Research Article

GASTROENTERITIS OUTBREAK AMONG ATTENDEES OF RECONCILIATION BANQUET IN RIYADH CITY, SAUDI ARABIA

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ABSTRACT

Objective: To identify the source and the contributing factors of this food poisoning outbreak.

Methodology: A retrospective cohort study was conducted. The data were collected via telephone calls with some cases and non-cases to inquire about food items they had, symptoms they experienced, either hospitalized or not, the management they received and the laboratory results if available. Anyone of the attendees developed one or more of the following symptoms (diarrhea, vomiting, abdominal pain and/or fever) within two days of the banquet was considered as a case.

Results: A total of 29 individuals were contacted,18 developed gastroenteritis manifested by diarrhea (100%), abdominal pain (88.9%), fever (88.9%) and vomiting (77.8%). All were Saudis; (62%) males and (38%) females. The median incubation period was 10.30 hours. The most probable implicated food items are aum ali (sweet) and green salad from the restaurant. Regarding aum ali (sweet) (R.R=1.93) with 95% C.I=1.06-3.53. Regarding green salad (R.R=1.85) with 95% C.I =1.28-2.67. salmonella-D was isolated from 5 cases belonging to family of banquet host.

Conclusion: salmonella-D was the causative agent whereas aum ali (sweet) and green salad from the restaurant were the most likely incriminated food items. The source of infection is likely family of banquet host.

INTRODUCTION

Background

About 70 persons attended a reconciliation banquet in a house in Riyadh city. 50 of them started to complain of diarrhea, abdominal pain, fever, nausea, vomiting, chills and headache with some variations in symptoms and severity. 25 of them visited emergency departments in different hospitals in Riyadh city. This was notified to the on-call center which was the northern PHCC in Al-naseem district. An investigation was initiated.

The plan consists of three major elements

1. Contact of the banquet attendees to collect full information about food items they have consumed, symptoms they have complained of, actions they have taken and their opinion about the situation e.g. the cause of their complaints.

2. Visits to different places responsible about food preparation, storage and delivery to see how prepare, preserve and deliver the food besides laboratory investigations of food items, utensils and food handlers.

3. Collection of laboratory results of the patients, food items, utensils and food handlers.

Introduction

Most clinicians consider a foodborne illness when a patient presents with a variety of gastrointestinal symptoms. However, other manifestations of foodborne illness can occur, such as neurologic symptoms. There are more than 200 known diseases capable of transmission through food.[1]

Three key questions will be reviewed here

1. What are the probable microbial causes of foodborne disease?
2. How do time course and types of symptoms serve as clues?

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3. How can a food history help to narrow the diagnosis?

Five organisms account for 90 percent of the deaths, most notably Salmonella spp.[2]

There are three important elements of the history that the physician should consider while trying to determine the differential diagnosis of foodborne diseases:

1. Presenting symptoms.
2. Exposure to a particular type of food associated with foodborne disease.
3. The time interval between exposure to the suspect food and the onset of symptoms.[3]

Salmonellae cause a broad range of infections, including gastroenteritis and enteric fever. Although there are many types of Salmonella, they can be divided into two broad categories: those that cause typhoid and enteric fever and those that primarily induce gastroenteritis.[4]

Food Net is a collaborative active surveillance program involving ten state public health departments, the CDC, FDA, and Department of Agriculture. It began in 1996; the following observations were noted in reports covering 1996 to 1999: Conservative estimates indicated that there were about 1.4 million Salmonella infections, which resulted in about 15,000 hospitalizations and approximately 400 deaths per year.[5]

Nontyphoidal Salmonella infections proportionally caused the greatest percentage of hospitalizations and deaths due to foodborne pathogens.[6]

Salmonellosis was most problematic in people over 60 and infants. Most deaths occurred in older patients with comorbid illnesses. Seventy-one percent of patients with invasive salmonellosis were hospitalized and approximately 5 percent died.[7]

A case control study in infants strongly suggested that breast feeding protects against acquisition of Salmonella infection in infancy.[8]

Chicken consumption (not just egg consumption) appeared to be a new risk factor for development of Salmonella enteritidis infection.[9-10]

Salmonellosis rates differed by region. A decrease in rate was seen and in some areas may have been due to on-farm control measures, better refrigeration, consumer education, and better food handling in restaurants and homes.[11]

Objective

To identify the source and the contributing factors of this food poisoning outbreak.

METHODOLOGY

Study design

A retrospective cohort study.

Study setting

Riyadh is the capital of Saudi Arabia. Riyadh population is about 4 million. It is located in the central region. The suspected restaurant group consists of about 8 restaurants and one main center for food preparation.All restaurants have the same food items. There are about 100 food items. There are about 800 people working in this group.

Study population

The attendees of the reconciliation banquet, 29 persons.

Case definition

The case was defined as any person who has eaten in the reconciliation banquet in Riyadh city and developed diarrhea and one or more of the following symptoms (vomiting, abdominal pain and fever) within two days of food consumption.

Data collection

The data were collected via telephone calls by the team members. 29 of the attendees were contacted. The laboratory results of food items, food handlers and of cases were obtained.

Analysis plan

Epi-Info software (version 3.5.4) from CDC, was used to data entry and for analysis. The data were analyzed to respond to the objectives of the study. The food specific attack rate (A.R), relative risk (R.R) and 95% confidence interval (95%C.I.) for each food item were calculated.

Ethical concerns

Ethical considerations were according to regulations and rules.

RESULTS

Out of 70 persons attended the reconciliation banquet. Only 29 persons of them were traced.18 of the 29 persons developed gastroenteritis. 100% of them (18 patients) complained of diarrhea, 88.9% (16 patients) complained of abdominal pain, 88.9% (16 patients) complained of fever, 77.8% (14 patients) complained of vomiting,27.8% (5 patients) complained of headache,22.2% (4 patients) complained of chills and 22.2% (4 patients) complained of nausea (figure 1).
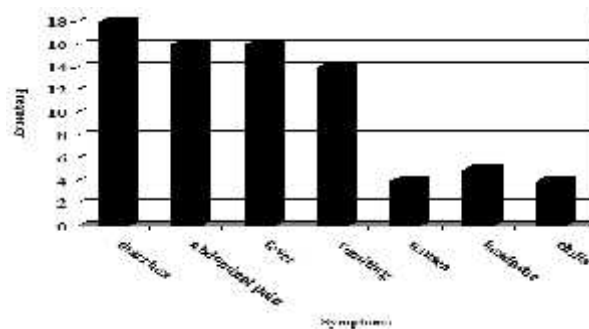

Figure 1 Frequency of symptoms of food poisoning outbreak in Riyadh city

The time lapse between food consumption and onset of symptoms ranges between 7-23 hours with a median duration of 10.30 hours, the mean was 12.38 hours, the standard deviation (S.D.) was 4.72 and mode was 10 hours (figure 2).

The total number of sample is 29 persons out of 70 attendees. Out of the 29 persons, 18 were cases (62%) and 11 were non-cases (38%).
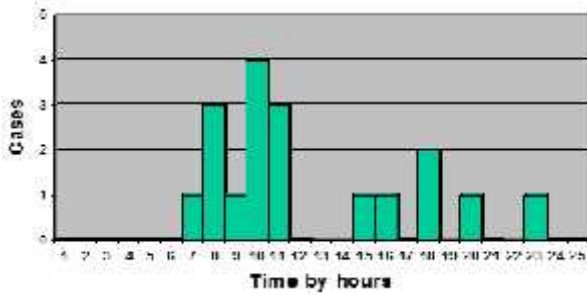
Figure 2 Incubation periods by hours of food poisoning outbreak in Riyadh city

Regarding laboratory results; 5 cases gave positive results for *salmonella D*. Food items, utensils and food handlers gave negative results.

The relative risks(RR) and 95% Confidence Interval (95% C.I) of the food items eaten on that banquet were calculated and it was observed that; aum ali sweet had the highest RR 1.93 followed by that of green salad 1.85 while the least RR was for juice (table 1).

Table 1 Attack rates, relative risks &95% confidence interval of consumed food items in reconciliation banquet in Riyadh city

Food items	Eaters		Non-eaters		Relative risk (RR)	95%CI
	Attack rate (AR)	Ill/Total	Attack rate (AR)	Ill/Total		
kabsa	36	5/14	87	13/15	0.41	0.2-0.86
Aum ali	84	11/13	43	7/16	1.93	1.06-3.53
kebba	78	7/9	55	**11/20**	1.41	0.83-2.4
kenaffa	75	6/8	57	12/21	1.31	0.76-2.26
barbecues	85	6/7	55	12/22	1.57	0.97-2.56
fish	71	5/7	59	13/22	1.2	0.67-2.17
Cream caramel	85	6/7	55	12/22	1.57	0.97-2.56
cake	80	4/5	58	14/24	1.37	0.79-2.39
Green salad	100	5/5	54	13/24	1.85	1.28-2.67
tabbolah	80	4/5	58	14/24	1.37	0.79-2.39
juice	20	1/5	70	17/24	0.28	0.05-1.66

DISCUSSION

The clinical, laboratory, and epidemiological data point to *salmonella D* as the most likely causative organism of this outbreak. This is advocated by the isolation of the organism from 5 patients. The clinical picture including diarrhea and fever is compatible with that of *salmonella*.[12-14]

The incubation period variability may be due to the differences in doses of inoculation, the susceptibility of the individual, and/or incorrect information. *Salmonella* is the commonest causative organism of foodborne outbreak in Saudi Arabia according to statistics published by Food Safety Program in Ministry of Health. Usually such outbreaks arise from contaminated food at its source or during handling by an ill person or carrier. *Salmonella* can multiply rapidly in optimal circumstances as temperature from $7^{o}C$ to $46^{o}C$.[14]

Regarding the probable incriminated food items –aum ali sweet is prepared under high temperature exceeding $75^{o}C$ for more than 12 minutes under which salmonella cannot survive.[15]

Therefore, the contamination happened possibly during transportation or more likely at home not during preparation but green salad is not exposed to temperature so contamination possibly happened during preparation ,transportation or at home which is most probably by cross contamination. The main component of aum ali sweet is milk. The raw or incompletely pasteurized milk can cause infection from several pathogens,[16]

CONCLUSION

The causative organism of this foodborne outbreak was salmonella D. The incriminated food items were probably aum ali and green salad. Asymptomatic carrier was possibly the source of organism. The carrier is most likely within the family of banquet host. Although the temperature of preparation is adequate to kill the organism but cross contamination after preparation could be the cause. The mode of transmission is probably person to person.

Declaration of Interest

The authors report no conflicts of interest. The authors are responsible for the content and writing of the paper.

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