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Original Article

Outburst of Food Poisoning among Hostellers of Certificate Level Nursing Students at Janaki Medical College, Dhanusha

Hari Narayan Purbey[1]

Author's Affiliations

[1]Assistant Professor, Department of General Practice, Janaki Medical College, Janakpurdham.

Correspondence to:

Dr. Hari Narayan Purbey, MDGP
Department of General Practice
Janaki Medical College, Janakpurdham.
E-mail: drhnpemgp@gmail.com

ABSTRACT

Background & Objective: Food poisoning is the result of eating contaminated, spoiled or toxic food and frequently felt in our society. There are more than 250 food borne diseases. Some of them causes complications even to death. It is worldwide public health burden as well. Causative agents werebacterial, protozoal, possible chemicals and some confounders. This study aims to evaluate the causative agents and treat the patients with protocol in Emergency.

Material and Methods: A purposive descriptive observational study of food poisoning in Proficiency Certificate level Nursing students in Janaki Medical College was done. All students and staffs were under survey by admitting in the Emergency ward and maintaining the treatment in observational ward. Proper history taking, Physical examination and investigations were done. Knowledge, Attitude and Practices of causation, safety risk, control measure and prevention of food handling were sensed by valid questionnaires. Data were analyzed using SPSS version 20.0.

Results: All patients (n=51) were female of 20 districts. 92% cases were of emerging adults. BMR ranges 17.5-25. 83% cases were admitted in observational ward and 5.4% cases were self-limited. Clinical features were abdominal pain (70%), diarrhea (70%), fever with chills (70%), headache (52%), Nausea (35%) and vomiting (31%). Hemogram showed 52% cases were of leukocytosis. Neutrophilia (88%), lymphocytosis (52%), anaemia (46%), hypoglycemia(72%), hyponatraemia (16%) and hypernatraemia (6%).Stool RE/ME showed loose stool(100%), green(100%) in colour, mucoid (10%) consistency in physical examination while plenty of pus cell (100%), undigested food particle (40%), microscopic RBCs(20%), Entamoeba histolytica (10%) were seen in microscopic examination. Stool culture showed 80% cases were of pathogenic E.coli. and 10% cases were of shigella. Three cases were urine culture isolates with E. coli. Overall, questionnires to Knowledge, Attitude and Practices of food handling, safety and risk about food poisonings were found satisfactory.

Conclusion: The causative agents were EPEC (clinically), shigella dysentery and E. histolytica. The sensitivity patterns of antibiotics were of ceftriaxone, ciprofloxacine, meropenum, chloramphenicol, clindamycin, Piperacillin with Tazobactam. Overall assessment of Knowledge, Attitude and Practices about food handling, safety and risk factors were found satisfactory. The responsible departments were emphasized to take appropriate actions in specific way for further control and prevention of food poisoning.

Keywords: Food poisoning, Nursing, Outburst

INTRODUCTION:

Food poisoning is the result of eating contaminated, spoiled or toxic food. Although it is quite uncomfortable, it is frequently faced in our society. Researchers have identified more than 250 foodborne diseases. Some of them are lethal. 48 million people in United Nation are suffering from food poisoning every year; 188 patients with consumption of drinking water at school camp [1], outbreak of EPEC was reported (1000 cases) in Japan [2]; 7000 outbreaks in 2020 in China; sporadic presentation of food poisoning in different places of Nepal [3-8]. Similarly, other countries are suffering from food poisoning each year medically significant in number. Thus food poisonings are worldwide public health burden. Anyone can get food poisoning but more susceptible to older, children, immunocopromised, pregnant woman etc.

Previous studies have shown several cases of food poisonings due to pathogenic microorganisms. Most food poisonings are chiefly of Bacteria, parasites, viruses, protozoal, fungal, chemicals, biotoxins etc contamination in food. Raw food material, uncooked food and liquid materials ,food mixed with harmful chemicals, food mixed with animal faecal matter, unwashed hands before cooking and having food are cumulatively contaminated and causes food poisoning. Bacterial causes for food poisonings include mostly of E. coli (shiga toxin producer), listeria, salmonella, compylobacter, clostridium botulinum, staph. Aureus, shigella, vibrio etc. [9]. Parasites includes Toxoplasma gondii, Giardia lamblia, Taenia solium, cryptosporidium, Entamoeba histolytica. Viruses includes norovirus, rotavirus, hepatitis A viruses etc. Common symptoms are nausea, vomiting, abdominal pain, diarrhea , fever even be severe enough to life threatening and lethal. Food poisoning can range from as little as 30 minutes to as long as 8 week. With or without treatment, most cases will get resolved in 1 week.

There is no previous local studies on mass food poisonings outburst in Janakpur. People are not enough cautious to food poisoning. The causative agents could be found out with appropriate modern technology. It needs several studies on them to manage them in effective way so as to save the life of the people by nullifying the complications and reducing even the morbidities.

One of the most important factors of foodborne disease prevention is educating consumers even though emerging adults' habit is difficult to control. The poisoning cases must be managed properly as for evidence based treatment. Questionnaires regarding knowledge, attitude and practices of food safety, handling and control of food poisoning could be exercised. For this, they should be pretested in matching group and followed. With the results, activities should be successfully enrolled. This fulfill the objectives of the study. As a result , the community moves away from food poisoning.

Thus food poisonings are the worldwide public health burden and needs several studies on them to manage them in effective way so as to save the life of the people by nullifying the complications and reducing even the morbidities. One of the most important factors of foodborne disease prevention is educating consumer. Emerging adults' habit are difficult to control. Previous studies have shown several cases of food poisonings due to pathogenic microorganisms in proficiency certificate level students in Nepal. They are more active and highly populated consumers in Nepal. They generally purchase food randomly and irrational way. The students in proficiency certificate level in nursing campus, Janaki Medical College, Ramdaiya run their canteen

themselves with the help of some workers. They may purchase goods and/or food themselves from Mahendranar market in similar manner. The status of vegetable, rice ,pulse, milk, meat and other food materials in term of sanitary storing is medically poor in the canteen store. It seemed poor provision of periodic washing of water tank on the roof. These situation are responsible for accidental food poisoning. There is no previous local studies on food poisonings outburst in Janakpur. People are not enough cautious to food poisoning. The causative agents should be found out with appropriate modern technology. The poisoning cases must be managed properly as for evidence based treatment. Questionnaires regarding knowledge, attitude and practice of food safety, handling and control of food poisoning could be exercised. For this, they should be pretested in matching group and followed. With the results, activities should be successfully enrolled. This fulfill the objectives of the study. As a result, the community moves away from food poisoning.

This study is planned to report the

MATERIAL AND METHODS

Descriptive observational study was conducted at Janaki Medical College, Teaching Hospital, Ramdaiya among proficiency certificate level, nursing hostel students of Janaki Medical College, Ramdaiya. All students who share the same food with/without clinical features of food poisoning. Approval from Janaki Medical College administration, Ethical Review Committee Ramdaiya, Dhanusha. Verbal consent from patients were taken. The survey was carried out by admitting the patients in Emergency Department and maintenance treatment in observation ward. All Nursing students and cook were also admitted. They together shared the same food. Whether they develop clinical features of food poisoning or not were taken under study.

Proper history taking, physical examination and concerning investigations revealed the diagnosis. Treatment was provided as per protocol. The protocol was not needed to revise. The aim of the study was explained to the patients. Questionnaires were pretested with control matching group. Patients were provided with the sheet of questionnaires with knowledge, attitude and practices regarding possible food poisoning, food safety and safe handling. With the help of their teacher with valid handout questionnaires were answered. Patients and other staffs who ate and/or participated in cooking food. Those who do not intend and/or give verbal consent. People not sharing the same food as in cooking or handling. The data were entered in Microsoft excels 2007 and analysed using SPSS 20.0.

RESULTS

Results section discuss the details of participants and observation made about the All of the patients (n=51) were females from various districts. The majority of the participants were between the ages of 18 and 23 (92%).

Among them, 90% were unmarried and 100% were Hindu, with BMR ranging from 17.5 to 25, and the fathers' occupation status by business were 49%, farmers 27%, and others bear 24%. Bramhan, Janjati, and other backward castes each constitutes 23.6%, chhetri (16.3%), adibasi (tharu) 9%, and dalit were 3.9% (Table-1).

Table-1: Demographic characteristics (n=51)		
Statement	**Range/Category**	**Percentage (%)**
Age group	18-23 years	92%
Marital Status	>23 years	8%
	Married	90%
	Unmarried	10%
Religion	Hindu	100%
	BMR	17.5-25.0
Fathers Occupation		
	Business	49%
	Farmer	27%
	Others	24%
Caste		
	Bramhan	23.6%
	Janajati	23.6%
	Other backward	23.6%
	Chhetri	16.3%
	Adibasi (Tharu)	9%
	Dalit	3.9%

Comorbidity consists of one case of hyperthyroidism, two cases of hypothyroidism, 56% of acid pepsin disorder (APD), and one case of anxiety. Complications included two cases of hypotension, one case of hypothermia, and one case of appendectomy. In terms of clinical features, there was abdominal pain (70%), diarrhea (70%), fever with chills (70%), headache (52%), nausea (35%), vomiting (31%), and other minor illness. Abdominal pain, diarrhea, fever with chills, and headache were the gold standard clinical features. 83.6% of cases were admitted to the observational ward, 10.9% were not admitted and were treated in the Emergency Department, and 5.5% were self-limited. All cases received two doses of anti-corona vaccine (Table 2).

Poison is tissue damager (74%);toxic doses of chemicals(50%);farming chemicals(52%) and bacterial Toxin(53%).Food poisoning is concerning with food mixing with Toxins(72%);freshly sprayed insecticides on vegetable(62%); Bacteria, virus, plant and infected animal(29%) and Acute gastroenteritis(29%). Non-Bacterial food poisoning includes fertilizers (56%); pesticides (27%);insecticides(23%); Herbicides(29%). Salmonella typhimurium food poisoning occurs in 12-24 hrs(92%); 2-3 days(20%) and 6 days(2%).Most common bacterial food poisoning is E. coli(74%);salmonella(76%); campylobacter(3%) and listeria(3%).Most of the foodborne illness is because of improper handling of food by the consumer(47%); improper handling of foods in restaurants 0r food source setting(50%); improper processing of foods by the manufacturer(50%) and Expiry date of food materials(60%). Microbe can be removed from liquid solution by the process of filtration (86%). Most frequently used skin disinfectant is ethanol(43%) and alcohol based Dettol(94%).Early symptom of food poisoning is abdominal pain(94%); loose motion(31%); Nausea(29%) and Vomiting (39%).

Table-2: Comorbidities and clinical features among participants (n=51)		
Comorbidity	**Number**	**Percentage (%)**
Hyperthyroidism	1	2%
Hypothyroidism	2	4%
Acid pepsin disorder	29	56%
Anxious	1	2%
Hypotension	2	4%
Appendectomy	1	2%
clinical features		
Abdominal pain	36	70%
Diarrhea	36	70%
Fever with chills	36	70%
Headache	27	52%
Nausea	18	35%
Vomiting	16	31%
Admission at:	0	
Observational ward	43	83.6%
Not admitted	6	10.9%
Self- limited.	3	5.5%
COVID-19 Vaccination	0	
Vaccinated	51	100%
Not vaccinated	0	0%

The most danger sign of food poisoning is diarrhea (68%); mucus and blood in stool(50%); fever(27%) and vomiting(17%). Botulism affects medically on nervous system (33%) and gastrointestinal system (66%).

Table-3: Responses to ***Knowledge*** for food poisoning (n=51)		
	Statement for knowledge about food poisoning	Response (%)
Poison is:	tissue damager	74
	toxic doses of chemicals	50
	farming chemicals	52
	bacterial Toxin	53
Poison is:	concerning with food mixing with Toxins	72
	freshly sprayed insecticides on vegetable	62
	Bacteria, virus, plant and infected animal and	29
	Acute gastroenteritis	29
Non-Bacterial food poisoning includes	Fertilizers	56
	Pesticides	27
	Insecticides	23
	Herbicides	29
Salmonella typhimurium food poisoning occurs in	12-24 hrs	92
	2-3 days	0
	6 days	2
Most common bacterial food poisoning is	E. coli	74
	Salmonella	76
	Campylobacter	3
	Listeria	3
Most of the foodborne illness is because of	improper handling of food by the consumer(47%)	47
	improper handling of foods in restaurants 0r food source setting(50%)	50
	improper processing of foods by the manufacturer(50%)	0
	Expiry date of food materials	60
Microbe can be removed	process of filtration	86
Most frequently used skin disinfectant is:	ethanol	3
	alcohol based Dettol	94
Early symptom of food poisoning is:	abdominal pain	94
	loose motion	31
	Nausea	9
	Vomiting	39
The most danger sign of food poisoning is:	Diarrhea	68
	mucus and blood in stool	50
	Fever	7
	Vomiting	17
Botulism affects medically on:	nervous system	3
	gastrointestinal system	66
The most effective sanitary barrier should apply to:	Flies	50
	Insects	5
	mice	6
Reservoir of E. coli and /or shigella spp is	sewage	80
	watertank	45
	Garbage	27
	well water	7
Reservoir of Entamoeba histolytica is:	sewage	34
	water material around water resources or ditch	17
	watertank	10
	Garbage	10
Food specific attack rate is	no. of cases eating food/total no of food consumer	40
	consumer health burden	41
	consumer public health concern	33
	health indicator	10

Table-4:Responses to *Attitude* for food poisoning	Yes	No
1. Interest of food intake in restaurant	100%	0%
2. Habit of consumption of roasted food	60%	40%
3. Accidental exposure to partial cooked food	60%	40%
4. The use of food freshly sprayed insecticides/pesticides	12%	88%
5. Use of long storage rice, flour, potatoes, beaten rice	18%	82%
6. Aware of presence of Mice, Flies, Rats, Dust in the kitchen	81%	29%
7. Use of adulterated food	78%	22%
8. Unhealthy and/or diseased and/or undertreatment animal meat	14%	86%
9. Use of food mixed with preservative chemicals	6%	94%
10. Water source near latrine and its use for drinking purpose	14%	86%

Table 5: Responses to practices for food poisoning	Yes	No
1.Proper hand washing 20 sec with soap and water during food handling and after use of toilet	100%	0
2.Hygiene to cutting board and knife to salad, fruit and vegetable	100%	0
3.Rinsing fresh fruits and vegetables under running water	90%	10%
4. Use of disposable gloves, head caps, gown, cooking and setting food	16%	84%
5.Practice of keeping cooked food material at 4 degC to 10 degC	39%	61%
6.Kitchen and surroundings hygiene with suitable chemicals	74%	26%
7.Proper disposable garbage	100%	0%
8.Use of safe and wholesome water	88%	12%
9.Use of moulded and rotten food/fruits after removing some portion	42%	58%
10. Personal hygiene	100%	0%

DISCUSSION

Several studies were done on the outbreak of diarrhoeagenic E. coli infections. A waterborne outbreak of multiple diarrhoeagenic E.coli infections associated with drinking water at a school camp [1] forwarded a total 188 patients with symptoms of diarrhea, abdominal pain and nausea were identified. The completed questionnaires suggested that the consumption of drinking water was likely to this outbreak. Clinical specimens were cultured using standard microbiological methods for bacterial and viral pathogens and found EHEC,EPEC,EAEC ,ETEC,EIEC etc as bacterial isolates in stool and drinking water. "Outbreak of Enterotoxigenic E. coli infection [10]

A review of food poisoning caused by local food in Japan, Takashi Watari [11],Takayuki Tahibana,BA et al[12], in adult, EPEC diarrhea presents as watery diarrhea (sometimes associated with vomiting) in association with a low grade fever. This illness, if left untreated, may persist for up to 120 days. They recorded at least 1000 cases of food poisoning per year in Japan from 2015 to 2018. Of these, bacterial infection is the most common, followed by viral and parasitic infections. Among bacterial species, Campylobacter jejuni and E. coli are the primary and most frequent (about 300 cases/year) causes of food poisoning. Approximately 15 cases of Staph. Aureus and EHEC per year. Among viral infections, norovirus food poisoning accounting for approximately 250 virus. China reports more than 7000 outbreaks in 2020 by Joe whitworth on November 1, 2021: Salmonella with 286 outbreaks and 3,446 illnesses was the top bacterial pathogen linked to outbreak and illness, followed by vibrio para-haemolyticus at 128 outbreaks and 1,848 illness, and staphylococcus aureus with 75 outbreaks and 954 illness. More than 1,500 people were sick in 54 E. coli outbreaks and 620 illnesses came from 50 Bacillus cereus outbreaks. Five clostridium perfringens

outbreaks sickened 287 people. Three campylobacter jejuni outbreaks affected 133 while three Clostridium botulinum reports included 10 people. Only one Listeria monocytogens outbreaks was recorded with 28 patients. Among the chemical agents, nitrites was the most common factor associated with outbreaks and illnesses like dizzy, weak, abdominal cramp, vomit, diarrhea, unconscious shortly after onset of symptoms. The second most poisoning is by pesticides. Plant and animal toxicants caused more than 1000 outbreaks with 4,584 as well.

Global symptoms of food poisonings are nausea, abdominal pain, diarrhea, fever with chills, headache and vomiting for most of the studies of Enteropathogenic E. coli. Global risk factors were immunocompromised people, pregnant women, older adults, young children and unsafe foods like uncooked meat, eggs, shellfish, raw food, unhygienic poultry, farming , poor personal hygiene, deli meat, unpasteurized milk and its products, raw unwashed fruits and vegetable etc, not cleaning water tank on the roof at least monthly.

Overall, most outbreaks, illness and deaths were linked to home cooking and catering services. Findings provide a basis for prevention and control measures and support for food safety risk assessment, formulation and revision of standards protocol, and global risk management.

In my study in JMCTH, Nursing Campus Emerging adults of 20 different districts of Nepal were cases of food poisonings. They represented their regional immunity and hygienic status of Nepal. 83% of patients were shifted to observation ward after initial resuscitation in emergency department. Symptoms of food poisonings were abdominal pain (70%), diarrhea (70%), fever with chills with headache (70%) and vomiting. Patients were complicated to hypotension two in number, hypothermia one in number and appendicitis one in number. Risks factors resembled as previous study or in literatures. Besides, anaemia (46%), hypoglycemia(72%),acid pepsin disorder(56%) with the use of pantoprazole, omeprazole etc., unpauteurised milk, sausage, custards, uncooked eggs, roasted food, frequent use of spicy and raw food (salad, samosa, chowmein, mo:mo, spicy chatpate), close peer, share clothe of friends, drinking water near latrine, improper disposal of garbage, use of freshly sprayed insecticides over vegetables etc. . Two doses of anti-corona vaccination were taken by all consumers. It was very high. So organism was very virulent. 46 were admitted in observation ward .Only 6 patients were not admitted. 1 patient went outside on persistent request for dischage and 3 were self-limited. The epidemic situation was controlled with a special team of JMCTH, Janakpurdham branch within 4 days of management. No revision of protocol was sensed during treatment. Renal physiology was found intact. Hyponatraemic (16%), Hypernatraemic (6%), Hypokalaemic(22%) and Hyperkalaemic (14%) were managed properly. Differential count of blood showed predominantly of Neutrophilia (88%) i.e. early enteric pathogenic organism infection and lymphocytosis (52%) revealing late enteric pathogenic infection. Loose Stool Microscopic Examination showed plenty of pus cells/HPF (100%) and microscopic RBCs in stool (20%), cysts of E. histolytica(10%). Blood and mucus in stool were seen with E. histolytica.

Stool culture showed isolates of pathogenic E.coli (80%) and Shigella dysentery (10%). 3 cases showed Urine culture isolates as E. coli.

Sensitivity patterns of antibiotics were fluoroquinolone and cephalosporin in both isolates. These drugs were given to the patients intravenously with accessary drugs as well. Epidemic situation was controlled within 4 days of stay in hospital.

Knowledge was assessed and found more than 50% correct answers as Poison is tissue damager,toxic dose of drugs, bacterial toxin and farming chemicals. Food poisonings concerns with food mixing with bacterial toxins and farming chemicals. Most of the food borne illness is because of improper handling of food by the consumer. Most common food poisonings are salmonella and E. coli whose reservoirs are sewage. The higher the food specific attack rate, the higher the public health burden is mandatory. These bacteria can be filtered from liquid. E. histolytica is waterborne disease. The contamination can be kept apart by using alcohol based hand senitizer. The sanitary barrier is necessary to stop transmission of diseases. Early symptoms of food poisoning are interchangeably abdominal pain, vomiting, loose motion and nausea but the gold standard symptoms of this study are abdominal pain, diarrhea, and fever with chills with headache followed by nausea and vomiting. The most danger signs are diarrhea, mucus and blood in stool and fever. The incubation period ranges from few hours to days to 2 weeks.

All patients were interested to have food in restaurant/hotel with roasted food. Use of freshly sprayed insecticides/pesticides on vegetables after just washing them. They are aware of Flies, mice and rats. Accidental exposure to partial uncooked food is faced. Use of adulterated food or beverages is denied. Sharply obligation to consume milk and meat from unhealthy animals. They prefer taking chemical from product as food and safe water from source of latrine.

In my study, negative drawback regarding knowledge are sub threshold thought of food poisoning concern with viral, fungal, plant and infected animals(29%), early symptom nausea(29%) and vomiting (39%), food specific attack rate-a health indicator(13%),botulism involves(13%) only. Negative drawback of attitude are intake of roasted food, partial cooked food(60%) each, under treatment animal meat, milk(25%), drinking water source near latrine(13%), use of adulterated food(21%), not aware of rats, dust(29%), use of long storage of beaten rice(18%),accidental exposure of uncooked food(40%). Negative drawback of practices are not using disposable hand gloves, head caps, gown while cooking or setting food, not keeping of cooked food at 4 to 10 deg centigrade till its consumption, removing moulded or unsafe part of vegetable or food and use the remaining portion for cooking and consuming.

CONCLUSION:

Outburst of sudden food poisoning in PCL nursing students were found because of contamination of EPEC strain of bacteria, shigella dysentery and Entamoeba histolytica in food. Several risk factors and negative drawback of knowledge, attitude and practice of students were found to precipitate the condition. Since there was no history of food poisoning in the canteen before this incidence, this food poisoning condition was found accidental event. Canteen hygiene, sanitary cooking process, personal hygiene, food and water hygiene, continual food safety risk assessment, formulation and revision of standards of living and risk management must be sensed on time. Control measures to etiological findings like E. coli, Shigella dysentery, E. histolytica, anemia, use of

proton pump inhibitor, close peer, raw food etc are to be maintained. Revision of negative drawback of knowledge, attitude and practice in correct manner is to be implemented.

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Conflict of interest

The authors declare that they have no conflict of interest.

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