Infections through Gastro-Intestinal Tract

AGENTS

- **VIRUSES:**
  - Gastroenteritis: Coxsakie, Echo, Reo, Rotavirus
  - Poliomyelitis
  - Viral Hepatitis

- **BACTERIAL:**
  - Enteric fevers: *Salmonella typhi, S. paratyphi*
  - Gastroenteritis: E.Coli, Campylobacter spp
  - Dysentry: Shigella spp
  - Cholera: Vibrio cholera
  - Food poisoning: *Salmonella typhimurium, Staphylococcus aureus, Clostridium welchii*

Agents

- **PROTOZOAL:**
  - Amoebiais
  - Giardiasis

- **HELEMENTHIC:**
  - Nematodes: Ascariasis, Enterobiasis, Trichuriais, Trichinosis
  - Cestodes: Taeniasis, Hydatid cyst

Epidemic patterns

- **Water Borne:**
  - Explosive
  - Affects people over wide area
  - No other traceable connection except common use of water

- **Food Borne:**
  - More localised
  - Affecting persons from same household or boarding institution, those who feed communally at a hotel, restaurant, staff canteen etc

Host factors

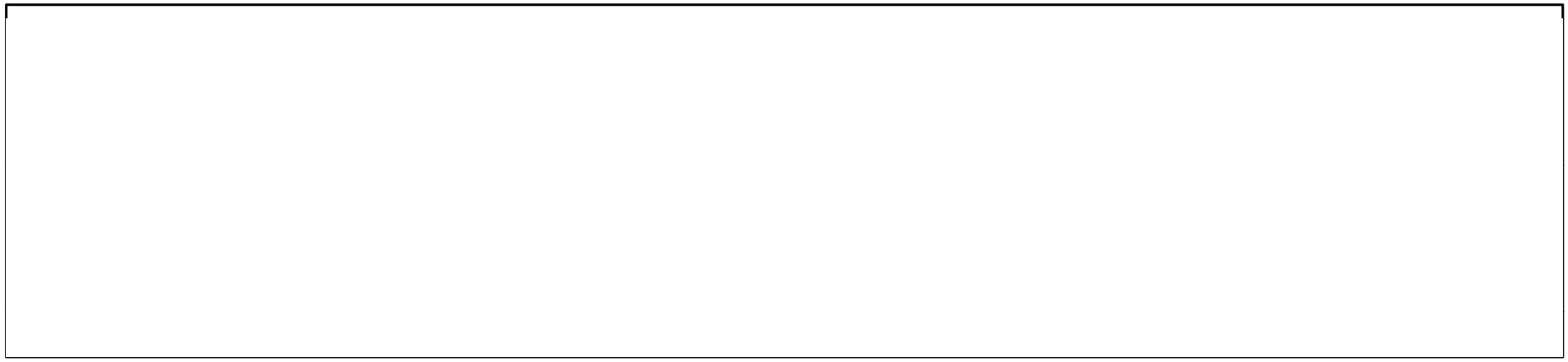
- **Non specific factors**
  - High acid content
  - Antibacterial lysozyme

- **Specific factors**
  - Natural infections
  - Artificial immunisation
  - Local resistance of mucosa

Control

- **Infective agent:**
  - Sanitary disposal of faeces
  - Elimination of human and animal reservoirs
- **Route of transmission**
  - Provision of safe water supply
  - Protection of foods from contamination
  - Control of flies
  - Improvement of personal hygiene
- **Host**
  - Specific immunisation
  - Chemoprophylaxis
  - Specific treatment

Acute Diarrhoeal Diseases



Diarrhoea

- Passage of loose, liquid or watery stools
- More than three times a day

- Change in consistency and character of stools is more important

Clinical types

1. Acute watery diarrhoea:

- Lasts several hours to days
- Main danger is dehydration
- V. cholera, E. coli, Rota virus.

2. Acute bloody diarrhoea

- Dysentry i.e. visible blood in the stools
- Main dangers are damage of intestinal mucosa, sepsis and malnutrition.
- Shigella

3. Persistent diarrhoea

- Lasts 14 days or longer
- Main dangers are malnutrition and serious non-intestinal infection.
- Person with other illnesses e.g. AIDS

4. Diarrhoea with severe malnutrition

- Main dangers are sever systemic infection, dehydration, heart failure, vitamin and mineral deficiency.

Problem Statement

Diarrhoea and Deaths in Under 5 children:

- ***Second*** leading cause of death vs ARI
- 4.6 million (in 1980) to 1.2 millions (in 2000) and around 760 000 (in 2011).
- 90% of deaths occur in Sub Sahara Africa and South East Asia.
- ***09% under five death # mostly <2 yrs—0.6 m death (2012)***
- Globally, 1.7 billion cases of diarrhoeal disease every year
- ***A median of 03 episodes per child-year for children under 5 years in developing countries***
- 1.4 billion episodes/year; 123 million clinic visits; 9 million hospitalizations
- ***Loss of 62 million DALYS***

- ***8% of deaths in under 5 children***
- *11.6 million cases & 1323 deaths (2014)*
- *10.7 million cases & 1535 deaths (2013)*
- *0.6 million cases & 1293 deaths (2011)*

Agents

- **Viruses**
  - Rotaviruses
  - Astroviruses
  - Calciviruses
  - Coronaviruses
  - Norwalk group
  - Enteroviruses
- **Others**
  - Protozoa
  - Helminths
- **Bacteria**
  - *Camplyobacter jejuni*
  - *Escherichia coli*
  - *Shigella spp*
  - *Salmonella spp*
  - *Vibrio cholerae*
  - *Vibrio parahemolyticus*
  - *Bacillus cereus*

Agents frequently identified in children with ADD in Developing Countries

Pathogen		**% of cases**
Viruses	Rotavirus	15 - 25
Bacteria	Enterotoxigenic E. coli	10 – 20
	C. jejuni	10 – 20
	V. cholerae	5 – 10
	Shigella	5 – 10
	Salmonella (non typhoid)	1 – 5
	Enteropathogenic E. coli	1 – 5
Protozoa	Cryptosporidium	5 - 15

Reservoir:

- **Human** (mainly):
  - ETEC, Shigella spp., V. cholera, Giardia lamblia, E. histolytica

- **Animals:**
  - Campylobacter jejuni, Salmonella spp., Yersinia enterocolitica

Host factors

- Children: 6 months – 2 years
- Incidence highest during weaning
  - Incorrect feeding practices
  - Declining maternal acquired antibodies
  - Direct contact with faeces when child starts to crawl

- Common among malnourished
- Poverty
- Prematurity
- Reduced gastric acidity
- Lack of personal hygiene

Environment factors

- **Temperate areas:**
  - Warm seasons: Bacterial diarrhoea
  - Winter: Viral diarrhoea

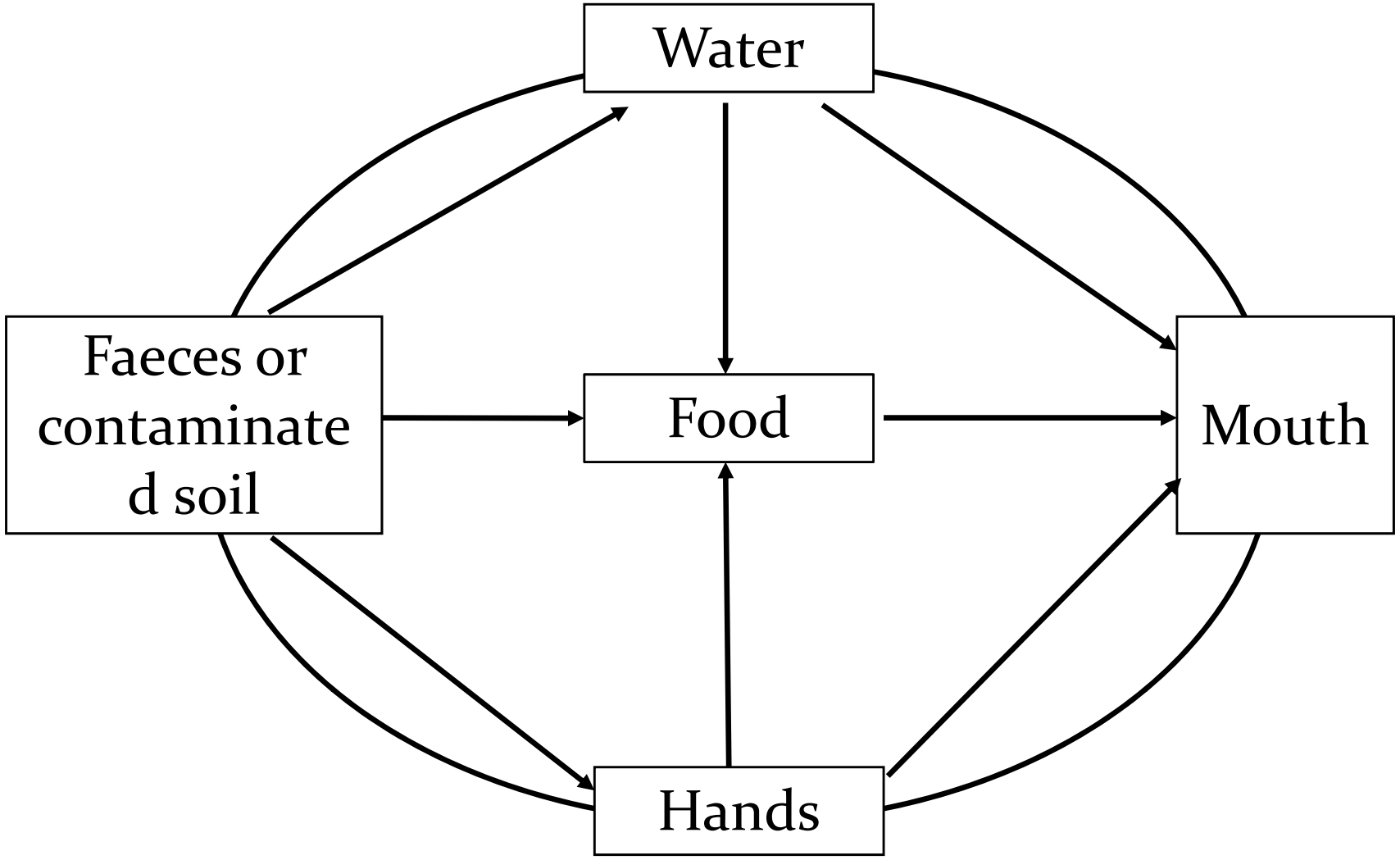
- **Tropical areas:**
  - Throughout the year: Viral diarrhoea
  - Warmer, rainy season: Bacterial diarrhoea

Mode of Transmission

- **Feco Oral Transmission**

- Directly infectious
- Become infectious after maturation in the soil

Pathways of feco oral transmission



Control of ADD

1. Short term:

- Appropriate clinical management

2. Long term:

- Better MCH care practices
- Preventive strategies
- Preventing diarrhoeal epidemics

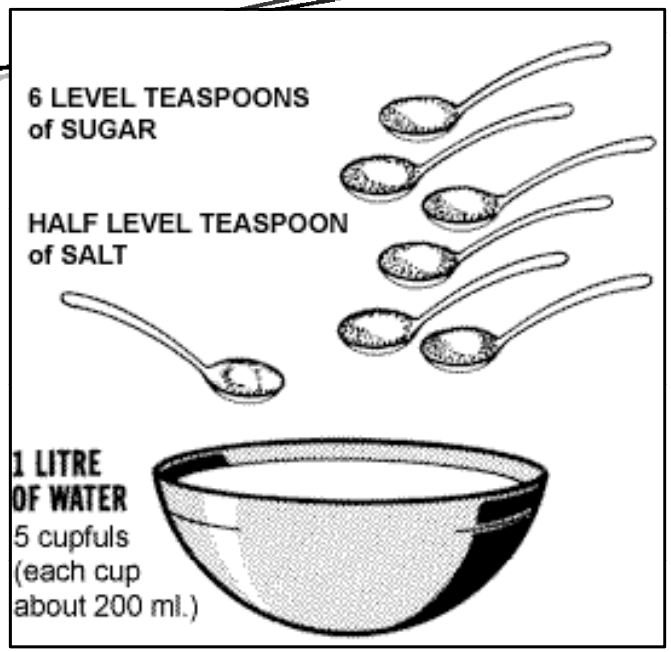
Appropriate clinical management

- Oral rehydration therapy
- Intravenous rehydration
- Maintenance therapy
- Appropriate feeding
- Zinc supplementation
- HBF (Home based fluids)
- SSS (Sugar salt solution)

ORT

Reduced osmolarity ORS	grams/ litre	Reduced osmolarity ORS	mmol/ litre
Sodium chloride	2.6	Sodium	75
Glucose, anhydrous	13.5	Chloride	65
Potassium chloride	1.5	Glucose, anhydrous	75
Trisodium citrate, dihydrate	2.9	Potassium	20
		Citrate	10
		Total Osmolarity	245

SSS



Half (1/2) litre of clean drinking
Add a **3-finger pinch of salt** (approx. 1.75gms)**.**
Taste the solution. **It shouldn't be more salty than your tea**
Add a **scoop of sugar** (approx. 20 gms.)
Stir the mixture till the **salt and sugar dissolve.**

Better MCH care practices

- **Maternal nutrition:**
  - Antenatal care
  - Postnatal during lactation

- **Child nutrition:**
  - Exclusive breastfeeding
  - Appropriate weaning practices
  - Vitamin A supplementation

Diarrhea: Evidence based Intervention (Reduction in Under 5 Mortality) Preventive Intervention

- Breast Feeding (🡻 by 13%)
  - Exclusive Breast feeding for first 6 months
  - Continued breast feeding 6-11 months
- Complimentary feeding (🡻 by 6%)
- Water, Sanitation, Hygiene (🡻 by 3%)
  - Safe drinking water
  - Hand washing
- Vitamin A (🡻 by 2%)

Low Osmolar ORS

- Reduced Risk of-
  - Hypernatremia

Evidence of Zinc efficacy in diarrhea

Cochrane Meta-analysis 2000 (18 Trials)

study setting did not alter outcome

Preventive Strategies

- *Sanitation*
- *Health education*
- *Immunization*
- *Fly control*

. Dr. N K Goel

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Department of Community Medicine

Govt. Medical College & Hospital, Chandigarh.

Food poisoning

- *Acute gastroenteritis caused by ingestion of food or drink contaminated with either living bacteria or their toxins or inorganic chemical substances derived either from plants or animals.*

Characteristics

- History of ingestion of common food
- Attack of many persons at the same time
- Similarity of signs and symptoms in the majority of the cases

Types

- **Non bacterial**
  - Contamination of food by chemicals
  - Eg: Fertilisers, Pesticides etc

- **Bacterial**
  - Toxic: Staphylococcal food poisoning, botulism, Bacillus cereus,
  - Infective: Salmonella, Shigella

Salmonella food poisoning

- *Extremely common form of food poisoning:*
  - *Increase in community feeding*
  - *Increase in* international trade in human food
  - *Increase incidence of salmonellosis in farm animals*
  - *Increase* ***use of household detergents*** *interfering with sewage treatment*
  - *Wide distribution of '****prepared food****'*

- Agent:
  - *Salmonella typhimurium, S. enteritidis, S. cholera-suis*
- Source:
  - Farm animals and poultry – through contaminated milk, meat, and egg products
  - **Rats and mice**: urine and feaces
- Incubation period: 12 – 24 hrs
- Mechanism:
  - Multiplication of bacteria leading to enteritis and colitis

Staphylococcal food poisoning

- Agent:
  - Enterotoxins of certain strains of coagulase positive Staph. aureus
- Source:
  - *usually milk and milk products*
- Incubation period: 1 – 8 hrs
- Mechanism:
  - Ingestion of ***pre-formed toxins*** in the food (intradietetic toxin)

Botulism

- Agent:
  - Exotoxin of Cl. Botulinum type A, B or E
- Source:
  - **Home preserved foods** (Latin word 'botulus' means sausage)
- Incubation period: 18 – 36 hrs
- Mechanism:
  - *Preformed intradietetic toxin*
- Symptoms:
  - Due to action of toxin on ***parasympathetic system***
  - Diplopia, dysphagia, paralysis, ptosis, dysartharia, fatal

Clostridium perfringens

- Agent: Clostridium perfringens
- Source:
  - ***Ingestion of meat, meat dishes and poultry***
- Incubation period: 6 – 24 hrs
- Mechanism of action:
  - Toxins produced due to multiplication of organism

Bacillus cereus

- Source: Ubiquitous
- Mechanism: Enterotoxins (preformed)

➢ **Emetic form**:

- ➢ short incubation period 1-6 hours
- ➢ resembling staphylococcal food poisoning

➢ ***Diarrhoeal form***:

- ➢ Longer I.P. 12-24 hours
- ➢ ***resembling Clostridium perfringens***

Investigation of food poisoning

- Line listing of cases/patients
- History of food intake in the past two days
- Lab investigations:
  - Stool, food remains, vomitus of the patients and stools of food handlers
- Environmental study
- Data analysis
  - Time, place and person
  - Food specific attack rates

Prevention

- *Food sanitation*
  - *Meat inspection*
  - *Inspection of food handlers*
  - *Personal hygiene*
  - *Food handling practices*
  - *Sanitary improvements*
  - *Health education*
- *Refrigeration*
- *Surveillance*

Be on your guard! Leafy vegetables, fruits can cause infections

TRIBUNE NEWS SERVICE

CHANDIGARH, APRIL 21

If you think only cut fruits can cause water and food-borne infections, think again! Whole fruits and vegetables are no less culprit.

Every year, one in six city residents gets sick due to water and food-borne infections and 40 per cent of them still do not consult a doctor despite related symptoms such as nausea, vomiting and diarrhoea surface.

Prof Rakesh Sehgal, head, department of medical parasitology, PGIMER, Chandigarh says leafy green vegetables and fruits are one the major culprits.

"In India, a number of water and food-borne infections are caused by fruits and vegetables, especially leafy green vegetables, that are difficult to clean with just water," said Professor Sehgal. He further added that raw, uncooked or half-cooked food sends the maximum number of patients to the emergency room of the PGI.

"Leafy vegetables such as spinach and cabbage are responsible for illness," he says. However, Dr Sehgal further added that it does not mean people should avoid eating fruits and veggies.

"When properly cleaned, cooked and safely stored fruits and veggies provide essential nutrients that would otherwise be lacking in most Indian diets," Dr Sehgal said.

Use potassium permanganate

- Washing in plain water is no longer enough. Mix potassium permanganate in water to give it a light pink colour. Soak fruits and vegetables in it for five minutes. This will remove pesticides, bacteria and other pests. Too much of it can be harmful, so be careful that the water is just light pink, not dark.

Avoid roadside drinks

Consuming drinks available with roadside vendors exposes one to water-borne diseases. Adding a cube of ice from an unreliable source to a bottled drink is equally harmful. Keeping this in view, the Deputy Commissioner of Chandigarh has issued an order under Section 2 of the Epidemic Diseases Act, 1897, as per which:

- The sale of all kinds of exposed edibles- cakes, sweets, biscuits, breads, parched grains of all kinds, dates and cut fruits is banned.
- All kinds of cold drinks, including lassi, sugarcane juice, *sharbats*, *jal jeera*, curd and cut fruits kept for sale shall be properly covered with the help of a wire gauze or glass.
- The sale of unchlorinated water through water trolleys obtained from unauthorised sources has been banned
- Ice, ice candies and aerated water sold through outlets under unhygienic conditions is also banned.

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epaper.tribuneindia.com/c/9841841