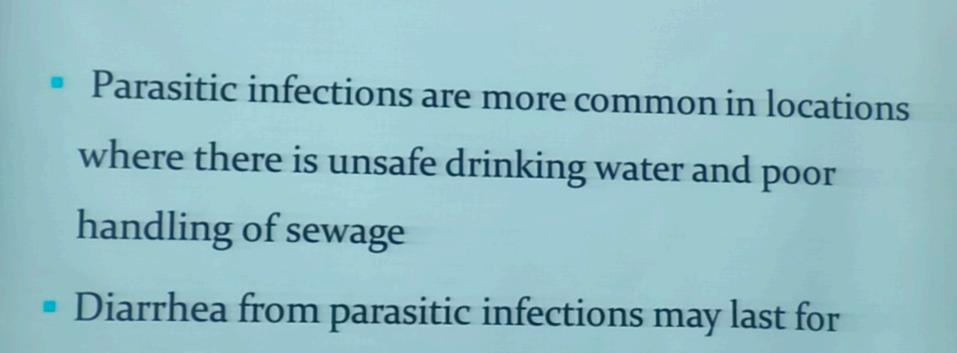
Viral diarrhoea

- Viral infection is the leading cause of diarrhea in children and is most commonly in the winter months
- Symptoms of viral infection can include: watery diarrhea, vomiting, fever (temperature higher than 100.4°F or 38.0°C)
- Headache, abdominal cramps, lack of appetite, and muscle aches

- Viral infection begins 12 hours to 4 days after exposure, and resolves within three to seven days
- No specific treatment is available for viral of diarrhea
- Children with diarrhea from viral infections are best treated with supportive measures (oral rehydration solution, limited diet, and rest)
- Vomiting is the predominant feature

- Bacterial infection is sometimes hard to distinguish from viral infection
- Bacterial infections are more common in locations where there is unsafe drinking water and poor handling of sewage
- Persistent high fever (higher than 40°C or 104°F) and diarrhea that is bloody or contains mucus are more common with bacterial diarrhea

- Most children with bacterial infection do not require antibiotics and will improve with time and supportive measures
- However treatment may be necessary in certain situations



weeks to months

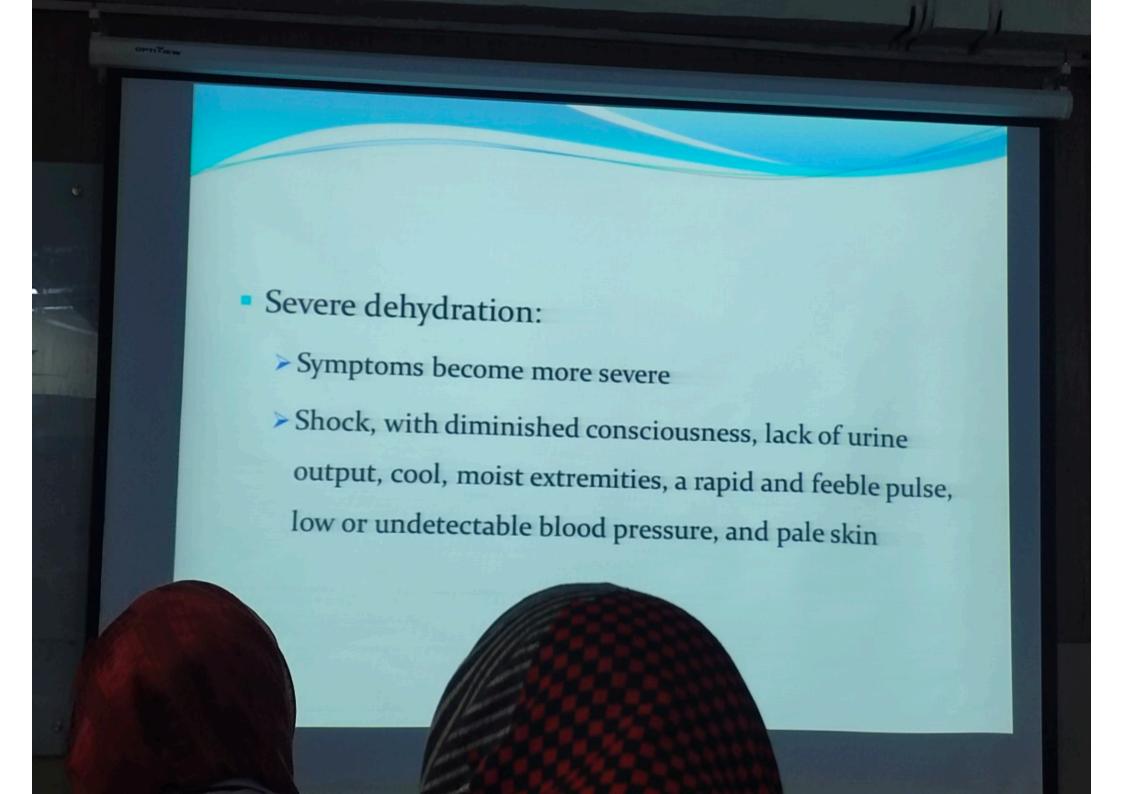
- Antibiotic-associated diarrhea:
- A number of antibiotics can cause diarrhea in both children and adults
- The diarrhea is usually mild and typically does not cause dehydration or weight loss
- The diarrhea usually resolves one to two days after antibiotics are finished

DIARRHEA EVALUATION

- The evaluation of diarrhea in children requires:
 Careful review of medical history
- > Physical examination, and diagnostic testing
- The clinician will perform a thorough
 examination because there are some infections
 (such as an ear infection) that can cause diarrhea

Monitoring for dehydration

- The most severe threat posed by diarrhoea is dehydration
- During a diarrhoeal episode, water and electrolytes
 (sodium, chloride, potassium and bicarbonate) are lost
 through liquid stools, vomit, sweat, urine and breathing
- Dehydration occurs when these losses are not replaced

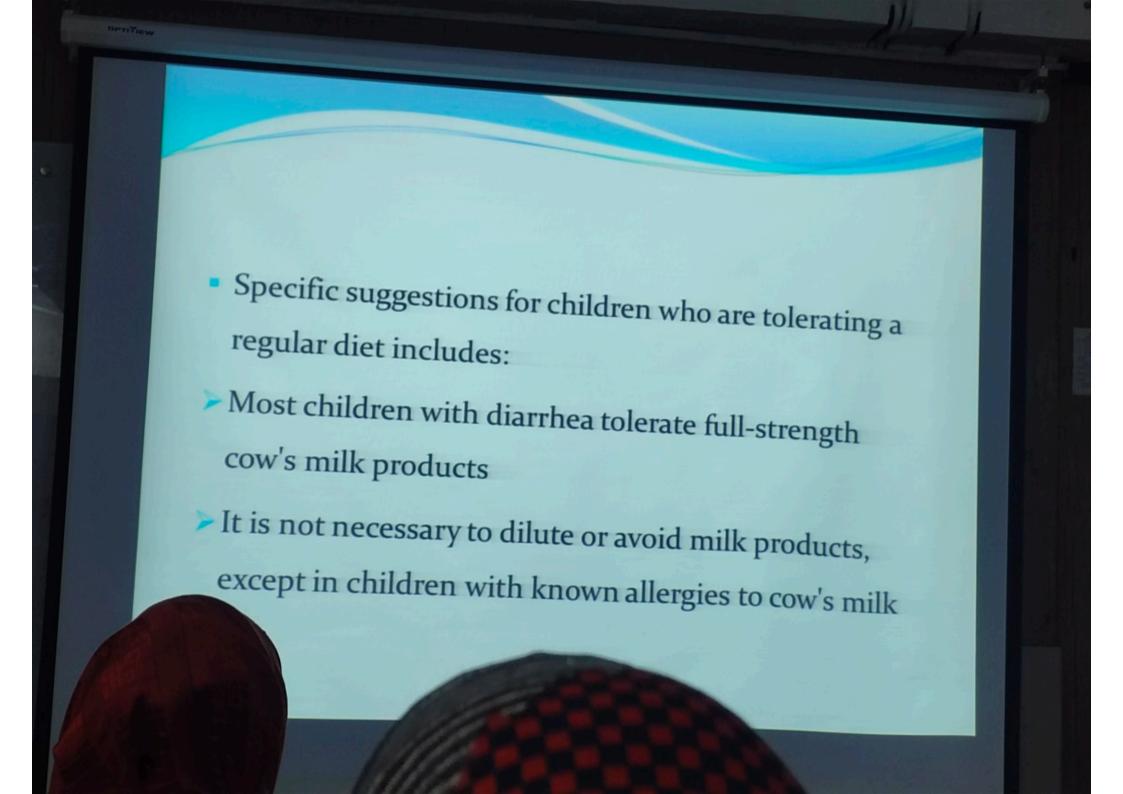


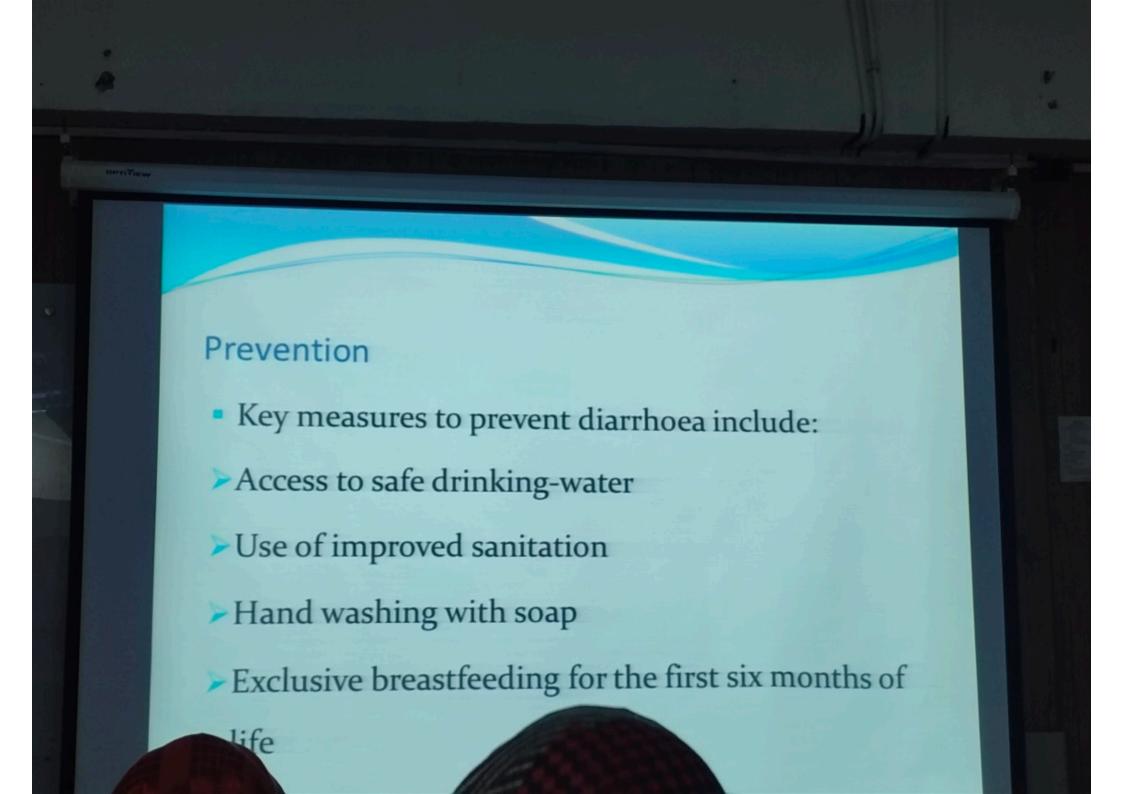
- Oral rehydration therapy (ORT) was developed as a safer, less expensive, and easier alternative to intravenous fluids
- (ORS) contains glucose (a sugar) and electrolytes (sodium, potassium, chloride) that are lost in children with vomiting and diarrhea
- ORT does not cure diarrhea, but help to treat the
 - hydration

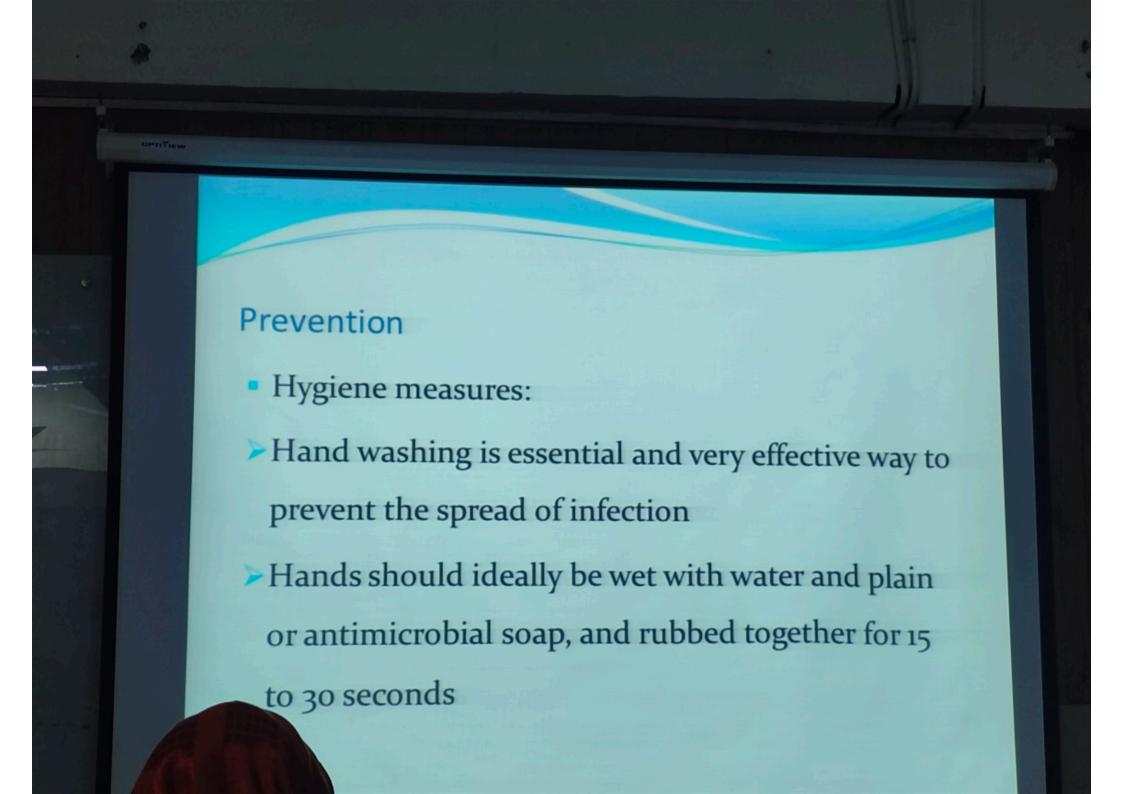
- Minimal or no dehydration
- Rehydration therapy is replacement of losses
- Less than 10 kg body weight 60-120 mL ORS for each diarrhea stool or vomiting episode
- More than 10 kg body weight 120-140 mL ORS for each diarrhea stool or vomiting episode

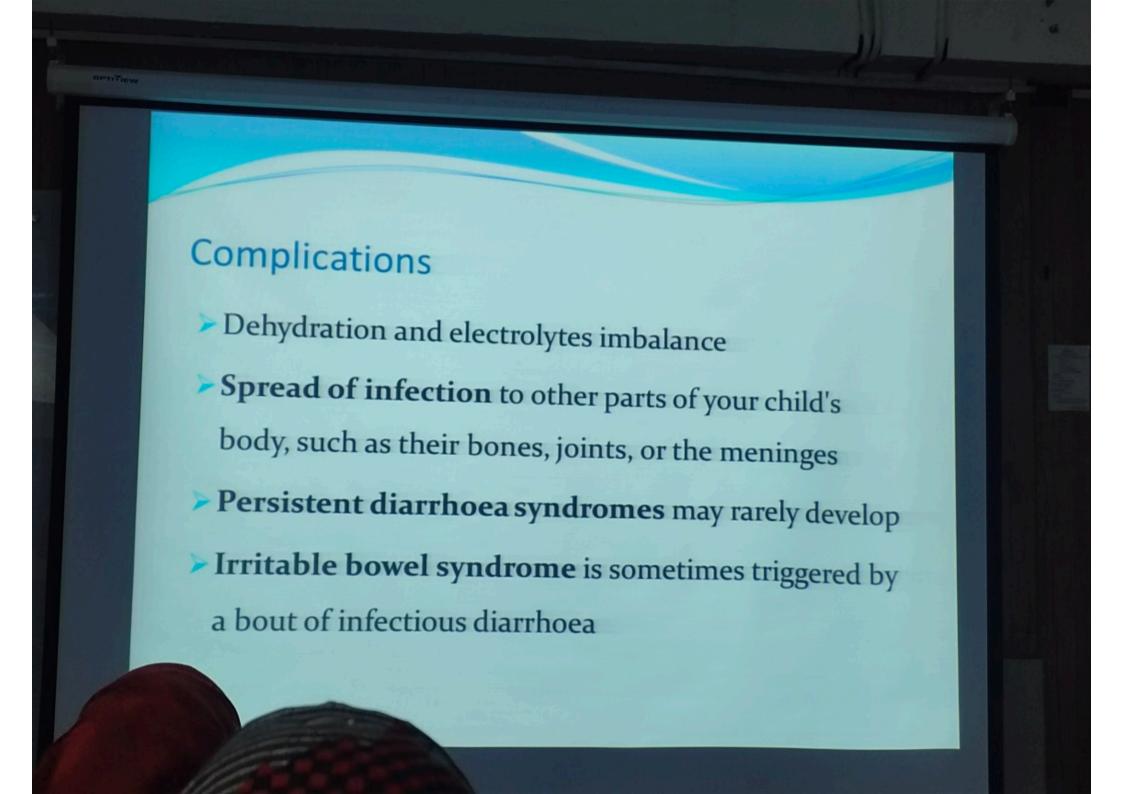
- Mild-to-moderate dehydration or some dehydration
- Therapy ORS (50-100 mL/kg over 3-4 h)
- Replacement of losses
- Less than 10 kg body weight 60-120 mL ORS for each diarrhea stool or vomiting episode
- More than 10 kg body weight 120-140 mL ORS for each diarrhea stool or vomiting episode

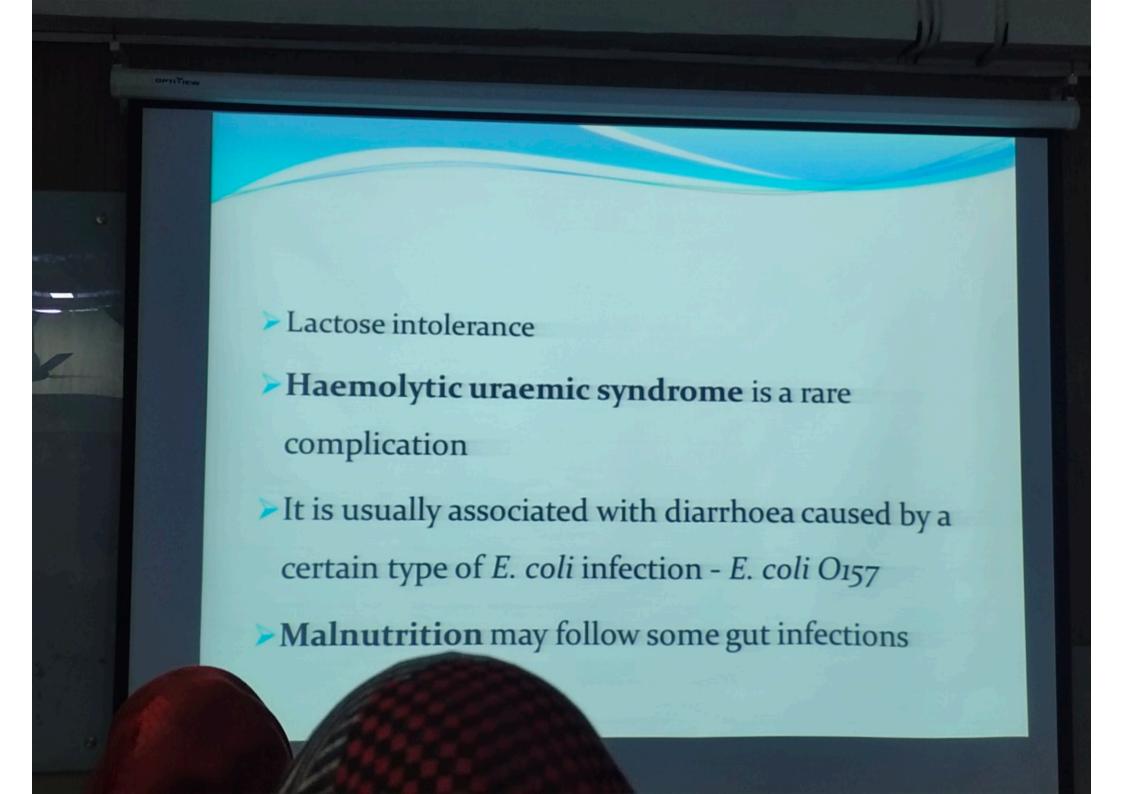
- Severe dehydration: Rehydration therapy Intravenous lactated Ringer solution or normal saline (20 mL/kg until perfusion and mental status improve)
- Followed by 100 mL/kg Ringer lactate
- If child less than 1 year 30 ml/Kg within 1 hour remaining 70ml/Kg over 5 hours
- If child more than 1 year 30ml/Kg within half an hour remaining 70 ml/Kg over two and half an hour











CHRONIC DIARRHOEA

- Despite considerable advances in the understanding and management of diarrheal disorders in childhood, dirrhoea is still responsible for a major burden of childhood deaths globally
- An estimated 2.5 million deaths
- These findings indicate the continuing need to focus on prevention and management of childhood diarrhea in

countries

- Most diarrheal disorders resolve within the first week of the illness
- Only 1 to 3% of acute diarrhoeas become chronic, With a high mortality and morbidity
- Persistent diarrhea has been defined as an episode that begins acutely but lasts for 14 days or longer

Classification of chronic Diarrhoea (CD)

- Type I—chronic diarrhoea in a previously normal child-90%
- Type Il—chronic diarrhoea in a child with mostly inherent defect-10%





Type 1 (persistent or protracted) starts as acute diarrhoea, but instead of subsiding in the usual time, diarrhoea goes on for a period of more than 2 weeks.

The various risk factors for this are:

Protein-energy malnutrition

Younger age < 18 months

Lack of breast-feeding

Bottle-feeding

Cow's milk., Soy protein

Inap e use of antibiotics

- Improper therapy of ADD
- Use of antimotility drugs like loperamide
- Starvation during ADD
- Vitamin A deficiency
- Zinc deficiency
- Poor hygiene leading to re infection

ctra intestinal infections, e.g., septicemia, UTI

TYPE II CHRONIC DIARRHOEA

- Inflammatory causes
- Tuberculosis.
- Eosinophilic gastroenteritis
- Crohn's disease
- Necrotising enterocolitis
- Allergic colitis
- Henoch-Schonlein vasculitis

- Malabsorption states
- Pancreatic diseases
- Cystic fibrosis
- Chronic pancreatitis
- Congenital lipase deficiency
- Congenital trypsin deficiency

- Lactase deficiency-congenital/acquired
- Glucose-galactose malabsorption

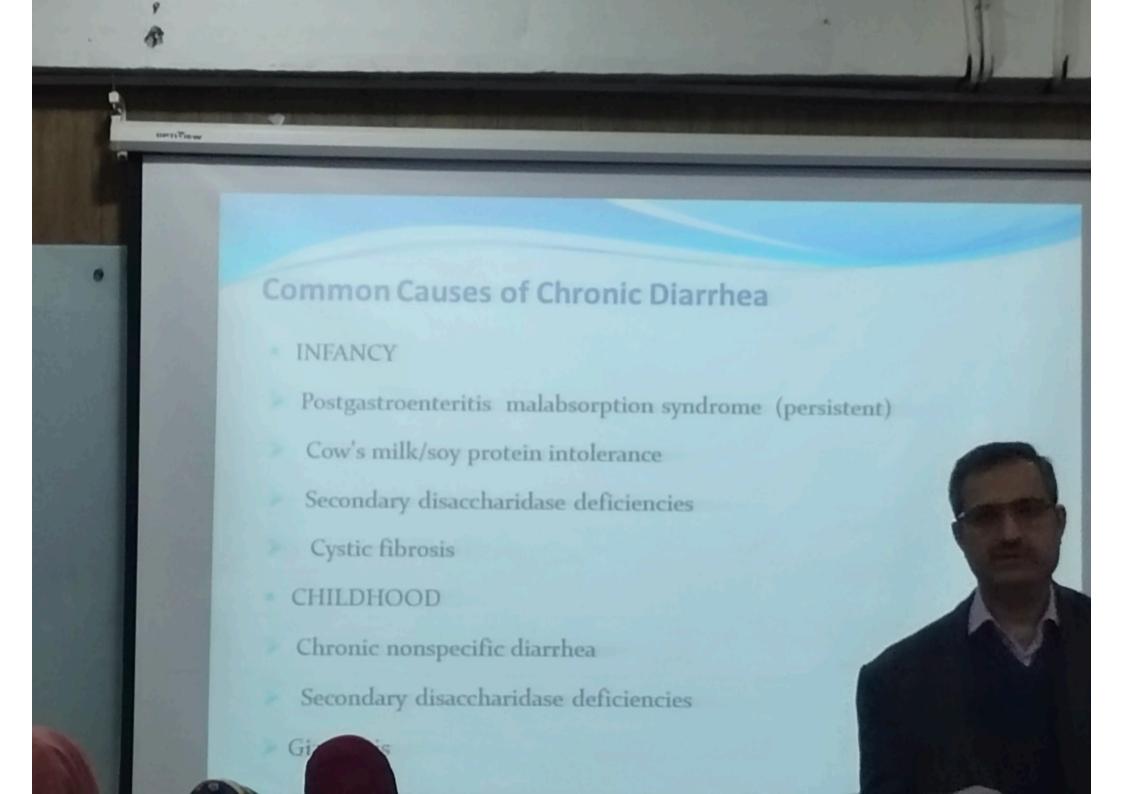
- Intestinal diseases
- Tropical sprue
- Coeliac disease
- Whipple's diseae
- Intestinal lymphangiectasia

- Metabolic disorders
- Congenital chloride diarrhoea
- Abetalipoproteinaemia
- Acrodermatitis enteropathica

- Endocrine causes
- Hyperthyroidism
- Adrenal insufficiency
- Congenital alterations in electrolyte transport

- Immune defects
- Agammaglobulinaemia
- Isolated IgA deficiency
- Combined immunodeficiency

- Anatomical or surgical disorder
- Necrotizing enterocolitis
- Short bowel syndrome
- Hirschprung's disease
- Intestinal lymphangiectasia



- Post gastroenteritis malabsorption syndrome
- Celiac disease
- Cystic fibrosis
- ADOLESCENCE
- Irritable bowel syndrome
- Inflammatory bowel disease
- Giardiasis
 - lactose intolerance

Osmotic Vs Secretory Diarrhea

	OSMOTIC DIARRHEA	SECRETORY DIARRHEA
Volume of stool	<200 mL/24 hr	>200 mL/24 hr
Response to fasting	Diarrheastops	Diarrhea continues
Stool Na*	<70 mEq/L	>70 mEq/L
Reducing substances[*]	Positive	Negative
Stool pH	<5	>6

EVALUATION OF A CHILD WITH CHRONIC DIARRHOEA

- Stool history
- Site of pathology, i.e. whether it is a SBD or LBD, and
 - the nature of the disease process
- SBD, -profuse watery, usually offensive stools, without
 - blood

Stool characteristics: blood, mucous, nondigested substances, steatorrhoea

Physical examination: FTT, abdominal distension, viscovintegaly, tetelerness, presence of abdominal paisses

Other organs affected, e.g. skin, respiratory system

Degree of dehydration and malnutrition should be

- Stool characteristics: blood, mucous, nondigested substances, steatorrhoea
- Physical examination: FTT, abdominal distension, visceromegaly, tenderness, presence of abdominal masses
- Other organs affected, e.g. skin, respiratory system
- Degree of dehydration and malnutrition should be

Diagnosis

- A complete clinical history is mandatory. Some clinical signs and symptoms are relevant for a diagnostic approach
- Age of onset
- Nutritional assessment
- Associated symptoms: fever, vomiting, abdominal pain, anorexia



Perianal fistula - Crohn's disease

Clubbing - malabsorption syndromes, IBD

Chronic liver disease- IBD

Hepatomegaly -lymphomas, metastatic carcinoid, IBD and Whipple's disease

Ascites - TB and lymphoma

Investigation

- STOOL EXAMINATION
- Microscopy
- Polymorphs and RBCs bacterial colitis, whipworm colitis, amoebic colitis and in IBD
- Eosinophils are seen in milk or soya protein intolerance

- Stool pH and Reducing Substance
- A stool pH < 5.5 (on cow's milk) or < 5 (on breast milk) is suggestive of carbohydrate malabsorption and proximal small bowel damage.
- Demonstration of Reducing Sugars in Stool
- Stool Culture
- Stool culture is positive only in 20% of patients with acute diarrhoea and it is even lower in PD.

- Occult Blood
- In acute diarrhoea- bacterial or parasitic colitis
- chronic diarrhoea- IBD like ulcerative colitis and Crohn's colitis
- CBC
- Haemoglobin
- bacterial infections like septicaemia, urinary tract infection etc.
- ESP very high in septicaemia and lymphoma of the bowel.

- Peripheral Blood Picture
- Iron deficiency anaemia or dimorphic anaemia
- Abetalipoproteinaemia (acanthocytes)
- Biochemical Investigations
- Serum electrolytes
- Blood urea
- Sugar and plasma proteins
- Blood and Urine Culture

- Barium meal follow through: This will detect ulcers and strictures of small bowel
- Small bowel biopsy: tropical sprue, coeliac disease, tuberculosis,lymphoma,abetalipoproteinaetnia, Whipple's disease, amyloidosis, lymphangicetasia

MANAGEMENT OF PERSISTENT DIARRHOEA

- About 30% of patients with PD require hospitalization, if they have 1 or more of the following:
- Age: Less than 4 months and not breast feed.
- Severe PEM.
 - Dehydration
- Presence of systemic infections.
- Patients with PD and malnutrition are highly prone to
 - sy infections, including septicaemia

Management

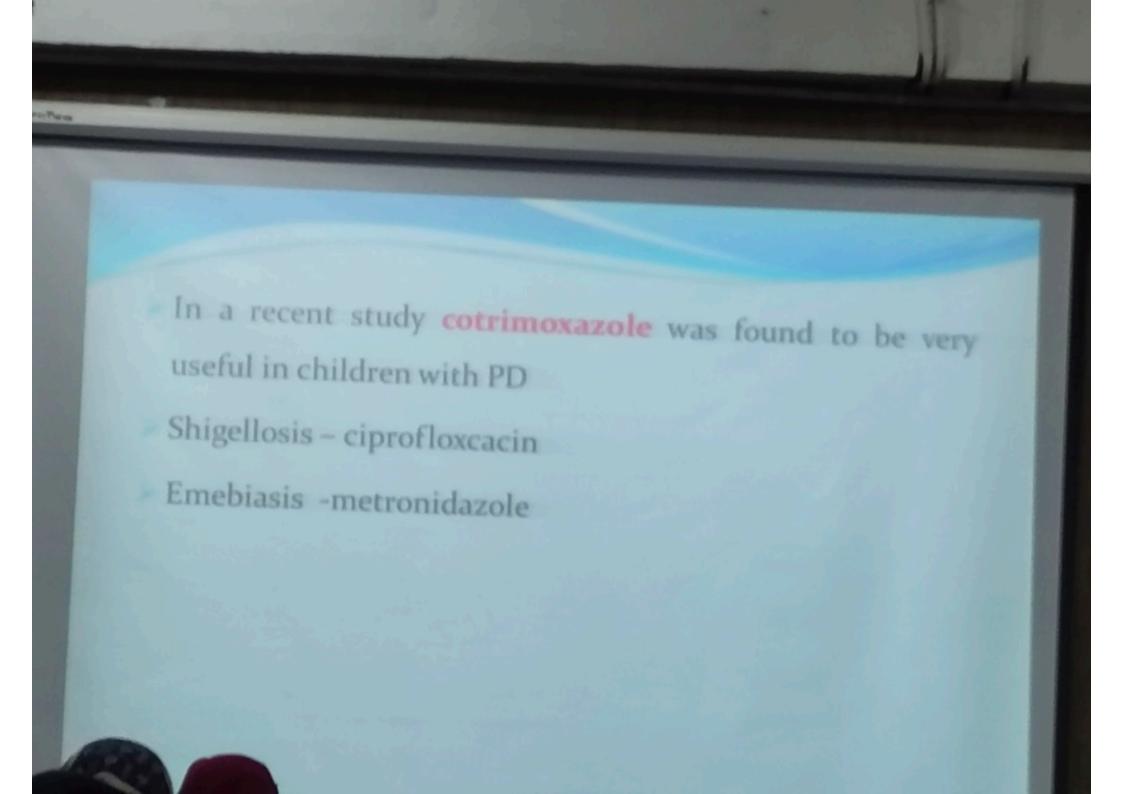
- The management of PD consists of 3 phases:
- Resuscitation phase (24-48 hours)
- Control of diarrhoea (up to 7 days)
- Rehabilitation phase (up to 8 weeks)

RESUSCITATION PHASE

- Correction of
- Dehydration, shock, electrolyte disturbance,
 - hypoglycaemia and renal failure.
- Appropriate antimicrobials

Control of Diarrhoea

- The major factors responsible for PD
- Bacterial contamination of the gut
- Systemic infections
- Food allergen (cow milk, soy protein, egg protein etc.
- Lactose intolerance
- Toxins
- Bile acids



REHABILITATION PHASE

- Aims
- To improve the general health and nutritional status
- To correct nutritional deficiencies
- For catch-up growth
- To educate the parents, especially to prevent future relapse.
- These patients should be followed up regularly, as they are predisposed to develop PD again