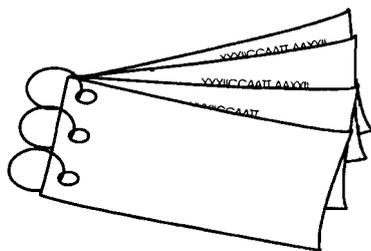


## UNIT 5 WATER AND FOOD ASSOCIATED VIRUSES



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- Viruses that infect our gastrointestinal tract may be food or water-borne.
- There are over 100 virus species present in sewage contaminated waters which cause a wide variety of illnesses in man. These include hepatitis, gastroenteritis, meningitis, fever, rash, conjunctivitis and may be even diabetes.
- Millions of people die each year from gastroenteritis. Rotaviruses alone are responsible for most of the children dying from diarrhoea.
- Hepatitis A, poliomyelitis, astrovirus, adenovirus, parvovirus, corona virus, Norwalk and other small structured viruses as well as Hepatitis E are other health significant viruses that may be acquired by ingestion of contaminated water or shellfish.

### 5.1 Gastroenteritis

- Gastroenteritis means inflammation of the stomach and small and large intestines.
- Many different viruses cause gastroenteritis including rotaviruses, adenoviruses, caliciviruses, astroviruses, Norwalk virus and a group of Norwalk-like viruses.
- Infants, young children, persons unable to care for themselves, people with low immunity level are at risk from dehydration because of loss of fluids.

#### *Symptoms*

- The main symptoms of viral gastroenteritis are watery diarrhoea and vomiting. The affected persons may also have headache, fever and abdominal cramps.
- In general, symptoms begin one to two days following infection with a virus that causes gastroenteritis and may last for 1-10 days depending on which virus causes the illness.

### *Transmission and Spread*

- Viruses spread through close contact with infected persons, eating or drinking contaminated foods or beverages.
- Infected food handlers can contaminate food especially if they do not wash their hands regularly after using the bathroom or changing diapers and nappies.
- People who eat raw or undercooked shellfish harvested from contaminated waters may get diarrhoea.
- Drinking water can also be contaminated by sewage and be a source of spread of viruses.
- While rotavirus is the most common cause of diarrhoea in infants and young children under 5 years of age, Norwalk and Norwalk-like viruses are more likely to cause diarrhoea in older children and adults.

### *Prevention*

- Frequent hand washing can reduce the chances of getting infected. Food or water that is thought to be contaminated should be avoided.
- Maintenance of hygiene and sanitation in the home environment especially cooking, eating and food storage areas is vital.
- Raw fruits and vegetables should be washed thoroughly before eating.
- Raw meat, fish, muddy vegetables have a high load of microbes that they can pass on to other foods. Cross-contamination should be prevented by keeping these items away from other foods and not using the same chopping boards and knives without thoroughly washing them first.
- All foods need to be cooked thoroughly to the core. Semi-cooked portions may harbour microbes.

## **5.2 Norwalk Virus**

- Humans are the only known hosts of Norwalk and Norwalk-like viruses. The viruses are passed in the stool of infected persons.
- Anyone can get the infection by having food or water contaminated with stool from an infected person. Shellfish, salad ingredients, contaminated water, ice, eggs and ready-to-eat foods can be sources of infection.

### *Symptoms*

- Signs and symptoms include nausea, vomiting, diarrhoea, stomach cramps, severe illness or hospitalization.
- Onset occurs 1-2 days after swallowing contaminated food or water. Infected persons usually recover in 2-3 days without serious or long-term health effects.

### *Prevention*

Steps in preventing and controlling the virus include:

- Washing hands with soap and water after toilet visits and before preparing or eating food.

- Cooking all shellfish thoroughly before eating.
- Washing raw vegetables before eating.
- Disposing sewage in a sanitary manner.
- Not allowing infected food handlers to prepare or touch food.

### 5.3 Enteric Adenovirus

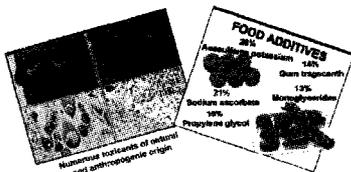
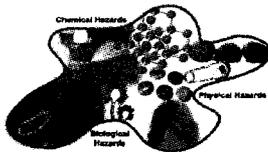
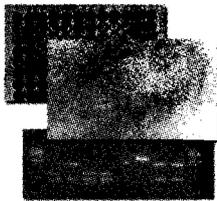
- Enteric adenoviruses cause 5-20% of gastroenteritis in young children. They can contribute to malnutrition because they can lead to chronic diarrhoea.
- The virus is mainly transmitted by the faecal-oral route.

#### *Symptoms*

- The illness is characterized by persistent diarrhoea accompanied by fever and vomiting of short duration. The diarrhoea may last around 10-14 days.
- In infections with both serotypes, vomiting is mild. Fevers are also mild in that they have a short duration of 2-3 days and only moderately-high temperatures.

#### *Prevention and Treatment*

- Hand washing curbs rates of faecal-oral transmission.
- No vaccine available. Rehydration therapies can be used if needed.



### 5.4 Hepatitis A

Hepatitis A is caused by Hepatitis A Virus (HAV), an enterovirus multiplying only in liver cells.

#### *Symptoms*

- Hepatitis A is characterized by sudden onset of fever, nausea, vomiting, fatigue and abdominal pain. This is followed by jaundice. Other symptoms include pain in the liver area, dark yellow urine, light coloured stools.
- The disease is usually mild and recovery is complete in one to two weeks. Occasionally the symptoms are severe and complete recovery can take several months.

#### *Spread*

- The Hepatitis A virus is spread primarily by person-to-person contact through:
  - Faecal contamination (for example, parents or child-care workers handling soiled diapers or nappies).
  - Eating food contaminated by food handlers not washing their hands properly after using the bathroom.
  - Eating raw or undercooked shellfish from contaminated water.
  - Drinking contaminated water (for example when travelling).

- Water, shellfish and salads, fruits, fruit juices, milk, milk products, vegetables and iced drinks may be contaminated.
- Transmission by infected persons may occur before symptoms show up since incubation period varies from 10 to 50 days. Young children often do not show clinical signs but can still be contagious.

#### *Prevention and Control*

- Vaccines are now available which provide long-term protection. Individuals who have been infected will have a lifelong protection against re-infection.
- Other preventive measures include proper hand-washing after using the bathroom or changing soiled diapers and nappies.
- Drinking boiled water or water treated by ultraviolet rays especially during the rainy season and during epidemics also checks spread of infection.

## **5.5 Poliovirus**

- Poliovirus is an infectious disease caused by a virus. It is primarily an infection of the digestive tract but the virus may infect the central nervous system in a small percentage of cases resulting in varying degrees of paralysis and possibly death.
- It can strike at any age but affects mainly children under five, 6 months to 3 years old children being most vulnerable.

#### *Symptoms*

- Polio follows infection with any one of three related enteroviruses. The virus enters through the mouth and multiplies in the intestines.
- Initial symptoms include fever, fatigue, headaches, vomiting, constipation (or less commonly diarrhoea), stiffness in neck and pain in the limbs.
- Once established in the intestines, the poliovirus can enter the blood stream and invade the central nervous system, spreading along nerve fibres. As it multiplies, the virus destroys nerve cells (motor neurons) which activate muscles. These nerve cells cannot be regenerated and the affected muscles no longer function. Limbs become floppy and lifeless – a condition known as acute flaccid paralysis (AFP). More extensive paralysis involving trunk and muscles of the thorax and abdomen can also result.
- In the most severe cases (bulbar polio), the virus attacks the motor neurons of the brain stem — reducing breathing capacity and causing difficulty in swallowing and speaking. Bulbar polio can be fatal without respiratory support.

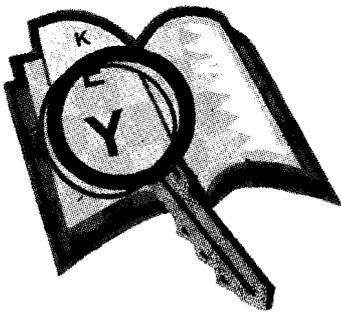
#### *Transmission*

- Polio virus is transmitted by the faecal-oral route. It can survive for long periods in a cold environment. However, the virus can easily be inactivated by temperatures used for pasteurization and by chemicals.

- Man is the only known reservoir of infection. The virus is found in faeces and oral secretions of infected persons. In the acute phase the virus occurs in the throat and therefore spread by droplets also happens if an infected person talks, sneezes or coughs.
- Environmental sources of infection are contaminated water, food and flies. Overcrowding and poor sanitation provide opportunities or exposure to infection. Polio is more likely to occur during the rainy season.

#### *Treatment and Prevention*

- There is no specific treatment for polio. Treatment is entirely symptomatic. Moist heat coupled with physical therapy stimulates muscles. However, permanent polio paralysis cannot be reversed.
- Immunization is the sole effective means of preventing polio. A primary course of 3 doses of OPV at one month intervals is recommended before the infant is 6 months of age. This is because polio is caught between the ages of 6 months and 3 years. Upto 6 doses are given to a child before the age of 18 months. The polio programme aims to simultaneously administer the vaccine to all children upto the age of five years.



#### **Key Terms**

**Endemic:** Referring to a disease which is very common in certain places

**Enteric:** Referring to the intestine

**Filter feeders:** Animals who feed on solids removed from the water they filter through their bodies

**Gastroenteritis:** Inflammation of the membrane lining the intestines and the stomach

**Immunization:** Making a person immune to an infection usually by injecting an inactivated form of the bacteria/viruses

**Pathogen:** Microorganism which causes a disease

**Sewage:** Waste matter especially excreta which is conveyed in sewers

**Vaccination:** Inoculation with a vaccine to produce immunity from a disease



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