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Investigation of a Dysentery Outbreak at a Psychiatric Rehabilitation Institution in Shilin District, Taipei City, 1997

Introduction

On 30 October 1997, 16 cases of diarrhea in a psychiatric rehabilitation institution were reported to the Taipei Health Bureau. On 3 November, a team from the Shilin District Health Center visited the institution to collect rectal swabs for laboratory testing and to disinfect of the environment. To understand the souces of the incident and its route of transmission, the Field Epidemiology Training Program (FETP) was asked to conduct an epidemiological investigation.

Background

The psychiatric rehabilitation institution is privately owned. It began to admit relatively stable patients in May 1997. The institution has three two-storied buildings: two for male patients, and one for female patients. Each building has its own dining room and water storage tower. Patients all share the same food and food is placed in individual plate (Figure 1).

On 4 November 1997, there were 112 patients: 69 males and 43 females. There were 17 employees; of them, three were nurses. They helped patients in eating, washing, and medication. In case of acute psychiatric conditions, patients were referred to a psychiatry hospital for care. They were returned to the institution when conditions became stable. For other conditions, they were sent to neighboring hospitals for case. In September, some patients began to show symptom of diarrhea and were suspected having dysentery infection. In late October, the Chen-Hsing Hospital reported them to the Shilin District Health Center.

Materials and Method

1) Cases and Environmental Survey

The attending physician of the three reported cases was interviewed for clinical information of the patients. Medical records of all patients were then reviewed. Employees of the institution were also interviewed. Other suspected diarrheal cases were identified. The environment and living conditions of the patients were reviewed. Drinking water was tested for residual chlorine. One water specimen was collected for testing for pathogens by the National Institute of Preventive Medicine. As the psychiatric patients were unable to fill out questionnaires, a special form was developed to record their medical care and living conditions in the past month.

2) Definition of Case

One was defined as a possible case if he/she had diarrhea three and more times a day since September. One with the symptom and was positive of dysentery bacillus testing was defined as a confirmed bacillary dysentery case. One with the symptom and was positive of dysentery amebic testing was defined as a confirmed amebic dysentery case.

3) Laboratory testing

Testing for dysentery bacillus: rectal swabs were collected from all employees and patients on 3-4 November; one water specimen was also collected. They were sent to the National Institute of Preventive Medicine for isolation of dysentery bacillus strains and antibiotic sensitivity test [1.2]

Testing for dysentery amebic: as two of the six hospitalized patients showed amebic dysentery antibody positive, the Shilin District Health Center, on 6-7 November, took fresh fecal specimens from all employees and patients for laboratory testing by the National Institute of Preventive Medicine [1, 2].

4) Preventive Measures

A general disinfection of the environment, particularly the toilets, took place on 3 November. Laboratory-confirmed bacillary and amebic dysentery cases were sent to the Taipei Municipal Yangming General Hospital for treatment. Other diarrheal cases were placed under collective management at the institution with separate toilet facilities to avoid further contact with others. Antibiotic sensitivity test showed that the dysentery bacillus isolated was sensitive to the first line medicine of nalidixic acid. On 8 November, all patients were given seven days of nalidixic acid as prophylactic. As some suspected cases had been referred to other psychiatry hospitals for treatment, local health bureaus had been informed of the incident and asked to practice preventive measures.

5) Statistical Analysis

Variables were tested for differences between risk factors by either $\chi 2$ test or Fisher's exact test. A P-value smaller than 0.05 was considered statistically significant.

Results

1) Cases and Environmental Survey

By 4 November, 18 suspected cases had been identified, giving an attack rate of 161% (18/112). Of them, 17 were males, attack rate being 24.6% (17/69); and one female, attack rate being 2.3% (1/43). These two attack rates were significantly different ($p<0.05$, Fisher's exact test). Laboratory findings were: of the 115 rectal swabs collected on 3-4 November (104 from patients under institution care, and 11 from employees), three were positive to *Shigella flexneri* 2a; and one of the three reported cases under hospital care was also positive to *Shigella flexneris* 2a. Thus, a total of four confirmed bacillary dysentery 120 cases were identified. Of the were dysentery fresh fecal specimens collected on 6-7 November (107 from patients under institution care, and 13 from employees), two were positive to amebic dysentery; one was of the active type, one was of the cyst type (without symptoms), and they were bacillary dysentery negative (Table 1).

Table 1. Results of Bacillary and Amebic Dysentery Tests

No	Sex	Age	Date of Onset of Diarrhea	Date Admitted to Institution (Day/ Month)	Type of Baccillary Dysentery Testing	Type of Amebic Dysentery Testing
1	F	36	25/9	21/8	*S.flexneri* 2a	Negative
2	M	41	10/10	22/9	*S.flexneri* 2a	Negative
3	M	56	11/10	30/6	*S.flexneri* 2a	Negative
4	M	71	22/10	28/5	*S.flexneri* 2a	Negative
5	M	63	1/11	30/6	Negative	(+) active
6	M	59	No symptom	1/10	Negative	(+)cyst

The first case was a mentally retarded female referred by the Hungtze Hospital of Hsintien on 21 August. She became ill on 25 September the first time, and again, on 12 October. She was not medically cared for her mild symptoms. In early October, eight more diarrheal cases were reported; of them, two were confirmed bacillary dysentery. In late October, another eight diarrheal cases were reported; of them, one was confirmed bacillary dysentery. In early November, only one diarrheal case was reported, a confirmed amebic dysentery (Figure 2).

The residual chlorine in water was found on 3 November to be 0.4 ppm. No pathogenic agents were isolated from the water specimens collected.

2 Preventive Measures

The four confirmed bacillary dysentery and two confirmed amebic dysentery cases were referred to the Municipal Yangming Hospital for care. Suspects with symptoms were collectively managed at the institution. All patients of the institution were given seven days of nalidixic acid as prophylactic. Rectal swabs of the tour confirmed bacillary dysentery cases were found negative on 18-21

November; specimens of the two arnehic dysentery cases were found negative on 26 and 29 December.

Discussion

By the size of the infection, epidemic curve on time of onset, and testing of drinking water, the dysentery outbreak was considered to have been caused by personal contact rather than the contamination of water sources. Personal hygiene of psychiatric patients is generally poor, and anemic and bacillary dysentery cases are often chronic carriers, dysentery outbreaks are not uncommon in psychiatric hospitals and nursing care institutions [3, 4, 5]. Measures should be taken to prevent the spread of the mouth-fecal infectious disease at these institutions.

Though the same serum-type, *S. flexneri* 2a, was isolated from the four bacillary dysentery cases, as male and female patients shared different buildings, it was not possible to speculate how the male and female confirmed cases crossed each other. As chronic carriers are likely to exist in psychiatric institutions [6], it was not possible to identify the sources of infection. Molecular typing has been extensively used in epidemiological investigations recently [7], this technique could he used in the present investigation to clarify the relationship between male and female patients.

In a closed area such as jail and psychiatric hospital where many people crowd into a limited space, often under poor sanitation conditions, new corners can easily bring in infectious diseases to induce an outbreak. In the present case, the sick ones though were moved from their individual bedrooms to one bedroom for isolation, they were returned to their original bedrooms soon after the symptoms disappeared. As patients kept moving, their chances of infection by personal contact were high. As the number of long-term care facilities is increasing, health education of the staff in the prevention of infectious diseases should he strengthened. Examination of new corners for infectious diseases such as tuberculosis and dysentery should he made mandatory for these institutions to avoid any outbreaks.

The effect of chemo-prophylaxis for contacts of dysentery is limited and can lead to drug resistance. This practice is no longer recommended in the Control of Communicable Disease Manual of the American Public Health Association for years [8]. Though antibiotics are effective against bacillary dysentery [9], they can shorten period of symptoms, they, on the other hand, extend the period of carrier [10, 11]. Some cases of the dysentery outbreaks at the Chungchen Primary School of Taoyuan and the Taichung Detention Center, for instance, continued to carry bacilli even after three or four treatment procedures [12, 13]. Unless the conditions are serious, or for people of high risk groups such as the elderly, and persons in poor physical conditions, the use of antibiotics for persons of normal physical conditions infected with bacterial gastroenteritis is not recommended [9, 14]. For those in the high risk groups, the use of the new quinolone such as coprofloxacin is recommended. In the present outbreak, patients had been on psychiatric medicines for some time, their liver and kidney functions were not adequate, medication should he more cautious.

Multiple drug resistance of bacillary dysentery has always been a problem in the treatment of dysentery patients [15]. In 1995, the World Health Organization issued a report on drug resistance in Burundi [16]. An observation of drug resistance at six medical care institutions six months after the use of nalidixic acid as a front line medicine for the treatment of *Shigella dysenteriae* found that the average ratio of drug resistance was 57%. The data of the Kaohsiung Medical College in 1992 showed that of the 128 strains isolated from infants and the newborns, 25% were resistant to nalidixic acid [17]. Medication to asymptomatic contacts will not only change the distribution of normal colonies in their intestinal tracts, also place them under the risk of some side effects. Careful assessment should, therefore, be made as to the need for prophylactic treatment of contacts of bacillary dysentery.

Recommendations

1) Patients in the present outbreak shared a crowded space, sometimes ten berths in a room. Living spaces at nursing care institutions should be improved to reduce chances of infection. Health education on the prevention and control of communicable diseases for staffs of long-term care institutions should be strengthened.
2) In the early stage of the outbreak, some cases were referred to a municipal hospital for treatment. Physicians though had suspected of intestinal tract infection, failed to report to health authorities. The incident was later reported as dysentery infection to the health authorities by the Chenghsing Hospital. Physicians of public hospitals should he made more actively responsible for the promotion of public health.
3) In the case of outbreaks, asymptomatic contacts, positive cases, and suspects should not he given similar treatment.

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Figure1. Floor Plan of the Psychiatric Rehabilitation Institution, Taipei City, 1997

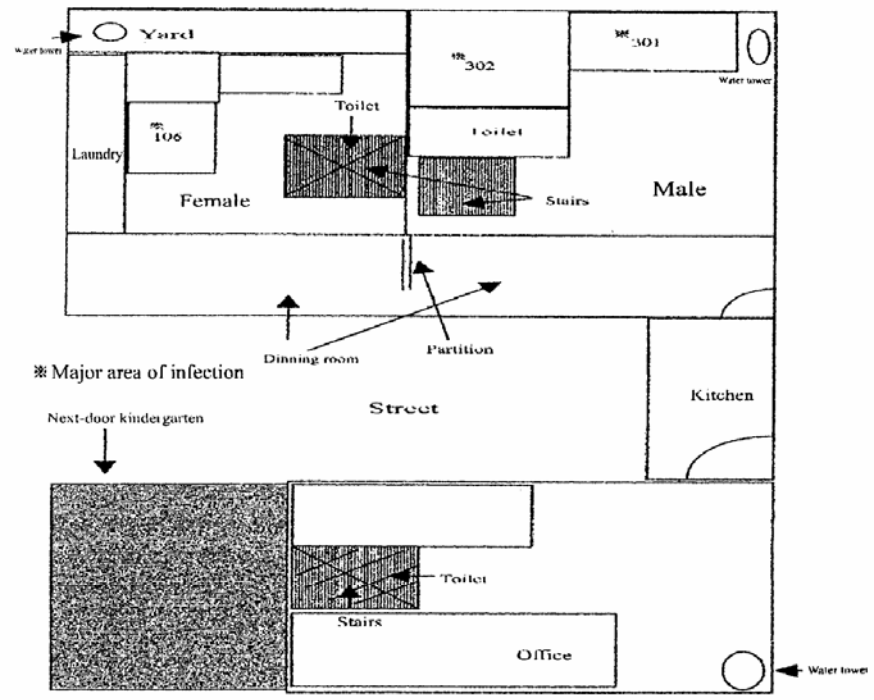

Figure 2. Epidemic Curve of a Dysentery Outbreak, Taipei, 1997