



Food borne diseases or food poisoning

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Food borne intoxications or food poisoning is caused by ingestion

- Of toxicants found as toxins of certain plants or animals.
- Toxin formed by microbes while they multiply in the foods or after entering the intestines.
- Poisonous substances that may be intentionally or incidentally added to foods during production, processing, transportation or storage.

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Bacterial intoxications

1.1 Staphylococcal poisoning

- Most common infection
- Caused by infection with staphylococcus aureus
- Enterotoxins produced are heat stable.
- Toxin causes gastroenteritis. Symptoms appear within 1-6 hours of consumption of contaminated food.
- Symptoms are dose dependent, more the toxin ingested, earlier and severe the symptoms.
- Nausea, vomiting, abdominal pain, diarrhoea, dehydration. If severe and not appropriately treated, it can be fatal.
- Common foods implicated are custard and cream, bakery foods, poultry and ham, fermented meat and dairy products especially 'khoa' in India.
- Following proper hygiene in the preparation and storage is the key to avoid infection

1.2 Bacillus cereus poisoning

- Caused by bacillus cereus infection
- May cause nausea abdominal pain or diarrhoea. Symptoms may appear within 15 minutes to 11 hours.
- Common foods attributed are cereal dishes like rice, pudding, mashed potatoes, sauces, vegetable soups, etc. Most of the out breaks are due to contamination of cooked rice.

Both types of food poisoning can be avoided by following:

- Proper hygiene before and after cooking
- Proper storage of food till usage. Rice and other hot foods have to be maintained at 65°C and above till consumption. Other foods like milk and its products are to be stored below 7°C.
- Avoid holding rice and other cooked preparation at room temp for long periods.
- Avoid frequent handling.

1.3 Botulism

- Infection by Clostridium botulinum
- It produces neurotoxin which is heat sensitive.
- Disease starts within 2 hours to 14 days after ingestion of contaminated food.
- Symptoms are nausea, vomiting, headache, persistent constipation followed by blurred vision.
- Common foods implicated are fermented or smoked marine products, home cured ham and meat products.
- Botulism can be prevented by killing C.botulinum spores in the foods.
 - During processing
 - Eliminating recontamination of processed food
 - Destroying the toxin by proper heating of processed food.
 - By proper storage.
 - By discarding the product that has developed signs of spoilage ex. off odour, bulging of cans and gas bubbles on opening the can.

Food borne infections

It is caused by ingestion of pathogenic microbes that penetrate the intestinal mucosa and multiply or migrate in to other tissues where they multiply.

2.1 Salmonellosis (Typhoid)

- Incubation period is 6 hours to 3 days.
- Major symptoms are nausea, diarrhoea and fever which may last for several days.
- Foods implicated are egg, meat and milk and their products
- Infection either comes from product of infected animal like meat or milk or from food handler who is a carrier of infection and has not been following strict hygiene.

- Infection can be prevented by strictly adhering to good cooking methods.

2.2 Shigellosis (Bacillary dysentery)

- Caused by bacteria of genus *Shigella*.
- It can be destroyed by heating.
- Mostly caused by human to human transmission, contaminated water, milk and salad preparations.
- Incubation period ranges from 1-7 days.
- Symptoms are bloody diarrhoea, fever, nausea and cramps.

2.3 *Vibrio parahaemolyticus* gastroenteritis:

- Incubation period is 12-24 hours.
- Major symptoms are severe abdominal pain, vomiting and diarrhoea.
- Sources of contamination are fish, shellfish, crab and shrimp.
- Organism is easily destroyed by heat.

2.4 Enteropathogenic *Escherichia coli* diarrhoea:

- Presence of *E. coli* in foods indicates faecal contamination.
- It is a heat sensitive organism.
- Pasteurisation and normal cooking temperatures are effective in destroying the organism.
- Symptoms appear within 12-72 hours.
- Abdominal pain, diarrhoea, vomiting and fever are common.
- Foods implicated are poultry, meat and dairy products.
- It can be prevented by adopting strict personal hygiene and good sanitary practices.

2.5 Hepatitis A:

- Infective hepatitis is a viral disease.
- It is caused by faecal contamination and spreads from man to man.
- It has long incubation period 15-50 days.
- Symptoms are fever, abdominal pain, headache and jaundice.
- Contaminated drinking water, shellfish from polluted water, fruits and vegetables contaminated by faeces and salads prepared under unhygienic conditions are implicated.
- Prevention includes ensuring good personal hygiene of food handlers and avoiding eating foods if hygiene practised is doubtful.

2.6 Shellfish poisoning:

- Shellfish like oysters, mussels and clams are generally bred in sewage polluted beds or brackish water.
- Poisoning occurs due to accumulated toxins produced by a dinoflagellate algae *Gonyaulax catenella* in the shellfish.
- Shellfish is also usually consumed under cooked or uncooked hence may have other pathogenic organisms. Poisoning is usually an emergency and needs medical advice at the

earliest.

Other toxic infections

Some food borne toxic infections are caused by ingestion of large number of enterotoxigenic bacteria which while multiplying in the intestine produce and release enterotoxins in the intestine which are responsible for the symptoms.

3.1 Clostridium perfringens gastroenteritis: Common in places where large number of people eat like in restaurants, institutional canteens,, hospitals, etc.

3.2 Enterotoxigenic E. coli gastroenteritis:

- It is one of the chief causes of traveller's diarrhoea.
- Occurs due to contaminated water and improper food handling.

3.3 Cholera:

- Due to Vibrio cholera bacterium
- Incubation period for cholera is few hours to 5 days.
- Symptoms include abrupt onset of vomiting and watery diarrhoea and dehydration. It may turn fatal if not promptly rehydrated.
- Cholera can be prevented by proper and safe disposal of sewage and supply of protected water.

3.4 Listeriosis:

- Caused by L. monocytogenes
- It mostly occur in pregnant women, newborn children and in people whose immune system is compromised. The disease could be fatal.
- Milk and dairy products, contaminated sea foods, vegetables and salads are implicated.
- Proper cooking and hygienic food handling can prevent the infection.

Food borne diseases due to naturally occurring toxicants

Many naturally occurring food toxins have been linked to human ill health and death. Some important toxins in India are:

- Lathyrism
- Veno occlusive disease due to ergot alkaloids
- Epidemic dropsy

Epidemic dropsy occurs due to contamination of mustard oil with Argemone mexicana oil, a weed which grows along with mustard. It may get mixed accidentally or be added for adulteration. Toxic alkaloid implicated is sanguinarine. It is characterised by nausea vomiting, diarrhoea, fever followed by periphera edema

characterised by nausea vomiting, diarrhoea, fever followed by peripheral edema, cardiac failure and death. Severe glaucoma may result. Mortality rate is about 5-50%.

Treatment includes, avoiding further exposure and supportive therapy for cardiac failure. Prevention of oil contamination by removing argemone weeds growing among the oil seed crops is the best preventive method. Unscrupulous dealers should be strictly handled under PFA act.

Epidemiology of food borne diseases

Problems and their prevention have several factors with closed relationship between them like environmental, food processing, storage, distribution of food and socio cultural conditions specific to the country. In India rapid urbanisation, availability of a wide variety of foods and establishment of several types of food services has all contributed to the food borne diseases. Ex: In India emergence of "Caterers" who prepare food, transport and serve at a place away from the place of cooking is on the increase. Food habits are changing. Consumption if not prepared hygienically can lead to diseases. Insufficient cooking of milk products like khoa, meat and poultry and their bad storage can lead to infections.

Economic cost of food borne diseases

Food borne diseases are the most wide spread health problem in our country. In addition to health consequences, economic cost of food borne diseases such as lost of man days, cost of treatment, loss of affected food articles, etc can be huge.

Source: Portal Content Development Team

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