



# An Outbreak of Staphylococcal Food Poisoning Occurs at Low Literacy Girl High School Rajpipala, Narmada District

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## ABSTRACT

**Background** Food borne diseases including food borne intoxication and infection are term applied a disease caused by agents that enter body through consumption of contaminated food. with increase in urbanization, industrialization, mass catering systems food borne diseases are on increase throughout the world.

**Objectives:** To investigate the food borne outbreak affecting 156 girl students studying in standard VII to XII of low literacy girl high school run by tribal subplan office, Rajpipala Narmada District.

**Materials and Methods:** A retrospective cross-sectional study was conducted. The team members reviewed medical records and interviewed affected students, teachers, principal, food handlers & patrons of the food vendor.

**Results:** Out of 360, 156 students suffered from acute gastroenteritis (43.3% attack rate) during 9:00 am to 12:30 pm on 11<sup>th</sup> December 2017. Seventy-four (74) out of those 156 complained about vomiting, 14 had Headache & 66 were suffered from mild abdominal pain. There was no death reported. 10 student's vomitus sample were collected and out of these six sample shows staphylococcal infection.

**Conclusion:** The possible source of infection is milk supplied as breakfast to the students

**Keywords:** Acute Gastroenteritis, Rapid response Team (RRT), Water samples,

## INTRODUCTION

Foodborne disease can be defined as any disease of an infectious or toxic nature caused by the consumption of food or water<sup>1</sup>

In India foodborne diseases are not categorized separately in the Health Information of India. For example, in the official document of health information, Government of India for 2004, 9575112 cases of acute diarrheal diseases including gastroenteritis with 2855 deaths have been recorded and cases of foodborne disease may have been categorized under gastroenteritis<sup>2</sup>

Foodborne diseases are being investigated to prevent both ongoing transmissions of disease and similar outbreaks in the future. The importance of foodborne disease investigation includes control of

ongoing outbreaks, detection and removal of implicated foods, identification of specific risk factors related to the host, the agent, and the environment, identification of factors that contribute to contamination, growth, survival, and dissemination of the suspected agent, prevention of future outbreaks and strengthening of food safety policies, acquisition of epidemiological data for risk assessment of foodborne pathogens, and stimulation of research that will help in the prevention of similar outbreaks.<sup>3</sup> Foodborne disease surveillance is essential for estimating the burden of foodborne diseases and monitoring trends, identifying priorities, and setting policy in the control and prevention of foodborne diseases and their outbreaks, detection, and evaluation of control strategies<sup>4</sup>

**OBJECTIVES**

The study was conducted to investigate the food borne outbreak affecting 156 girls students studying in standard VII to XII of low literacy girl high school run by tribal subplan office, Rajpipala Narmada District; and to find out epidemiological feature of outbreak.

**MATERIAL & METHODS:**

As per instruction received from Dean Office GMERS Medical college Gotri, Vadodara on request of CDHO Narmada to send Rapid response Team (RRT), to investigate the food borne outbreak affecting 156 girl students studying in standard VII to XII of low literacy girl high school run by tribal subplan office, Rajpipala. Team comprising teaching Faculties from Department of Community Medicine, Microbiology & Paediatrics visited District Hospital Rajpipala and low literacy girl high school run by tribal subplan office, Rajpipala on 13<sup>th</sup> December, 2017. Local coordination was provided by Epidemic Medical Officer Narmada (EMO). The low literacy girl school is residential school run by Tribal sub plan office, Ministry of Tribal Development Department where the food and residential accommodation is provided by school authority.

During morning hours on 11<sup>th</sup> December, 2017 in morning 156 students from standard VII to XII reported gastroenteritis by complaining of vomiting, headache, and abdominal pain during 9 :00 am to 12 noon after eating morning breakfast containing green peanuts and milk.

Our Rapid response team investigated to verify the outbreak to determine its magnitude, to identify the source, and provide control and preventive measures.

The team members reviewed medical records and interviewed affected students, teachers, principal, food handlers & patrons of the food vendor. They collected food samples of green peanut and milk (both sanjivani & gokul gold brand) served during breakfast on 11<sup>th</sup> December, 2017 to food and drug laboratory, Bharuch for detection of microbiological contamination. They collected water samples and sent to public health laboratory & they also collected Vomitus of (residue of food) from 10 students who having symptoms of vomiting to microbiology department, SSG Hospital Vadodara.

**A case of food poisoning** was defined as any student of low literacy girl school complaining of vomiting, headache and/or abdominal pain with onset from 10<sup>th</sup> to 13<sup>th</sup> December, 2017 after eating morning breakfast on 11<sup>th</sup> December 2017. We conducted active case finding to identify more cases, the team

collected food samples & Vomitus of patient from ten affected students for laboratory confirmation.

**RESULT**

Total strength of girl students in the school is 360. Out of these 156 students suffered from gastroenteritis (43.3% attack rate) during 9:00 am to 12:30 pm on 11<sup>th</sup> December 2017. Seventy-four (74) out of those 156 complained about vomiting, 14 had Headache & 66 were suffered from mild abdominal pain. There were no fever and diarrhoea cases reported to school authority. There was no death reported & school authority shifted all 156 students to nearby District Hospital Rajpipala.

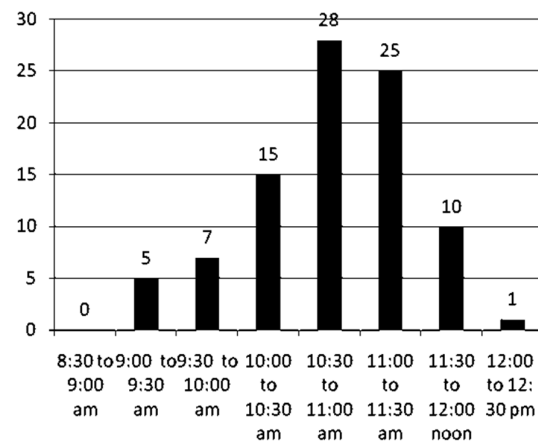
Out of 156 students, 91 were admitted under Pediatric Department, District Hospital Rajpipala and were started Oral rehydration therapy and IV fluid. Rest of 65 students were manage on OPD base treatment as their complains were mild.

Out of 91, 74 students complaining of Vomiting among these 10 Students Vomits sample were taken and sent to microbiology Department SSG Hospital Vadodara for Microbiological confirmation. When we reached on 13<sup>th</sup> December, 2017 there were 13 students still admitted in paediatric ward and their clinical condition was stable.

**Table 1: Distribution of 91 Gastroenteritis cases according to symptoms admitted to District Hospital Rajpipala on 11<sup>th</sup> December 2017**

Symptoms	Affected Students (N=91) (%)
Vomiting	74 (81.3)
Abdominal Pain	66 (72.5)
Headache	14 (15.3)

**Figure 1: Time of Onset of 91 Gastroenteritis cases admitted to District Hospital Rajpipala on 11<sup>th</sup> December 2017 (Epidemic curve)**



**Table 2: Age Distribution of 91 Gastroenteritis cases admitted to District Hospital Rajpipala on 11<sup>th</sup> December 2017**

Age in Years	Cases (n=91) (%)
9-10	1 (1.1)
10-11	5 (5.5)
11-12	24 (26.3)
12-13	15 (16.4)
13-14	21 (23.1)
14-15	9 (9.9)
15-16	14 (15.4)
16-17	2 (2.2)

Mean age of affected girl students was 13 years.

Epidemic curve clearly pointed to occurrence of this outbreak as a point source & looking at time of onset of symptoms mean incubation period from epidemic curve is 2 hrs.

All 360 student ate morning breakfast containing raw green peanut bought from food vendor named "Narmada chavana Gruh udhyog" situated at GIDC Rajpipala. There were two categories of milk supplier supplying milk in which standard VI to VIII consumed milk from Vendor name "Sanjivani brand" which provide 200ml prepared ready to use milk pouch and standard IX to XI were provided 500 ml milk from Vendor name "Gokul gold ". As per food handler of school, the milk was not boil before distributed to students and on looking at kitchen area there were unhygienic cooking practices and found nuisance of fly. All food samples (Green peanut and milk from both vendors) collected and sent to nearby Food and Drug laboratory, Bharuch but there was no growth of organism seen in all food samples as per their report.

Staphylococcus aureus were isolated from 6 out of 10 Vomitus sample. (60 %) so possibility of suspicion towards milk borne point source food poisoning outbreak.

The team also checked drinking water supply from overhead water storage tank as well as tera fit (purification plant)/water tank set up at ground floor but no microbiological contamination was found.

## DISCUSSION

Staphylococcus aureus are Gram-positive organisms. Some strains of which are capable of producing a highly heat-stable protein toxin that causes illness in humans. Staphylococcal food poisoning is one of the most common food-borne illnesses<sup>5</sup>. Staphylococci exist in air, dust, sewage, water, milk, and food or on food equipment, environmental surfaces, humans, and animals. Humans and animals are the primary reservoirs.<sup>6</sup> Staphylococci are present in the nasal passage, throat, hair and skin of

more than 50 percent healthy individuals and are abundant in cuts, pustules, and abscesses.<sup>7</sup> They thrive in protein-rich foods with a high salt content and thrive in the temperature range of 7°C to 48°C. <sup>8</sup>Diseases related to contamination of drinking water and food constitute a major burden on public health.<sup>9 & 10</sup>

Under the Integrated Disease Surveillance Project (IDSP) in India, food poisoning outbreaks reported from all over India in 2009 increased to more than double as compared to the previous year (120 outbreaks in 2009, as compared to 50 in the year 2008). This could be due to improved reporting. Etiological diagnosis was not made in any outbreak, though appropriate samples (food and/or stool) reached to the lab in 18 outbreaks. In one outbreak, groundnuts were reported as the implicated food. It is important to keep in mind that these are only the reported outbreaks and actual number of outbreaks may be much higher, since all cases or outbreaks do not get reported.<sup>10</sup>

Common organisms isolated from Food borne outbreak that Cause Symptoms in 1-6 hours are Staph aureus and Bacillus cereus but B. cereus mostly found mostly in fried rice with unhygienic cooking practices.<sup>12</sup>

Similar study conducted by Mustafa MS, "raita" was incriminated for food poisoning and when raita food sample was subjected to bacteriological analysis, S. aureus was isolated <sup>11</sup>Staphylococcal enterotoxins induce food poisoning, when food contaminated with the enterotoxin produced by coagulase-positive Staphylococci is consumed.<sup>13</sup> For staphylococcal food poisoning to occur, it is necessary that adequate time should have elapsed from the time of cooking to the time of consumption. Besides, optimum temperature must also be present for the bacteria to multiply and produce the enterotoxin. <sup>14</sup>

## CONCLUSION & RECOMMENDATION OF PREVENTIVE & CONTROL MEASURES

This was clearly point source epidemic and probable reason was unhygienic preparation of milk consumed by students in morning breakfast lead to acute Gastroenteritis caused by Staphylococcus aureus.

Steps taken by local health authority

The situation warrants effective food safety surveillance. This particular outbreak investigation was an eye-opener to any such future incidences as precautionary and mandatory quality and surveillance measures shall be put in place to avoid any such events. Precautionary activities according to the set standards to prevent food borne outbreaks. The government and its related sectors including health,

food safety, water authority, and public together should play an active role in provision and consumption of safe drinking water and food.

Steps taken by RRT (Rapid response team)

- Recommendation was to observe hygienic storage of raw food in the store room of girl 's hostel as well as kitchen
- Health education to food handlers and other personnel about clean hygienic preparation of food in kitchen and serving of food and emphasis on through hand washing before preparing and serving food to student as well as after going for toilet & explained to food handler that milk should be boiled for at least 30 minutes at appropriate temperature before serving to the students
- There was an emphasized on taking stool samples from food handlers also necessary for detection of microbiological contamination.
- The structural and operational deficiencies in the school kitchen were explained to school authority and urged to correct these deficiencies immediately.

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