

SUMMARY

An outbreak of gastroenteritis due to *Salmonella berta* occurred following a social function (barbeque) affecting 12 out of 16 guests. A birthday cake bought from a catering firm in Gozo was the most likely vehicle of infection implicated. Three patients were admitted to hospital with severe diarrhoea and abdominal pain.

NARRATIVE

On Wednesday 4th September 1996 at 11.00 a.m. the Disease Surveillance Branch of the Department of Public Health was alerted of a food poisoning event through two notifications of gastroenteritis by a local general practitioner. An investigation team was set up comprising the Medical Officer of Health, the Principal Health Inspector for the region of Gozo together with the respective District Health Inspectors.

The cases followed a barbeque held at the backyard of the home of one of the index cases at the village of Sannat. This was held on Sunday, 1st September from 5.00 p.m. onwards.

Over the next 24 hours 12 out of the 16 guests developed symptoms of gastroenteritis, primarily diarrhoea and abdominal pain. All the 12 symptomatic guests stated that they had eaten from the birthday cake at the function the previous day. The other 4 guests did not.

A 22 year old man who attended the function was admitted to Gozo General Hospital the day following the function, while two girls (ages six and nine years) were admitted 2 days later with gastroenteritis.

METHODS

(a) Epidemiology

A preliminary enquiry started by visiting the two index cases, one at the hospital and the other at home to verify the cases. The Disease Surveillance Branch obtained the names and addresses of guests at the function, identified the caterer, and procured a list of catering staff. A customised questionnaire was prepared for guests based on the information provided. Specific inquiry was made about consumption of individual foods and included questions on any resulting symptoms, and their respective time of onset. Relevant questionnaires were filled up by District Senior Health Inspectors and stool sample bottles were distributed to the persons involved.

(b) Investigation of the Premises and Food Preparation

(i) Caterer: The caterer's premises were inspected. Only sweet confectionery was prepared on site. No other party food was prepared at this place.

The caterer suspended his activities voluntarily for a few days until the investigation was complete. The general state of hygiene of premises was good. Working tops were in good state of repair and clean. Rubbish bins

were properly covered. Equipment used for the manufacture of confectioneries was unremarkable.

The following deficiencies were noted;

1. No hand washing facilities were present in the preparation area.
2. Some shelving was not impervious.
3. Lime stone washing was lacking.
4. Fridges and prepared food were within reach of the general public.
5. Electric insectocuters were not functioning.

As regards to personal hygiene of the staff, no skin lesions were evident. None of the staff (two) were symptomatic and they did not report illness in the previous two weeks.

Environmental swabs (working tops and mixer), as well as hand swabs of the catering staff were taken. There were no party leftover food items. Six raw eggs and samples of ready-to-eat food items found at the premises were taken for analysis.

No other known cases of salmonellosis had been recently linked to food poisoning from the same premises.

(ii) Household: The house where the function was held was located in a new residential area.

The drain was connected to public sewers. The water system operated from the Government main supply. The working area in the kitchen was separated from the storage area. Raw and cooked foods in the fridge were noted not to be properly separated, predisposing to cross contamination. A sample of service water as well as two leftover slices of birthday cake that were saved were taken for microbiological analysis.

(iii) *Meat Supplier:* The meat used was bought from a butcher shop. The place was well equipped. The freezers and the equipment used was clean and well maintained. The personal hygiene of the food handlers was noted to be good, including proper use of head covers and washable clean overalls.

(iv) *Egg Supplier:* An inspection of poultry layers farm revealed good general state of hygiene of premises. Lime washing was in good condition. Premises were free from accumulation of chicken dung. Lighting and ventilation were good. The farm was adequately supplied with service water. A sample of 12 eggs and service water were taken for analysis.

(c) Microbiology

Stool samples were obtained from all kitchen staff and from 9 symptomatic guests.

The environmental swabs collected from the kitchen area as well as the food samples obtained, including the remnants of the birthday cake, were examined by standard methods (PHLS 1974) using selenite F selective broth enrichment for *salmonellas*. No effort was made to quantify *salmonellae* in foods. The food items were also tested for the presence of *Klebsiella*, *Streptococci*, *Campylobacter*, *Staphylococcus aureus*, and *Escherichia coli*.

(d) Temperature

Ambient temperatures (maximum and minimum) for dates of the outbreak were obtained (Meteorological Office, Department of Civil Aviation). This Office is located 15 km as the crow flies approximately 40 degrees due South-East from the outbreak site.

RESULTS

(a) Foods Served

- The foods served at the function are listed at table 1.
- The steak was cooked at the barbeque site.

Birthday cake Steak Raw vegetable salad: cucumber, tomatoes, onions and lettuce.
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Table 1: Foods served at the function

(b) Questionnaires

- All guests attending the function completed the questionnaires. (16/16, 100%).

(c) Attack rates

- 12 out of 16 guests were ill, an attack rate of 75%.

A guest or staff member was defined as a case if he or she developed diarrhoea or vomiting plus or minus any other symptom within 24 hours of the function.

The principal symptoms reported by cases by frequency of occurrence are at table 2.

Symptoms	Frequency
diarrhoea	100%
nausea	83%
abdominal pain	75%
fever/chills	67%
headache	67%
weakness	67%
vomiting	50%

Table 2: Main symptoms reported by cases by frequency of occurrence.

The initial symptoms were diarrhoea and fever. The mode duration in hours from consumption till onset of symptoms was 14 hrs. The arithmetic mean for the same time period was 13.6 hrs. Range of incubation periods were 8-16 hrs.

Three persons required admission to hospital. Many guests lost time from work as a result of gastroenteritis.

(d) Food histories

Table 3 is a 2x2 table for exposure (consumption of cake) to development of illness i.e. becoming a case. There was an association between illness and the consumption of cake.

The Null hypothesis stated that there was no association between illness and the consumption of foods at the barbeque.

		exposure		
		+	-	
cases	+	12	0	
	-	0	4	
				16

Table 3: 2x2 table for exposure to development of illness.

Odds ratio is infinite. The null hypothesis is thus rejected.

(e) Bacteriological outcome

(i) Guests
Nine out of the twelve cases submitted stools, seven of which (78%) yielded *Salmonella berta*.

(ii) Kitchen Staff
The two persons who were involved in the preparation of the cake submitted stool specimens. These were positive for *Salmonella enteritidis*.

(iii) Foods and Environmental Swabs
The results of culture for salmonellae carried out on various foods, both remnants and food un-consumed at the function are shown in Table 4.

Environmental swabs obtained from the kitchen premises did not yield salmonellae though *Klebsiella* was cultured, indicating deficient hygiene. (Table 5)

Foods tested	Site	Growth
Cake (sample A)	Household kitchen	Salmonella enteritidis detected
Cake (sample B)	Household kitchen	Klebsiella spp detected
Service water	Household kitchen	No growth
Jam tart	Caterer's kitchen	No growth
Apricot jam tart	Caterer's kitchen	No growth
Date turnover	Caterer's kitchen	No growth
Almond cake	Caterer's kitchen	No growth
Apple tart	Caterer's kitchen	No growth
Six fresh eggs	Caterer's kitchen	No growth
Service water	Caterer's kitchen	No growth

Table 4: Results of culture carried out on various foods

Environmental swabs	Site	Growth
Working top	Caterer's kitchen	Klebsiella spp detected
Hobart mixer	Caterer's kitchen	No growth
Food handler (1)	Caterer's kitchen	Klebsiella spp detected
Food handler (2)	Caterer's kitchen	Klebsiella spp detected

Table 5: Results of culture of the various environmental swabs taken

(f) Ambient Temperatures

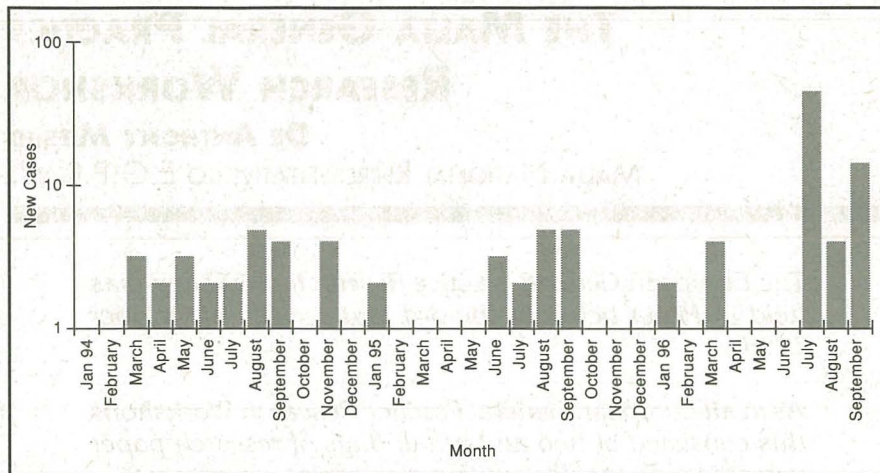
The maximum and minimum ambient temperatures recorded within 15km of the caterer's premises are shown in Table 6.

Day	Maximum	Minimum
31st August	30.5°C	24.3°C
1st September	29.4°C	22.4°C
2nd September	29.0°C	21.6°C

Table 6: Maximum and minimum ambient temperatures recorded within 15Km of the caterer's premises.

Environmental swabs and sampling took place three days after the outbreak occurred. One sample out of the two from the same cake cultured *Salmonella enteritidis*.

Graph 1 shows the number of new cases of salmonella food poisoning by month over the last 3 years. It is noted that the incidence is highest during the months of August and September. The cases were all sporadic except for 2 outbreaks which occurred in July and September 1996 involving 35 and 13 individuals respectively. High ambient temperatures are expected to enhance food spoilage. This factor has been noted before (Roberts 1982).



Graph 1: Time series (logarithmic scale) for notified salmonellae food poisoning in Gozo by month (January 1994 - September 1996).

(g) Action Taken

As *Salmonella enteritidis* was isolated from the two sole proprietors and food handlers at the establishment, the place was closed for business for 15 days. The kitchen was thoroughly cleaned. All cakes and food not securely packaged were withdrawn from sale. Staff were required to produce three negative stool samples before being allowed to return to work. The staff were further instructed on cooking and storage techniques, as well as personal and environmental hygiene.

A follow up inspection was carried out at the catering firm to ensure that the licensee had carried out the works recommended.

The residents at household where the function was carried out were advised about proper separation of raw and cooked foods at refrigeration to avoid cross contamination.

DISCUSSION

This outbreak was characterised by its small size and was well circumscribed. This facilitated thorough tracing and follow up of each person involved. Epidemiological and bacteriological evidence suggested that consumption of cake was the most likely means of infection. The cake was probably contaminated by infected egg shells. However, the isolation of *Salmonella berta* from the cake may have been caused by cross contamination at site of preparation by the affected patient following illness ("reverse causality").

CONCLUSION

In summary, this report describes an outbreak of food poisoning involving 12 persons following a barbecue. Epidemiological and microbiological investigations were carried out on cases and food suppliers. The causative organism detected in people and food was *Salmonella berta*. The following action was taken:

1. Deficiencies in the kitchen were highlighted and a supervised cleanup of the premises carried out.
2. All food handlers were suspended for 15 days from work until cleared by 3 consecutive negative stool cultures.
3. Food handlers were further instructed on hygienic measures in production of confectionery.

Early notification in this case resulted in immediate and timely action to be carried out. This case illustrates how notification of infectious diseases by doctors, apart from being a legal obligation under the Medical & Kindred Professions Ordinance, and Prevention of Diseases Ordinance, is key to useful preventive action in the interests of the whole community.

REFERENCES

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