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Crisis management of SARS in a hospital

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Abstract

Introduction: A large general hospital was suddenly disabled by an in-hospital outbreak of Severe Acute Respiratory Distress Syndrome (SARS). Method: The crisis was successfully managed by a Standard Operation Procedure (SOP) that included: (a) containment of SARS patients on a special floor and evacuation of the patients from the infected and near-around floors; (b) sorting of the hospital into areas and floors to avoid cross contact of people; (c) triage of patients into groups according to risks; (d) closure of the emergency room and outpatient clinics; and (e) set up of an outdoor fever screening station and emergency service. Results: The situation was quickly controlled after the implementation of these procedures. The central argument in this case is that crisis managerial behavior is the result of how managers channel and distribute the attention of their crisis sense. Impact on industry: What managers should do depends on what risk issues and actions related to risk independency, efficiency, safety priority, and transparency they take. What risk issues and actions they take depends on the crisis sense and on how management responds to leadership, resource, and execution.

Keywords: Crisis management; SARS; Attention-based view; SOP; Containment and sorting strategy

1. Introduction

Severe acute respiratory distress syndrome (SARS) is a new disease caused by coronavirus. It first appeared to affect human beings in southern China in late November 2002 (Falsey & Walsh, 2003; Zambon, 2003). A worldwide outbreak quickly followed the visit of a medical professor from Guangdong Province, China to Hong Kong in late February 2003 (Chan-Yeung & Yu, 2003; Lee et al., 2003; Tsang et al., 2003). The disease then spread to Canada, Vietnam, Singapore, United States, Taiwan, and many other countries, causing panic among people and a standstill of business (Bloom, 2003). The case fatality rate is approximately 15% in the affected area; patients may succumb within a few days. It is highly contagious and more than 80% of the infections are acquired from the hospital. The typical pattern usually occurs following the admission of a patient to a hospital where health care workers are unaware of the possibility of SARS and ignorant about the grave consequences. Herein, we describe the successful crisis management in a large medical center suddenly plagued by an unexpected invasion of a SARS patient in Taiwan.

The government of Taiwan implemented a National Health Insurance Program in 1996. This program covers both in-patient and outpatient service and covers all persons residing in Taiwan. The pattern of medical practice in Taiwan includes office-based practice and hospital-based practice. The office-based practice refers to solo office practice and consists of 40% of licensed physicians; while hospital-based practice refers to practice in the hospital clinic and care of in-patients, and consists of 60% of licensed physicians. There are three levels of hospitals: community hospitals, area hospitals, and medical centers. Medical center refers to a large general hospital of more than 500 beds with an emphasis on the integration of service, education, and research. The hospital has to pass a government accreditation every three years to renew the status of the medical center. Practice related to new and advanced technology is limited to medical centers. Medical center refers to a large general hospital of more than 500 beds with an emphasis on the integration of service, education, and research. The hospital has to pass a government accreditation every three years to renew the status of the medical center. Practice related to new and advanced technology is limited to medical centers. However, there has been no solid referral system and the patient frequently serves as a self-referral. As a consequence, medical centers are loaded with a large volume of outpatients as well as in-patients.

There had been no reported SARS patients in Taiwan prior to March 8, 2003 when a businessman who recently returned from Guangdong, China was admitted to a leading hospital.
university hospital in Taipei; his wife and son were also admitted with SARS a few days later. A resident physician who performed the intubation on this patient also contracted the disease and was admitted subsequently. All four patients recovered from the ailment and were discharged a month later. This event was highly publicized by the local news media and both the government and the public appeared to enjoy the success of effective treatment and prevention of SARS in this island country. Indeed, all the reported SARS patients (64 possible cases reported to the World Safety Organisation [WHO] by April 20, 2003) were returning businessmen or travelers from Hong Kong or southern China.

On April 24, 2003, a 500-bed city hospital in downtown Taipei was suddenly rattled by the storm of massive SARS infection; more than 7 possible cases and 14 suspect cases of SARS were identified. The government immediately contained and locked the hospital by police enforcement; no one was allowed to enter or leave the hospital. Even health workers who had already gone home were called back to be quarantined inside the hospital. More than 1,300 people, including patients and health care workers, were confined.

The hospital consisted of two main buildings, Building A and Building B. Most SARS patients were identified on the 8th floor of Building B. However, there was no restriction on cross contact of people between Building A and B or between floors; nurses and health workers were allowed to communicate with each other. There were no quarantine measures with classification of patients into different risk groups (possible SARS patients, suspect SARS patients, unlikely SARS patients with fever, ordinary patients with no history of contact to SARS patients, etc.). To make matters worse, the possible SARS patients were subsequently transferred to other major hospitals in the Taipei area, where negative-pressure isolation rooms were available. The suspect SARS patients were transferred to a previously unprepared downtown Air Force hospital hurriedly designated for the care of SARS patients. As a consequence, the possible cases of SARS patients in Taiwan rose to 127 on April 28 and to 326 on May 10, 2003. The SARS situation disabled the leading university hospital that had previously treated the initial SARS patients successfully and idled the emergency room of several hospitals. Eventually, 222 SARS cases were identified as related to the outbreak of this city hospital, including 93 that were reported from inside the hospital. The condition of this hospital was described as “out of order” by the consultants from the U.S. Centers for Disease Control and Prevention (CDC). WHO quickly listed Taiwan as a country with “most rapidly growing outbreak” in the world.

2. Method

Chang Gung Medical Group belongs to Chang Gung Foundation, a private non-profit foundation, and consists of Chang Gung Memorial Hospital at Linkou (where the headquarter is located), Taipei, Keelung, Chiayi, and Kaohsiung, a nursing home, a health village for senior citizen, a university, and an institute of technology. It is a conglomerate-integrating service, education and research. There are 7,651 beds, 1,368 attending physicians, 1,258 residents, 307 interns, 5,269 nurses, and 7,063 other health workers and administrative personnel with a total of 15,261 employees among the franchise hospitals. Service includes primary to tertiary referral care. It covers approximately one-tenth of the medical service in Taiwan. In late March 2003 when SARS began to appear in Taiwan, the CEO of the Group (Chairman of the Steering Committee) issued a 4-level of alert to all hospitals. Guidelines were provided for each level of alert.

Level 1 refers to the appearance of SARS patients in the community, but not yet having a SARS patient admitted to the hospital. Emphasis at this stage was focused on education and training of physicians, nurses, and all other personnel regarding the knowledge of SARS and its preventive measures. Health care workers were asked to wear a N-95 mask and to wash their hands, along with the use of gowns, gloves, protection eyeglasses, and face shields if necessary; patients with fever and upper respiratory tract infection were screened. Each person was asked to protect him/herself and measures were taken to avoid being infected and/or becoming an infection source; each unit chief was asked to educate and protect his/her subordinates, not to be infected, and not to become an infection source. These education courses were repeated and enthusiastically received in the three hospitals (Linkou, Taipei, and Keelung) located in northern Taiwan; however, people in the two southern hospitals appeared to be indifferent about SARS when checked retrospectively.

Level 2 refers to the existence of SARS patients in the hospital but with no contact infection among health care workers. A Committee for “War against SARS” was set up in each hospital at this stage. The superintendent of the hospital headed the committee. The deputy superintendent was in charge of the daily operation of the five working subcommittees: medical, nursing, material supply, administrative, and research. The medical subcommittee held daily meetings dealing with the diagnosis, management, and report of SARS cases to the government health authority. It was also responsible for organizing physicians into working groups ready to take care of SARS patients when the infection became overwhelming. The nursing subcommittee was in charge of the nursing manpower. The subcommittee on material supply was in charge of all material supply necessary for prevention and care of SARS and also assured the quality of the materials. The administrative subcommittee assured the execution, inspection, and supervision of the overall operation. The research subcommittee was responsible for planning, funding, and supervising the research projects relating to the epidemiology, clinical aspects, laboratory diagnosis, immunity, and genomic
aspects of SARS. Since SARS patients were likely to be screened in the emergency room, a negative pressure area was constructed in the emergency room in all hospitals in mid April. Each hospital was ordered to convert the top floor (or top two floors) into a negative pressure ward with individual negative pressure patient rooms. A designated floor with individual rooms in the intern, resident, and nurses dormitory was drawn out, ready for the quarantine of personnel exposed to SARS patients.

Level 3 refers to the appearance of contact infection of medical personnel involved in the care of SARS patients but without secondary in-hospital infection. The area or floor where contact infection occurred was contained; patients were triaged into three groups for quarantine monitoring: febrile patients, contact patients, and a-febrile non-contact patients. Each patient stayed in an individual room with the same group of health workers caring for the same patient to avoid cross contact. The non-contact afebrile patients were allowed to be discharged and quarantined at home. The list of these patients was given to the health authority for surveillance. The febrile and the contact patients were discharged after the quarantine period if their condition was stable and thus, the floor was gradually evacuated and emptied. Only one single visitor at a time wearing a N-95 mask was allowed to visit a patient under quarantine. Entrance to the hospital was controlled, each person entering the hospital underwent the measurement of their body temperature; visitors were required to fill out a health card requesting personal data and medical history over the previous 10 days. Elective surgery was barred; admission was limited only to those with serious condition.

Level 4 refers to the occurrence of secondary in-hospital infection. The operation procedure will be described in the result section.

3. Result

Chang Gung Memorial Hospital at Kaohsiung is a 2,435-bed general hospital with 384 attending physicians, 337 residents, 58 interns, 1,775 nurses, 830 technicians, and 567 administrative personnel. The occupancy of the hospital bed is approximately 90% and there are more than 7,000 out-patients a day and approximately 3,700 operations a month. It is one of the major teaching hospitals in southern Taiwan. Even with the outbreak of SARS in Taipei, there were still 4,000 outpatients a day and 1,200 in-patients in the early May. On April 26, the index patient, a 52-year-old woman from southern Taiwan was admitted to Ward 11A, Bed 1102A of the hospital with fever, myalgia, and pneumonitis. Prior to that, only seven sporadic suspect SARS patients visited the hospital. Two other patients in Bed 1102B and 1102C shared the same room with the index patient. A few days earlier, the index patient had been to a small community hospital a couple of times while visiting her son in Taipei. This hospital was a block away from the city hospital rattled by SARS; it also developed an outbreak of SARS that forced closure of the hospital on April 28, 2003. Two days after admission, the index patient was intubated and nebulized bronchodilator given for her respiratory distress. However, the diagnosis of SARS was not made until April 30, four days after the patient was admitted. All of the three patients in the same room were transferred to the negative pressure room for isolation. In addition, a total of 57 persons were quarantined, including 2 physicians, 34 nurses, and 2 respiratory therapists. The patients on this ward were quarantined in separate individual rooms of the same ward. However, a few patients were discharged against medical advice; these patients were reported to the health authority for follow-up surveillance. On May 1–3, the two physicians and the one nurse who attended the intubation of the woman developed fever and evidence of lung infiltration on their chest-X-ray. By May 11, 26 people including 4 physicians, 1 nurse, and 21 patients, their families or care-takers of this ward developed fever and lung infiltration. The leaders of the hospital were however unaware of the impending crisis and took no special measures. The Office of Steering Committee was not informed about the situation. At noon on May 11, the CEO of the group learned about the situation through a third party and immediately sent two investigators to evaluate the situation. When the report confirmed the impending crisis of a major in-hospital outbreak, he quickly ordered the evacuation of patients from Ward 11A as well as Wards 10A and Ward 12A; all possible or suspect SARS patients were transferred to Ward 13A, which was equipped with individual negative pressure rooms as well as a negative pressure corridor outside the patient rooms. Entrance to these wards was sealed with access gained by a specific elevator designated only for this floor. A specific car was used for the transportation of physicians, nurses, and other health workers working on the SARS ward to their individual rooms on a specific floor in the dormitory while off duty. They worked for 1–4 weeks and underwent a 10-day quarantine observation followed by a week of vacation. The main building of the hospital is an H-shaped structure; it was divided into A, B, C, D (4 areas). There are 18 elevators lined in 4 rows in the middle part of the building that connected the front and the back part of the building. The children’s hospital is a separate building connected to the main hospital through the emergency room. Connections between the main hospital and the children’s hospital were sealed as well as the connections between A, B, C, D areas. Thus, the hospital was sorted into five areas as well as different floors; health workers were not allowed to visit each other in order to avoid potential cross infection. Patient admission was limited to those with an acute condition; elective surgery was temporarily withheld. The patients were triaged into those with fever, those with contact with potential SARS patients, and those with no fever and no history of contact with SARS patients. The
last group of patients could be discharged from the hospital for quarantine at home if their condition was stable; the list of these patients was submitted to the health authority for follow-up surveillance. Entrance to the hospital was controlled; visitors were limited and each was required to have their body temperature measured and to fill out a health card. The administration office was moved from the 6th floor in area C and D of the main hospital to the children’s hospital, which was considered to be clean, and the staff was divided into two groups. An outpatient renal dialysis unit was located in Ward 3A; a standard operation procedure was implemented for dialysis. Dialysis patients were required to use a designated elevator. Patients with fever but no evidence of SARS underwent dialysis in a negative pressure room; SARS patients were dialyzed in their negative pressure rooms using a portable dialysis unit. In the following three days, many newly diagnosed SARS patients were identified as either being previous patients of Ward 11A or these patients’ families or health care workers. The news media and public heavily criticized the hospital for negligence and cover-up; they demanded that the government contain and take over the hospital the same way as the city hospital in Taipei. Hospital employees lost confidence in the hospital; 128 nurses and 7 physicians resigned. On May 13, the CEO of the group brought a team of four physicians, four nurse leaders, and four experienced administrators from the headquarters to assist in the control of the situation and promised help should it become necessary. He visited all working stations, making himself visible, encouraged the house staff, and stimulated the morale. On May 15, the CEO of the group closed down the outpatient clinics as well as the emergency room, held a news conference explaining the whole event and the actions implemented, assured the public that the situation was controllable. The shopping mall in the basement of the hospital was closed. An open-tent outdoor clinic was set up for the screening of potential SARS patients and to serve patients of the hospital with an emergency condition. There had been no new SARS patients reported from the in-patient or health care workers group after May 17, although there were already 46 possible SARS patients related to this outbreak and still 8 more new SARS patients developed outside the hospital between May 19 and May 24. On May 20, the CEO of the group held a second news conference announcing full control of the situation and reassured the public that the outpatient clinic and the emergency service would be open again 2 weeks later. Pharmacy service for refill of prescription to patients was open in the children’s hospital. The angry news media and public gradually calmed down. On June 2, the outpatient clinic and the emergency service resumed but was limited to chronic old patients of the hospital or those with an emergency condition; elective operation was prohibited. There was only one clinic for each subspecialty with a maximum of 40 patients a day. Previously implemented operation procedures were maintained. The outpatient and the inpatient service gradually resumed in the following weeks and the hospital crisis was over.

4. Discussion

4.1. Conclusion

When managers of a company sense the emergence of a potential crisis, the managers usually plan a strategy for solving the crisis according to a standard operation procedure (Ocasio, 1997; Wang, 2001). However, when the crisis happens to be one that has never occurred before, a standard operation procedure does not exist. Some core messages of the risk issues must be investigated. Therefore, the operation procedure or crisis management plan should be flexible to accommodate unexpected variables. SARS is caused by a new virus unknown to human beings before late April 2003 when the causal agent was identified (Falsey & Walsh, 2003). It can disable a hospital, a community, and a country suddenly and unexpectedly (Bloom, 2003; Chan-Yeung & Yu, 2003; Lee et al., 2003; Tsang et al., 2003). It panics people and idles the economy. The Office of Steering Committee in this report identified SARS as a potential crisis that may hit this organization in early March 2003 when the first SARS patient appeared in Taiwan. An operation guideline of SOP to create with levels was worked out according to the knowledge of SARS, WHO guidelines, and experience in Hong Kong, Vietnam, Toronto, and Singapore. This guideline or operation procedure is kept flexible to grow and modify to meet demands instantly if necessary as time goes by.

After the operation procedure or crisis-response manual is worked out, the next step is to check the material supply, the hardware structure, and the human power that are required for the operation. In the case of SARS, the materials include N-95 or P-100 masks, gowns, gloves, goggles, visors, and other protectors necessary for the direct care of patients; human power includes doctors and nurses for patients care, the supplying personnel for material supply, and the administrative personnel for execution and inspection of the operation. In addition, a specific floor for SARS patients to be contained and a special area in the dormitory for quarantine of health workers were designated. Both the quantity and quality of material supply, hardware structure, and the human power were ascertained.

Finally, successful crisis management depends on the ability for execution, adequate supervision during operation to allocate resources, and the leadership. In the case of SARS, doctors and nurses directly involved in patient care are at risk for being infected and becoming a source of infection and, thus, should be trained beforehand. Also, they require quarantine when off duty and should therefore be organized and structured into groups in advance. Supervision of the operation is also essential. It should be ascer-
tained that people under quarantine are following the rules, patients staying in the hospital are cared for according to the triaged groups, and that no cross contact occurs among the health workers, patients, and visitors. It should also be ascertained that all sub-committees are functioning as planned and that new unexpected problems are identified. This means that a crisis simulation is carefully reviewed in advance. Strong leadership is the key to successful crisis management. The condition is usually like a general in a battlefield, there is no time for consultation; decisions should be made in minutes.

4.2. An integrated framework developed

We present an integrated framework for SARS crisis management. A model to distribute and channel the attention is developed, and SOP to create and to meet the flexible needs with levels is implemented in Chang Gung Memorial Hospital (CGMH). The model incorporates the attention-based view of Ocasio (1997) and further enhanced by Wang (2001) as shown in Fig. 1. The contribution of the model is to link the concepts of organizational attention. The fundamental components of the model are: (a) the SOP to create and to meet the flexible needs with levels; (b) the risk issues and actions taken; (c) the attention of crisis sense; (d) the leadership; (e) the resource supply chain management; and (f) the execution process. The relationship among the above components are integrated by risk independency, efficiency, safety as the first priority, and transparency principles. These principles provide a set of rules to channel and distribute the containment and sorting (C & S) strategy with SOP to create and to meet the flexible needs with levels.

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