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Outpatients' behavior of seeking medical care after onset of severe acute respiratory syndrome and community control measures in Beijing

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Abstract

Objective: To analyze the time delay of patients seeking medical care from an outpatients department of a large urban hospital, following the onset of severe acute respiratory syndrome (SARS) and the type of measures used to gain community control in Beijing, China.

Methods: One hundered and six suspected and probable SARS patients, and their close contacts in Beijing Anzhen Hospital, from April 11 to May 20, 2003, were investigated with questionnaires.

Result: Comparing the data between the early phases (April 11 –April 30, 2003) and later phases (May 1 – May 20, 2003) of the SARS epidemic, we found that in the later phases, more patients presented with the onset of symptoms (27.3% vs. 62.7%; $p < 0.001$) rather than waiting. In addition, the use of public transport to hospital was lower (38.3% vs. 19.4%; $p = 0.008$) in later stages and the use of ambulance transportation increased significantly (5.8% in early group vs. 41.8%; $p < 0.001$). A significant difference was also noted between the two groups in the interval from the onset of SARS symptoms to hospital admission (6.6 ± 8.0 days vs. 1.7 ± 2.2 days for the early and later groups, respectively; $p < 0.001$). Comparing the data between early and later phases of the SARS epidemic, the proportion of close contacts who were quarantined within 1 day of a patient's admission to the hospital increased from 70.2% to 97.1% ($p < 0.01$).

Conclusions: Measures of community control led to more rapid hospitalization of SARS patients, and decreased exposure of the public to infected individuals. These measures of social mobilization instituted by the government will likely help control the source and spread of SARS infection.

Key words: severe acute respiratory syndrome, source of infection

During the period of the sudden acute respiratory syndrome (SARS) outbreak, case identification, reporting, quarantine and treatment were important ways to control the disease. We now know that patients are not contagious during their incubation period[1] and therefore the epidemiology of the disease is related to the behavior of the suspect patients and delays in seeking medical care and hospitalization. We also now know that there is a need for prompt isolation of suspect patients' close contacts.[2]

As patients' behaviors, and their activities during the non-medically monitored period, is the key to protecting the vulnerable population and general public from being infected, this study sought to investigate the time delays for both patients seeking treatment and isolation of their close contacts.

Research design and methods

Subjects

One hundred and six suspected and probable SARS patients (59 men, 47 women, aged 12–81 years; mean age, 38.6 ± 16.9 years) and their close contacts who were admitted to Beijing Anzhen Hospital between April 11 and May 20, 2003. Of those patients whose occupation was known, the distribution was as follows: farming laborers (17.9%); workers (15.1%); office clerks (14.2%), retirees (14.2%).

Methods

Fever was used to identify the onset of SARS symptoms.
Close contacts were defined as people who lived with the patient. Eighty-two close contacts were investigated.
Using May 1, 2003, as the cut-off point (this represents the median date of all patients' onset of SARS), we divided the period of SARS outbreak into early and later stages. The behaviors of the patients seeking medical care were compared in the two stages.
Patients in the study, and their close contacts, were interviewed by telephone from April 20 to May 22, 2003.
The investigators are physicians in the Department of Community Health at Beijing Anzhen Hospital.
Descriptive statistics, were used to compared statistical differences between the groups (x^2 test for categorical data and *t*-test for continuous data).

Results

Behavior of the patients seeking medical care

In total 44.3% of patients went to hospital immediately and just over half of these were admitted. Among the patients who didn't seek medical attention, 69.6% of the patients postponed their hospital visits because they believed they were not infected with SARS. 20% of the patients were afraid of contact with SARS patients in hospitals. Over 50% of patients who presented to the outpatient clinic were suspected of having SARS on the basis of fever. Table 1 shows behaviors of the patients seeking medical care in the early and later stages of the SARS outbreak
On average, patients had 1.8–1.9 (1–17) hospital visits and went to the hospital 187 individual times (Table 2)
Comparing the data in the early and later stages, we found that the percentage of patients going to hospitals by public vehicles (38.3% vs. 19.4%, $p = 0.008$) had decreased. Instead, many of them chose an ambulance (5.8% vs. 41.8%, $p < 0.001$) as an alternative.

Evaluation of the promptness of isolation methods applied by the community to the close contacts

Comparing the early and late phases of SARS outbreak, the quarantined intervals had been significantly shortened (2.2–3.8 days vs. 0.5–0.6 days, $p = 0.009$) (Table 3). The percentage of close contacts who were informed of the need for quarantining after the patients were hospitalized, were 95.1% (78). The proportion of close contacts quarantined in a day were 70.2% in the early phase and 97.1% ($p < 0.01$) in the later phase.

Discussion

The major reason for the SARS outbreak in Beijing was that this was the first time this contagious disease appeared in a human population, and was thus not immediately recognized by medical professionals and the public.[3–7]

The outbreak of SARS was a very serious public health concern. To quarantine and isolate the infected patients and those who had close contact with the source of infection is the key to bringing the epidemic under control in a timely manner.[8] To achieve this goal, the infection source should be identified, diagnosed, reported, quarantined and treated as soon as possible.[9]

The investigation indicates that there were many differences in the behavior of people seeking medical care between the early and later stage of the SARS outbreak. During the initial period of the percentage of patients who sought medical treatment on the day symptoms appeared was low (27.3%), and only 14.5% of families implemented quarantine at home The mild symptoms at the early stages of SARS and lack of diagnostic measures led to its spread. During the final period of the SARS outbreak, with the implementation of government policies, the percentage of SARS patients seeking medical attention on the first day of symptoms increased from 27.3% to 62.7% ($p < 0.001$), reducing the non-medically monitored period, and fewer patients were taking public transportation to go to hospital. Increasing numbers of patients with fever sought treatment at clinics; a greater proportion of families implemented quarantine measures at home. The average time of admitting patients by hospitals also shortened by 5 days, and there was a fourfold increase of patients hospitalized with early symptoms and an increase in the number admitted at the first examination. All these

behaviors helped prevent the virus from spreading continuously, thus minimizing the danger of further outbreak in the general public.

This study suggests that curbing the outbreak of SARS in a short period of time is dependent on community preventive systems and timely control of the potential infection sources. Table 3 indicates that close contacts were quarantined as soon as possible in the later phase, which means all potential infection sources were fully controlled.

Limitation of the study

This investigation is limited to the patients accepted by Beijing AnZhen Hospital from April 11 to May 20, 2003. So the investigation may only partially reflect patients' behaviors of seeking medical treatment and the promptness of community preventive systems' control measures.

Conclusion

This study suggests that the social awareness of the public with the government's mobilization strategies, greatly shortened the non-medically monitored period for patients. Effective community preventive systems and timely quarantine of potential infection sources, also facilitated the early identification, early reporting, early quarantine, and early treatments of the infection sources, which would appear to be the major reasons for the quick control of the SARS epidemic.

Public awareness and knowledge about the contagious diseases, especially respiratory contagious diseases, are the key to protection against transmission. Health professionals should advise the public how to prevent being infected when a contagious disease (especially a new unrecognized one) is occurring. For example, the suspected patients should be informed how to isolate and quarantine themselves before being diagnosed, and other healthy people who contact the undiagnosed patient should be advised on how to protect themselves. To accomplish all the above-mentioned activities, the public media should play an important role.

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Table 1 Behavior of patients seeking medical care in two stages

	Age (years)	Lag period between hospitalization and onset of SRAS (days)	Immediate hospital visit	Hospitalized at first examination	Hospitalized at first symptom appearance	Presented with fever	*Isolation
Early stage (*n* = 55)	40.7±18.2	6.6 ±8.0	15/55 (27.3%)	24/55(43.6%)	5/55(9.1%)	23/55 (41.8%)	8/55 (14.5%)
Later stage (*n* = 51)	36.3±15.3	1.7 ±2.2 **	32/51 (62.7%) **	34/51(66.7%) *	20/51(39.2%)**	33/51 (64.7%) *	34/51 (66.7%) **
Total (*n* = 106)	38.6±16.9	4.2±6.4	47/106 (44.3%)	58/106 (55.8%)	25/106(23.6%)	56/106 (52.8%)	42/106 (39.6%)

Compared two stages of SARS * $p < 0.05$ ** $p < 0.01$. The period of SARS outbreak were divided into the early and later stages by May 1st 2003. Note: Isolation were defined as one's families who had got fever isolated from others by themselves, the measures including stay home in a separate room, eating at separate table in home, wear respirator when contact others

Table 2 Data on patients' choice of hospital transportation in the two stages

	Total times	Individual times patients went to the hospitals by vehicle (%)				
		120 (999) ambulances	Public transportation			Other transportation*
			Taxi	Bus	Total	
Early stage (*n* = 55)	120	5.8 (7)	36.7 (44)	1.7 (2)	38.3 (46)	55.8 (67)
Later stage (*n* = 51)	67	41.8 (28)**	11.9 (8)**	7.5 (5)	19.4 (13) **	38.8 (26)
Total (*n* = 106)	187	18.7 (35)	27.8 (52)	3.7 (7)	31.6 (59)	49.7 (93)

Comparison of the two stages of SARS * $p < 0.05$ ** $p < 0.01$. Note: Other transportation including walking, bicycle, drive.

Table 3 Evaluation on the promptness of isolation methods applied

Quarantine intervals (days)	No. being informed	Quarantined in a day (%)	Mean ± SD	Range
Early stage *n* = 47	2.2 ± 3.8	0–18	43	70.2 (33/47)
Later stage *n* = 35	0.5 ± 0.6**	0–2	35	97.1 (34/35)**
Total *N* = 82	1.4 ± 2.9	0–18	78	81.7 (67/82)

Comparison of two stage of SARS * $p < 0.05$ ** $p < 0.01$

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