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### RESEARCH ARTICLE

#### MANAGEMENT OF FOOD POISONING EPIDEMIC AT COMMUNITY HEALTH CENTRE LEVEL IN RAJASTHAN

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#### Abstract

This case study examines the efficient management of food poisoning cases in a prominent hospital with early intervention and timely implementation of epidemiology study. The hospital implemented a streamlined approach to handle food poisoning incidents, emphasizing prompt diagnosis, treatment, and containment. An interdisciplinary team comprising physicians, nurses, and infection control specialists collaborated to ensure swift response and patient care. Utilizing advanced diagnostic techniques and evidence-based treatments, the hospital achieved reduced hospitalization durations and improved recovery rates. Additionally, they actively engaged in community awareness programs to prevent future outbreaks. The hospital's successful management of food poisoning cases showcased their commitment to patient welfare and public health.

**Methods:** A retrospective-prospective study design was used for the investigation of the outbreak. using an epidemiological case sheet for each case, primarily based on a standardized questionnaire.

**Results:** A total of 365 patients reported to the hospital with symptoms of diarrhoea (100%), with the number of episodes ranging from 4 to 20, abdominal cramps (87%), fever (21%), and vomiting (65%). The range of incubation period was from 12 h to 48 h. Keeping the incubation period and clinical profile in view, the likely organisms are enteropathogenic *Escherichia coli* or *Salmonella* spp.

**Conclusion:** Such events expose masses to risk of food-borne infections as the food is prepared under temporary arrangements. The application of WHO and The Food Safety and Standards Authority (FSSA) in India is a forward-looking act aimed at food safety at all levels which can prevent such occurrences.

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#### Introduction:-

Food poisoning is a common medical emergency that requires prompt and efficient management to prevent complications and ensure patient recovery. Underneath the Integrated Disease Surveillance project (IDSP) in India, food poisoning outbreaks are reported from everywhere in the India in which approximately 60% are related to food-borne infections<sup>1</sup>. Likely causes of food-borne illness include bacteria, parasites, viruses, toxins, metals, and prions<sup>2</sup>. The symptoms can vary from moderate and self-limiting vomiting and diarrhoea, abdominal cramps, fever to

severe and life-threatening neurological conditions. It takes hours or sometimes even days to develop symptoms of food poisoning after consumption of contaminated food.

Food poisoning is not unusual in settings wherein meals are organized for huge gatherings which include banquets, messes, religious occasions, and weddings celebration where food prepared in community kitchen. Safeguarding public health throughout mass gatherings is a large challenge. The crucial traits of such mass feeding events are that certain temporary arrangements are set up for cooking and serving food. In those provisional kitchens, food safety measures from farm to fork are hard to implement and can result in incidence of food poisoning outbreaks. In India, the felt need for a food safety regulation has been met via promulgation of food safety and standards Act (FSSAI) 2006, which applies to all eating establishments, messes, canteens, health facility kitchens, and religious places, in which mass feeding takes place<sup>3</sup>.

In the present study, a food poisoning outbreak was reported from a town Udaipurwati in Jhunjhunu district, India, wherein a large gathering of around 2000 people had consumed dinner in a community kitchen on the occasion of a wedding event and incidence of food poisoning epidemic occurs in local area which was managed at community health centre level with proper epidemiological study and clinical management guidelines under supervision of higher health authorities.

### **Material and Methods:-**

A retrospective-prospective study design was used for the investigation of the outbreak<sup>4</sup>. The investigation was carried out using an epidemiological case sheet for each case, primarily based on a standardized questionnaire using one-to-one interview approach after obtaining consent of the individual. The questionnaire consisted of personal details of the affected (cases) and non-affected (contacts) people, their food history of last 72 hours, date and time of onset of symptoms, type and severity of symptoms, and treatment history. Information about procurement of raw material, transport, storage, cooking, and serving of food have been also compiled. Based on the signs and symptoms and range of incubation period, the likely organisms were identified. Food samples were not available, however stool samples of admitted patients were sent for culture. Inspection of food preparation premises was carried out to find the probable source of contamination.

### **Epidemiological study and management of cases-**

The steps for investigation of a food poisoning outbreak were followed. The first step of verification of diagnosis of food poisoning was arrived at via history taking and clinical examination of the cases that reported to the hospital. The symptoms of diarrhoea, abdominal cramps, fever, and vomiting in a large number of cases after intake of common meals at a mass gathering confirmed the diagnosis of food poisoning.

The second step of confirmation of an outbreak of food poisoning was assessing the linkage of the cases by time, place, and individual with a history of intake of common meals in a community gathering. The number of cases was clearly in excess of expected frequency for this population as was assessed via the weekly trends for last three years available with the local medical authorities. This indicates a point source outbreak<sup>5</sup>, classically seen in a food poisoning outbreak. The index case had onset of symptoms at around 2330 h on day 1 (10 May 2023) and reported to the hospital at 0900 h on day 2 with complaints of diarrhoea, abdominal cramps, fever, and vomiting. The last case reported on day 3.

The third step become defining the population at risk. All the people who consumed food at the community gathering on 10 may 2023 were considered as the population at risk. A probable case definition was formed and included any person who reported with gastrointestinal symptoms (abdominal cramps, diarrhoea, or vomiting) with or without fever, after consuming food during the community lunch. Rapid search for cases was carried out in the community by house-to-house survey and Miking in affected area to report cases to the Hospital.

### **Management of cases-**

The management of food poisoning cases in the hospital follows a standardized process. District Public health authorities are notified for further preparedness, control of spread and prevention. Under direct supervision of CMHO Jhunjhunu and BCMO Udaipurwati timely interventions taken including resource and facilities mobilization and availability of supportive staffs from nearby health centers.

The process includes swift triage and assessment upon patient arrival, monitoring vital signs, obtaining a detailed medical history, and conducting relevant diagnostic tests. Patients reported in OPD with complaints of diarrhoea, abdominal cramps, fever, and vomiting were admitted. Upon admission, patients are assessed for severity and symptoms. Supportive care, including fluid and electrolyte replacement, is initiated promptly. Diagnostic tests including random stool sampling and stool cultures were performed to identify the causative agent. Specific treatments, like empirical antibiotics for bacterial infections, symptomatic and supportive treatment to relief for nausea and diarrhoea were administered as required. vital signs were observed and patients were closely monitored for complications. Continuous communication with the patients and their families ensures understanding of the treatment plan and progress updates with Nutrition counselling done. Strict infection control protocols were followed to prevent cross-contamination and contain the spread of infection within the hospital. A multidisciplinary team, including physicians, microbiologists, nurses, and nutritionists, collaborates to ensure the best possible outcomes and prevent further spread of infection.

CMHO Jhunjhunu and BCMO Udaipurwati formed dedicated survey teams for house-to-house survey and to take food and water samples of affected area and preventive medicines kit distributed. Transparent communication channels established to facilitate timely reporting of suspected cases. Partnering with local health departments to coordinate broader public awareness campaigns were started by miking, informational posters, educational pamphlets, health education was given when to seek medical attention and conducting hands-on workshops for patients and their families to learn safe food handling practices. Food poisoning epidemic controlled with no mortality reported in proper time.

### Results:-

A total of 365 patients reported to the hospital, out of which 212 (58%) were males and 153 (42%) were women and children.

**Table 1:-** Distribution of Cases reported to hospital-

Type of Patients	Frequency	Percentage
Male	212	58%
Female and children	153	42%
Total	365	100.0%

The predominant features among the 365 cases interviewed were diarrhoea (100%), with the number of episodes ranging from 4 to 20, abdominal cramps (87%), fever (21%), and vomiting (65%). No case reported with blood or mucus in stools.

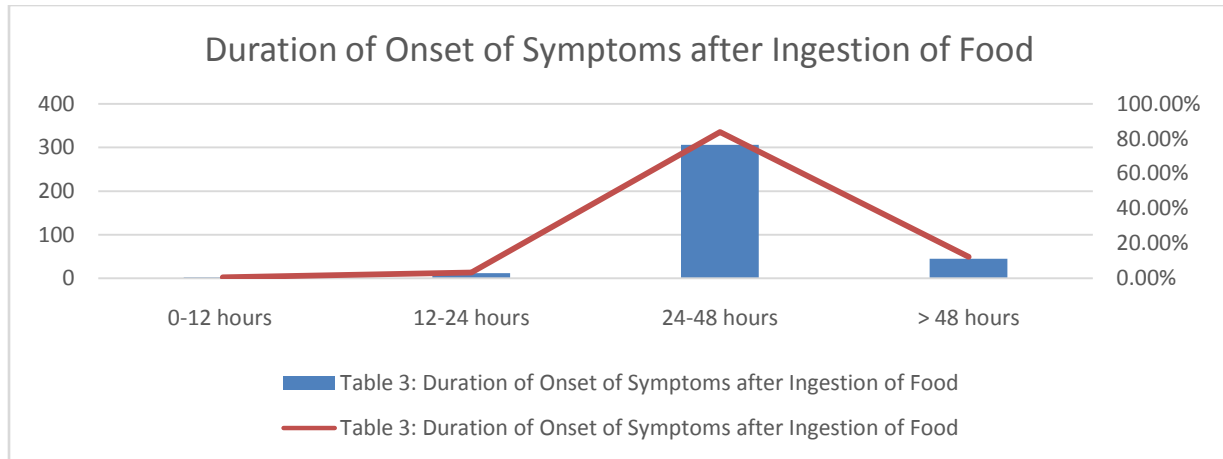
**Table 2:-** Frequency of symptoms among patients interviewed (n = 365).

Signs and symptoms	Number of cases	Percentage
Diarrhoea	365	100%
Abdominal cramps	317	87%
Fever	77	21%
Vomiting	237	65%

The time of onset of symptoms in the index case was a 2330 h on day 1, after consumption of food at 1630 h, and the last case reported to the hospital at 0800 h on day 3. The range of incubation period was from 10 h to 40 h. Median incubation period was 17 h.

**Table 3:-** Duration of Onset of Symptoms after Ingestion of Food.

Time in hours	Number (N=365)	Percentage
1-12	2	0.54%
12-24	12	3.28%
24-48	306	83.85%
> 48	45	12.33%



Total of 365 patients 285 patients were admitted in wards and managed accordingly and 80 patients have less severe symptoms which were treated as Out Patient Department basis. All patients recovered well with treatment and discharged to home after approximately 2-4 days hospitalization. There was no death or residual disability recorded.

The food menu comprised a variety with green gram (moong dal), mixed vegetable curry, peas cottage cheese curry (matar paneer), rice, Ice cream, sweets (Gulab jamun), Juices, Fritter dunked in yogurt (Dahi vada), bread (chapati), and salad.

**Causative organism:** Keeping the incubation period and clinical profile in view, the likely organisms are Salmonella spp. and enteropathogenic Escherichia coli. Stool samples from admitted patients were sent for culture, and reports showed growth of Escherichia coli and Staphylococcus but no growth of Salmonella, Shigella, and Vibrio group of organisms at 48 h and 72 h incubation period.

**Source of infection:** Contamination of food items can occur during cooking, storage, or distribution of food by the food handlers or in the vessels used during these processes. The food samples were not available for culture. The medical examination of food handlers and laboratory investigation of stool sample were conducted. There were no positive findings for carriers.

Environmental study was also performed regarding food preparations. Food was prepared and stored in large vessels for consumption throughout the day. The food was cooked in an open space with no protection against flies, rats, and other animals. Cooked food was stored in large vessels and served to the people attending the wedding ceremony. There was a possibility of contamination of food items during the course of cooking or storage.

### Discussion:-

It is a common practice during religious festivals or mass gatherings in our country to mass feeding, where food is cooked on mass scale and served to the public. Preparation and storage of food under such situations are often unhygienic, sometimes leading to local outbreaks of foodborne infections. In the present study, a food poisoning outbreak occurred in a community kitchen where a large gathering had consumed a common meal during a wedding event.

In our study, there was predominance of lower gastrointestinal tract symptoms such as diarrhoea and abdominal cramps, which eliminates Staphylococcus enterotoxins as one of the likely contaminants. Absence of blood in stools reduces the possibility of Shigella and E. coli O157. Profuse diarrhoea with rice water stools and severe dehydration, pathognomonic of Vibrio cholera, was also absent. Considering the incubation period of 10-40 h and symptoms of diarrhoea, abdominal cramps, and fever, the likely organisms were Salmonella spp. and enteropathogenic Escherichia coli. Another organism presenting with similar features is Campylobacter jejuni, but it has a longer incubation period of 1-10 days. Out of all the items served, juices or Fritter dunked in yogurt (Dahi vada), although not typical of Salmonella food poisoning, was found to be the incriminated food. However, the same could not be confirmed on culture because the samples of food items were not available. Also, the stool samples of the patients did not show growth of Salmonella. Like Sangrukar et al <sup>6</sup> reported the average interval between ingestion of food

and onset of symptoms was 6-9 hours in most of the cases due to E. coli, in our study also E. coli were grown from stool samples.

Water samples from different sites were checked for residual chlorine and bacteriological examination and were found satisfactory. Availability of potable water both for drinking and cooking is an important factor for prevention of food-borne illnesses.

As the food was prepared early in the morning and kept in the open for a long time, it is likely to have gotten contaminated during this time. Keeping food for prolonged periods of 6-8 h at a temperature range between 40 degree C and 60 C (danger zone)<sup>7</sup> can lead to rapid microbial growth and contamination of food. In a study of food poisoning outbreak by Mustafa et al.,<sup>8</sup> raita was prepared in the morning at 0800 h by mixing curd with cucumber procured from the local market and stored in a steel container at room temperature until midday, when it was served.

Lack of proper storage or reheating facilities during interim arrangements in such large gatherings is a weak link in food safety chain. A study done by Bawa et al.<sup>9</sup> in a village of Maharashtra found that products consumed from outside vendors were the source of contamination and resulted in outbreak of acute gastroenteritis.

### **Conclusion:-**

Food is an integral part of all social events. Such events expose masses to risk of food-borne infections as the food is prepared under temporary arrangements. The application of WHO and The Food Safety and Standards Authority (FSSAI) in India is a forward-looking act aimed at food safety at all levels which can prevent such occurrences.

Management of food poisoning epidemic and Identification of pattern, source and causative organism of food poisoning outbreaks may prove to be invaluable in designing interventions to curb these outbreaks. An interdisciplinary team comprising physicians, nurses, and infection control specialists collaborated to ensure swift response and patient care.

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# Five keys to safer food



## Keep clean

- ✓ Wash your hands before handling food and after during food preparation
- ✓ Wash your hands after going to the toilet
- ✓ Wash and sanitize all surfaces and equipment used for food preparation
- ✓ Protect kitchens areas and food from insects, pests and other animals

**Why?**

Millions of microorganisms do not cause disease, therefore, microorganisms are widely found in soil, water, animals and people. These microorganisms are carried on hands, wiping cloths and utensils, especially cutting boards, and the slightest contact can transfer them to food and cause foodborne illnesses.



## Separate raw and cooked

- ✓ Separate raw meat, poultry and seafood from other foods
- ✓ Use separate equipment and utensils such as knives and cutting boards for handling raw foods
- ✓ Store food in containers to avoid contact between raw and prepared foods

**Why?**

Raw food, especially meat, poultry and seafood, and their juices, can contain dangerous microorganisms which may be transferred onto other foods during food preparation and storage.



## Cook thoroughly

- ✓ Cook food thoroughly, especially meat, poultry, eggs and seafood
- ✓ Bring foods like soups and stews to boiling to make sure that they have reached 70°C. For meat and poultry, make sure that juices are clear, not pink. Ideally, use a thermometer
- ✓ Reheat cooked food thoroughly

**Why?**

Proper cooking kills almost all dangerous microorganisms. Studies have shown that cooking food to a temperature of 70°C can help ensure it is safe for consumption. Foods that require special attention include ground meats, stuffed meats, large joints of meat and whole poultry.



## Keep food at safe temperatures

- ✓ Do not leave cooked food at room temperature for more than 2 hours
- ✓ Refrigerate promptly all cooked and perishable food speedily below 5°C
- ✓ Keep cooked food piping hot (more than 60°C) prior to serving
- ✓ Do not store food too long even in the refrigerator
- ✓ Do not thaw frozen food at room temperature

**Why?**

Microorganisms can multiply very quickly if food is stored at room temperature. By holding at temperatures below 5°C or above 60°C, the growth of microorganisms is slowed down or stopped. Some dangerous microorganisms still grow below 5°C.



## Use safe water and raw materials

- ✓ Use safe water or treat it to make it safe
- ✓ Select fresh and wholesome foods
- ✓ Choose foods processed for safety, such as pasteurized milk
- ✓ Wash fruits and vegetables, especially if eaten raw
- ✓ Do not use food beyond its expiry date

**Why?**

Raw materials, including water and oils, may be contaminated with dangerous microorganisms and chemicals. Toxic chemicals may be formed in damaged and mouldy foods. Care in selection of raw materials and storage measures such as washing and peeling may reduce the risk.

**Knowledge = Prevention**



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