

PRIVATE HIGHER EDUCATIONAL ESTABLISHMENT

«KYIV MEDICAL UNIVERSITY»



STAPHYLOCOCCAL FOOD
POISONING:
characteristics, prevention

Name; SUBASH BOSE SUJARANI SUBINA MOL

Promotor: BEZKROVNA, Olena

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FOOD POISONING/ food borne illness





Food poisoning

- ▶ Food poisoning is a food borne disease. Ingestion of food that contains a toxin, chemical or infectious agent (like a bacterium, virus, parasite, or prion) may cause adverse symptoms in the body. Those symptoms may be related only to the gastrointestinal tract causing vomiting or diarrhea or they may involve other organs such as the kidney, brain, or muscle.



INFORMATION CONCERNING SUSTAINABLE DEVELOPMENT

- ▶ The 31 foodborne hazards considered in this WHO report caused an estimated 600 million foodborne illnesses and 420,000 deaths in 2010. Most (98%) falls on developing countries and most (97%) was due to biological hazards: bacteria, viruses and parasites.
- ▶ However, some infrastructure goals (economic growth, industrialization and consumption/production) can have an antagonistic relation with environmental goals, which in turn can have adverse on people goals (Figure)
- ▶ FBD is associated with a range of costs that fall on poor people and contribute to their remaining in poverty.
- ▶ SDG 3 'Good health and wellbeing' focuses on health, while SDG 2 'Zero Hunger' encompasses eradication of nutrition and nutrition associated disease and SDG 6 'Clean water and sanitation' is a pre-requisite for health.



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- ▶ framework grouping SDGs by domain and highlighting in yellow goals with antagonistic outcomes.





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TYPES OF THE FOOD POISONING

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A. Non – bacterial type of
the food poisoning

A. Bacterial Type of the food
poisoning



Classification Of Food Poisoning

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I. Based on symptoms and duration of onset

- ▶ a. Nausea and vomiting within six hours (Staphylococcus aureus, Bacillus cereus)
- ▶ b. Abdominal cramps and diarrhoea within 8-16 hours (Clostridium perfringens, Bacillus cereus)
- ▶ c. Fever, abdominal cramps and diarrhoea within 16-48 hours (Salmonella, Shigella, Vibrio parahemolyticus, Enteroinvasive E.coli, Campylobacter jejuni)
- ▶ d. Abdominal cramps and watery diarrhoea within 16-72 hours (Enterotoxigenic E.coli, Vibrio cholerae O1, O139, Vibrio parahemolyticus, NAG vibrios, Norwalk virus)
- ▶ e. Fever and abdominal cramps within 16-48 hours (Yersinia enterocolitica)
- ▶ f. Bloody diarrhoea without fever within 72-120 hours (Enterohemorrhagic E.coli O157:H7)
- ▶ g. Nausea, vomiting, diarrhoea and paralysis within 18-36 hours (Clostridium botulinum)



II. Based on pathogenesis

- ▶ a. Food intoxications resulting from the ingestion of preformed bacterial toxins. (Staphylococcus aureus, Bacillus cereus, Clostridium botulinum, Clostridium perfringens)
- ▶ b. Food intoxications caused by noninvasive bacteria that secrete toxins while adhering to the intestinal wall (Enterotoxigenic E.coli, Vibrio cholerae, Campylobacter jejuni)
- ▶ c. Food intoxications that follow an intracellular invasion of the intestinal epithelial cells. (Shigella, Salmonella)
- ▶ d. Diseases caused by bacteria that enter the blood stream via the intestinal tract. (Salmonella typhi, Listeria monocytogenes)



What are the signs and symptoms of food poisoning?

- ▶ Food poisoning most commonly causes:
 - **stomach cramps**, vomiting, and diarrhea.
- ▶ This can cause significant amounts of fluid loss and diarrhea along with **nausea** and vomiting may make it difficult to replace lost fluid, leading to **dehydration**. In developing countries where infectious epidemics cause diarrheal illnesses, thousands of people die because of dehydration.



A. NON – BACTERIAL TYPE OF THE FOOD POISONING

It is caused by the chemicals such as

- A. Arsenic
- B. Certain plants & sea foods
- A. Fertilizer
- B. Pesticides
- C. Cadmium
- D. Mercury





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BACTERIAL TYPE
OF
FOOD POISONING



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The Main Food Poisoning Bacteria

Type of food poisoning	Where the bacteria come from	Onset time	Symptoms
Salmonella	Raw meat, eggs, poultry, animals	6 - 72 hours	Abdominal pains, diarrhoea, fever, vomiting, dehydration
Clostridium perfringens	Raw meat, soil, excreta, insects	8 - 72 hours	Abdominal pain, diarrhoea
Staphylococcus aureus	Skin, nose, cuts, raw milk	1 - 6 hours	Vomiting, abdominal pains, lower than normal temperature

Staphylococcal food poisoning



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It is also as common as
salmonella food poisoning





AGENT

Staphylococcus aureus

- **Gram positive anaerobic coccal bacteria that appears in clusters.**
- At least five different enterotoxins have been Identified.
- **Toxins can be formed at optimum temperature of 35 C to 37 C.**
- These toxins are relatively heat stable and resist a boiling of 30 minutes or more.



SOURCE

Staphylococci are ubiquitous in nature

- Found on the Skin, Nose, Throat
- They are common agents of the boil and pyogenic infection in man and animals.
- Cow suffering from the mastitis have been responsible for the outbreaks of the food poisoning involving the milk and milk products.



INCUBATION PERIOD

1. Very short 1-6 hrs,
2. Short because of preformed toxins.



MECHANISM OF ACTION

Food poisoning resulting from the ingestion of the preformed toxins in the food.

- In food bacteria have grown (Intra-dietetic toxins).
- Toxins remain in the food after the organism have been destroyed by heating .

Action of The toxins:

- The toxin act directly on the intestine and CNS



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SIGNS & SYMPTOMS

- Sudden onset of vomiting ,Diarrhoea & Abdominal Cramps
- In severe cases blood & mucus may appear.
- Unlike salmonella food poisoning the staphylococci food poisoning rarely cause the fever.

Death is uncommon .



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DIAGNOSIS

Stool culture

- A stool culture is used to detect the presence of disease causing bacteria (pathogenic) and help diagnose an infection of the digestive tract.
- In the case of Staphylococcal enteritis it is conducted to see if the stool is + ve for a pathogenic bacterium.



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When to see a doctor

- ▶ If you experience any of the following signs or symptoms, seek medical attention.
 - Frequent episodes of vomiting and inability to keep liquids down
 - Bloody vomit or stools
 - Diarrhea for more than three days
 - Extreme pain or severe abdominal cramping
 - An oral temperature higher than 100.4 F (38 C)
 - Signs or symptoms of dehydration — excessive thirst, dry mouth, little or no urination, severe weakness, dizziness, or lightheadedness
 - Neurological symptoms such as blurry vision, muscle weakness and tingling in the arms



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Risk factors

Whether you become ill after eating contaminated food depends on the organism, the amount of exposure, your age and your health. High-risk groups include:

- **Older adults.** As you get older, your immune system may not respond as quickly and as effectively to infectious organisms as when you were younger.
- **Pregnant women.** During pregnancy, changes in metabolism and circulation may increase the risk of food poisoning. Your reaction may be more severe during pregnancy. Rarely, your baby may get sick, too.
- **Infants and young children.** Their immune systems haven't fully developed.
- **People with chronic disease.** Having a chronic condition — such as diabetes, liver disease or AIDS — or receiving chemotherapy or radiation therapy for cancer reduces your immune response.



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Complications

- ▶ The most common serious complication of food poisoning is dehydration — a severe loss of water and essential salts and minerals. If you're a healthy adult and drink enough to replace fluids you lose from vomiting and diarrhea, dehydration shouldn't be a problem.
- ▶ Infants, older adults and people with suppressed immune systems or chronic illnesses may become severely dehydrated when they lose more fluids than they can replace. In that case, they may need to be hospitalized and receive intravenous fluids. In extreme cases, dehydration can be fatal.

CASES OF STAPHYLOCOCCAL FOOD POISONING IN INDIA



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Outbreaks of staphylococcal food poisoning (SFP) are very common across the world; however, there is hardly any report of SFP from the Indian subcontinent. An outbreak occurred in the state of Madhya Pradesh (India) after the consumption of a snack called "Bhalla" made up of potato balls fried in vegetable oil. More than 100 children and adults who ate the snack suffered from the typical symptoms of SFP and required hospitalization. Food and clinical samples were found to contain a large number of enterotoxigenic *Staphylococcus* .



Prevention

- ▶ To prevent food poisoning at home:
 - **Wash your hands, utensils and food surfaces often.** Wash your hands well with warm, soapy water before and after handling or preparing food. Use hot, soapy water to wash utensils, cutting boards and other surfaces you use.
 - **Keep raw foods separate from ready-to-eat foods.** When shopping, preparing food or storing food, keep raw meat, poultry, fish and shellfish away from other foods. This prevents cross-contamination.
 - **Cook foods to a safe temperature.** The best way to tell if foods are cooked to a safe temperature is to use a food thermometer. You can kill harmful organisms in most foods by cooking them to the right temperature.
 - Cook ground beef to 160 F (71.1 C); steaks, roasts and chops, such as lamb, pork and veal, to at least 145 F (62.8 C). Cook chicken and turkey to 165 F (73.9 C). Make sure fish and shellfish are cooked thoroughly.

Staphylococcal food poisoning



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- **Refrigerate or freeze perishable foods promptly** — within two hours of purchasing or preparing them. If the room temperature is above 90 F (32.2 C), refrigerate perishable foods within one hour.
- **Defrost food safely.** Don't thaw food at room temperature. The safest way to thaw food is to defrost it in the refrigerator. If you microwave frozen food using the "defrost" or "50% power" setting, be sure to cook it immediately.
- **Throw it out when in doubt.** If you aren't sure if a food has been prepared, served or stored safely, discard it. Food left at room temperature too long may contain bacteria or toxins that can't be destroyed by cooking. Don't taste food that you're unsure about — just throw it out. Even if it looks and smells fine, it may not be safe to eat.



Finally, Never Forget:

- ▶ **Good Food Handling Practices are the Most Important Aspect of Food Hygiene.**
- ▶ **Get the Practices Right, Keep them Right, and you should Achieve Food Safety.**



conclusion and recommendations

PREVENTION OF STAPHYLOCOCCAL FOOD POISONING ACCORDING TO CONCEPT OF SUSTAINABLE DEVELOPMENT

The primary aim should be focused on reduction of initial load by proper selection of quality raw materials and ingredients, sanitation of food environments and proper personal hygiene among the food-handlers. People with respiratory disease, acute facial acne, skin rash, boil and cuts the hands should not be allowed to handle food. Heat treatment of food should be done wherever it's feasible to ensure killing of the live cells. Following heating, recontamination of food products should be avoided. An important causal factor in poisoning is keeping food at room temperature or inadequate refrigeration, practices which allow staphylococci to multiply.



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