FOOD POISONING: CAUSES, ITS EFFECTS AND CONTROL

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ABSTRACT

Food poisoning is also known as a foodborne illness caused by the consumption of contaminated food or water containing various bacteria, viruses, protozoa, non-microbial agents like vegetable origin or animal origin, and also toxins of biochemical or chemical nature. The primary source of foodborne illness is bacteria (66%), chemicals (26%), parasites (4%), and viruses (4%). Nowadays more people have died from diarrheal diseases caused by the consumption of contaminated food and water. The symptoms that occur through food poisoning are headache, giddiness, colicky pain, cold and clammy skin, intense thirst, acute vomiting, diarrhea, slow pulse, rigor, abdominal pain, hepatic, and cramps. To avoid food poisoning we should consume healthy food, fresh vegetables, fresh fruits, purified water and avoid junk food which is easily available in the market. Viruses that are present on water or surfaces can be removed through using an ultraviolet light.

KEYWORDS
Food poisoning, Causes, Effects and Control

1. INTRODUCTION

Food poisoning means an illness that's resulting from the ingestion of food through contamination of microbial or non-microbial (Rajesh 2017). Food poisoning is also known as foodborne illness, which is caused by consuming contaminated food. The reasons behind the food poisoning are microorganisms like viruses, bacteria, parasites, and toxins, which are produced infection on the food (Sowjanya and Aljayah 2016). Food poisoning is linked directly or indirectly with infectious agents, which are spread through the fecal-oral route, on contaminated hands, or in contaminated food and water, which results causing a serious problem in humans. The clinical features of foodborne infection are dependent on the pathogenic mechanisms involved (Anant et al. 2018). The condition of food poisoning is characterized by (a) the attack of many persons at the same time, (b) history of ingestion of common food, and (c) similarity of signs and symptoms in the majority of cases (Park, 2017).

The Food Standards Agency (FSA) reports that 900000 cases should be found every year due to food poisoning. The reason behind increasing food poisoning due to people are cooked several meals in advance and freezing them for a longer period or buying food that is only put in a microwave oven (Parashnath and Indranil, 2016). Headache, giddiness, colicky pain, cold and clammy skin, intense thirst, acute vomiting, diarrhea, slow pulse, rigor, and cramps are the symptoms seen in humans, which are caused by food poisoning (Anant et al. 2018). According to World Health Organization, 1.8 million populations are dead in 2005 due to contamination in drinking water and food which lead to diarrheal diseases (Center for Disease Control and Prevention, 2011).

The leading source of foodborne diseases is bacteria (66%), chemicals (26%), parasites (4%), and viruses (4%). Infection and intoxication are the most common types of foodborne illnesses. Intoxication occurs when food poisoning pathogen produced toxin, in contrast, infection occurs due to the presence of diseases in the food (Adams and Moss, 2008; Center for Disease Control and Prevention 2011). Viruses are the most common pathogens, which are transmitted through food, for example, viruses cause 66.6% of food-related illnesses in the United States (Mead et al., 1999). Approximately 80% of gastroenteritis was reported due to Norwalk-like viruses in the municipal health services of the Netherlands (Drapal et al., 2003).

2. CAUSES OF FOOD POISONING

2.1 Microbial Contamination

1. Bacteria - Bacillus cereus, Staphylococcus aureus, Salmonella group (except S. typhi), Shigella, Vibrio, Escherichia coli, Campylobacter, Yersinia enterocolitidis, Clostridium.


2.2 Non-microbial Contamination


2. Animal sources - Poisonous fish like shellfish, scombroid fish etc. and Mussel.


3. SYMPTOMS CAUSED BY BACTERIA

The symptoms of food-borne illness often simulate intestinal fluke and they may last a few hours or several days. Typical symptoms include diarrhea, vomiting, abdominal cramps, headaches, nausea, dry mouth, difficulty swallowing, and fluke-like symptoms (such as fever, chills, backache). The consumption of poisonous mushrooms leads to mycetism, while consumption of food contaminated with toxin-producing fungi leads to mycotoxicosis (URL-1). Food poisoning by Staphylococcus aureus occurs for 2-4 hours. The symptoms characterized by vomiting and diarrhea but no fever. The illness lasts less than 12 hours. In severe cases, dehydration, masked pallor, and collapse may require treatment (intravenously) infusion (Adams and Moss 2008). The incubation period of Clostridium botulinum is 12-36 hours. The symptoms which are generally caused by food poisoning are vomiting, dehydration, the mouth should be dried, hardened in faces, ocular paresis (blurred-vision), problem in speaking, also found some difficulties in breathing and
consumption of food which causes death within 7 days due to respiratory paralysis (Labbé and Nolan, 1981).

The incubation period of Clostridium perfringens is 8-24 hours. The illness symptoms are acute abdominal pain, diarrhea, and vomiting, the illness is self-limiting, and the patient recovers within 8-24 hours. The classic symptoms of Clostridium perfringens type A food poisoning are diarrhea with lower abdominal cramps. Vomiting is not common, and fever is rare (Robinson et al., 2000). The incubation period of Escherichia coli (E. coli) is 7-24 hours (Lederman, 2003). The clinical sign may be diarrhea with abdominal cramps, which may turn into grossly bloody diarrhea in a few days and no fever occurs (Bryan, 1994). The symptoms are shown due to Campylobacteriosis diseases are usually flu-like: fever, nausea, abdominal cramping, vomiting, enteritis, diarrhea, and malaise. Symptoms of food poisoning begin within 2-5 days due to ingestion of the bacteria, and the illness should occur in the lasts 7-10 days (Walderhaug, 2007). Some individuals may develop Guillain Barré (GB) syndrome, a nerve disorder that causes muscle weakness and paralysis of the limbs, about 2-4 weeks after infection (NIAID, 2007). The symptoms are shown due to Shigelliosis are abdominal pain, cramps, diarrhea, fever, vomiting, blood, pus, or mucus in stools and tenesmus. Low-grade fever is caused by mild infections about 100.4 to 102°F [38 to 38.9°C] and after ingestion of bacteria watery diarrhea occurs after 1 to 2 days. Children, particularly young children, are most likely to have severe complications. High fever (up to 106°F [41°C]), sometimes with delirium (Scallan et al., 2011; Mead et al., 1999).

4. PREVENTION OF BACTERIAL INFECTION FOOD

Proper cooking and processing of food can prevent most of the foodborne illnesses which kill bacteria such as improving personal hygiene, adequate refrigeration, adequate cooking or heat processing of food at a higher temperature and preventing the holding of food in melt device at bacterial growth temperatures (Bryan, 1994). The control method for controlling the food infection which is generally caused by bacteria; a) education to the people who are preparing the food materials at home and other food handlers so that they have to take personal proper measures; b) prohibiting individuals with absences; c) placing of food in cold place at 4-degree centigrade or lower of all food to prevent bacterial multiplication and the formation of toxin. Foods are always kept at room temperature for avoiding bacterial contamination (WHO, 2008). Destroying of all C. botulinum spores from home-canned is also found effective control on preventing food born diseases and cook always at a higher temperature like 121°C or higher.

Vegetables from home-canned should be boiled at least 3–4 minutes before serving (Jay, 2000). C. perfringens gastroenteritis syndrome also prevented from the food poisoning of bacterial intoxication (Bryan et al. 1997) by preventing recurrences of such problems, some researchers suggested the following points: a) cook meat at 74°C temperature to avoid bacterial contamination; b) all the containers and equipment that previously had contact with raw meat/eggs should wash and sanitation and c) when handling raw or uncooked foods then wash hands and use disposable plastic glove and before chilling separate meat and other food from one another (Robinson et al., 2000). The prevention/avoidance of foodborne illness caused by E. coli can be prevented by the same method as the prevention of other foodborne illnesses caused by bacteria. However, in the cases of ground beef, the recommendation is that it be cooked to 160°F or that the core temperature is brought to a minimum of 155.0°C for at least 5 seconds and that the juices are clear. Cooking at 155-160°F avoids bacterial contamination from the food.

Once cooked, the food meats should not be held between 40°F and 140°F for more than 3–4 hours (WHO, 2008). Control of Campylobacteriosis depends on sanitation and hygiene of animal sources to reduce the bacterial contamination from the environment of livestock. By using Hazard Analysis of Critical Control Points bacteria should be removed from the meat by cleaning, grappling, and freezing of meats (WHO, 2008). Shigella is heat-sensitive, and it will be killed by thorough heating (over 70°C). Cross-contamination undercooked, or raw foods are the main cause of infection due to contaminating or raw produce are contacted to cooked materials. For prevention of Shigella infections require proper cooking and hygiene in food handling. The most effective method for prevention is frequent and vigorous hand washing with warm, soapy water and ensuring clean drinking water sources and proper sewage disposal in developing nations (Mead et al., 1999).

5. SYMPTOMS CAUSED BY VIRUSES

Enterovirus is entered into the host with contaminated water or food and multiplies in the digestive tract. Symptoms of the infection are often slight, moderate but almost all enterovirus infections are asymptomatic. Diseases that are caused by viruses are showing a serious problem or it causes death due to paralysis and aseptic meningitis (Lees, 2000). The symptoms caused by rotaviruses are frequent infection of astroviruses with rotaviruses and calciviruses in childhood diarrhea complicates the epidemiology. Infections are more common in winter. Non enteric symptoms can often be observed in grown-up children on numerous occasions (subfertility, headache, etc.) (Kurtz and Lee, 1987). The symptoms that should occur due to the viruses are fever, vomiting, the red ulcerative injury that should be found on the oral tissue, and vesicular injury found on the skin of the body (Prempree et al., 2001; Lopez-Sanchez et al., 2003). The symptoms caused by Norovirus are vomiting and diarrhea, (rarely) convulsion, and others. Asymptomatic infections are common and may contribute to the spread of the infection (Usihijima, 2002).

6. PREVENTION OF TRANSMISSION OF VIRAL INFECTIONS VIA FOOD

In food pre-processing industrial processes also play an important role in increasing viral infection because some viral infections are present at the time of food processing. Another approach for inactivating viruses with adequate heating at the portion of food is relatively unreliable. The viruses which are present in water are exposed on the surface and inactivates with strong oxidizing agents or with ultraviolet light (Cliver, 1997a). Some researchers reported that foodborne diseases are controlled through (i) realizing to people that appearance and spreading of those viruses by food handlers (ii) improve and standardizing methods followed for the spotting of foodborne viruses through the laboratory at an early stage. Emphasize the viruses through the protection of food condition and managing the systems (like GHP, GMP, HACCP) (Koopmans and Duizer, 2004).

REFERENCES


