Prevention and Control of Severe Acute Respiratory Syndrome (SARS)
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1. INTRODUCTION

As of 5 July 2003, all known chains of person-to-person transmission of the SARS virus were interrupted. The last probable case was reported in Taiwan on 15 June 2003. The time needed to contain this epidemic from the first global alert issued by WHO was around 4 months. The total number of reported cases were 8437 with 812 deaths. The success achieved in containing SARS was commendable, considering the many unclear facets related to the epidemiology, laboratory and clinical management of the disease. The success was largely due to the effective international responses led by WHO and the cooperation of all affected countries. However, on the basis of current knowledge, the re-emergence of SARS can not be ruled out.

The SARS epidemic also serves as a wake up call to enhance disease surveillance and infection control at various health care institutions which, in most Member Countries, need considerable improvement.

Since SARS is a new disease, Member Countries as well as WHO need to be better prepared to tackle both emerging infectious diseases and the re-emergence of existing ones.

It is worth noting that all Member Countries in the Region have taken preventive measures far beyond those recommended by WHO. This is justifiable since importation of a single case may fuel a large outbreak. Strong political commitment by all SEAR countries coupled with effective regional collaboration among APEC, ASEAN and SAARC countries significantly contributed to the containment of SARS.

Till the end of the current epidemic, only three Member Countries reported SARS cases - India, Indonesia and Thailand - with no further transmission occurring after its importation.

2. EPIDEMIOLOGY

SARS is the first severe and readily transmissible new disease to emerge in the 21st century. When the outbreak was first detected in Hong Kong it was thought to be Avian Flu similar to the one which affected Hong Kong in 1997 when hundreds of thousands of chickens were slaughtered. The causative agent of SARS is a new corona-virus/CoV (named SARS CoV), which is notorious for its frequent mutations. Currently known corona-viruses cause the common cold that is usually mild in nature. In animals such as chickens, pigs and ducks, it causes diseases with various manifestations.

SARS CoV cannot survive for long outside the human body. On an average, (depending on the ambient temperature - the higher the temperature the shorter the lifespan) it can survive only up to 4 hours. Recent studies have, however, revealed that it can survive for 4 days in the stool of a SARS case (having diarrhoea).

The symptoms of SARS are : high fever - more than 38 degree centigrade/104 Fahrenheit - cough or difficulty in breathing and diarrhoea (in 20 per cent of cases). WHO’s most recent analysis estimates the case fatality ratio in the range of 14-15 per cent. In persons over 65 years, the case fatality ratio can exceed 50%.

SARS is not easily spread as many people think. It spreads through close person-to-person contact via droplets expelled by coughing or sneezing by an infected person. It is not an airborne infection. The incubation period is between 2 to 7 days, although a longer
period has been documented. For control purposes, 10 days is accepted as the incubation period. There is no evidence so far that during the incubation period or during the convalescing state, one can spread the disease although CoV has been detected during these periods. Even though other means of transmission such as environmental factors through sewage leakage and possibly infected objects have been clearly documented in Hong Kong, in the vast majority of cases, transmission occurs through close person-to-person contact. It is this mode of transmission that enables contact tracing which is an important component in the control of SARS. There is no evidence that commodities such as cloth, meat products or fruit play any role in the transmission of the disease. Traveling with a SARS case in a crowded environment such as in a plane has been proved to pose very minimal risk. Those contracting the disease are usually those sitting next to the case or one to two rows from the case, or the air crew attending the case.

There are two hypotheses regarding the emergence of SARS. One relates to mutation of already existing CoV. The other contention is that SARS CoV is a totally new entity. As to how this SARS CoV infects human beings, the recent discovery of SARS CoV in some wild animals consumed as delicacies in China strongly suggests that SARS CoV was transmitted from animals to human beings. WHO, in collaboration with FAO, is currently undertaking a study on the role of some animals in Southern China. If the study proves that these animals are the reservoirs of SARS, in other words, SARS is a zoonotic disease, it will not be possible to eradicate it. Constant vigilance will be indispensable, just as in the case of plague.

3. CASE DEFINITION AND LABORATORY TEST

Since there is no dependable confirmatory laboratory test (as in the case of TB and HIV/AIDS) diagnosis of SARS is based on exclusion, relying heavily on clinical and epidemiological factors.

A history of contact with a SARS case or having visited areas with recent local transmission (previously termed affected areas) is the most important component of the case definition. Since the world is now free of SARS, the case definition needs to be changed.

Earlier, WHO was very confident that a laboratory test consisting of PCR (Polymerase Chain Reaction), ELISA and IFA to detect antibody would be developed by the network of laboratories participating in this endeavour within a short period. Unfortunately, this was not the case. To date, the available PCR test (a molecular test) has not been fully validated. It has high specificity (low false positive) but low sensitivity (high false negative). Thus, a positive PCR is highly indicative of SARS infection whereas a negative finding does not exclude the infection.

The serological test (ELISA and IFA), become positive only after 2-3 weeks.

The laboratory test has to be undertaken in a facility fulfilling Bio-Safety Level 3. Only a few Member Countries have this facility.

4. CLINICAL MANAGEMENT

As with other viral diseases there is no cure for SARS. Treatment is merely symptomatic such as provision of oxygen or use of ventilator in very severe respiratory distress, administration of antibiotics to prevent secondary infection and use of antipyretics. Although some success was recorded in Hong Kong using ribavirin and corticosteroids, more valid evidence is required for WHO to recommend the use of these medications.
5. PREVENTIVE MEASURES

To date a vaccine to prevent SARS is not available. Vaccine development by the private sector may take at least 2-3 years. Since SARS CoV is frequently mutating (just like Influenza virus) it is very difficult to decide whether or not to develop a vaccine. It is possible that once a vaccine based on a certain antigenic property is developed, the SARS CoV would mutate, rendering the vaccine useless. Now, with the world free of SARS, the private sector may not be interested in developing the vaccine.

For personal preventive measures, frequent hand washing, using soap or alcohol-based disinfectants is highly recommended. For those with a high risk of contracting the disease, such as health care workers, use of personal protective equipment (N 95 mask, goggle, apron etc) is mandatory. Whenever possible household contacts should also wear a mask.

6. CONTROL/CONTAINMENT MEASURES

Since there is no cure or vaccine for SARS, containment measures are based on:

(a) prompt detection of cases through good surveillance network including early warning system.

(b) isolation of suspected or probable cases with good infection control using barrier nursing technique in health care institutions. Here, all Member Countries need to pay special attention since in general, before the SARS outbreak, no country was practicing good infection control.

(c) backward tracing to identify the source of infection and forward tracing to detect contacts that may develop the disease. Domestic and or international cross-notification resulting from these tracings is of immense importance to prevent further transmission.

(d) voluntary or mandatory quarantine of suspected contacts for 10 days.

(e) exit screening for outgoing passengers from areas with recent local transmission by asking questions and temperature measurement.

(f) disinfection of aircraft and cruise vessels having SARS cases on board using WHO guidelines.

Although WHO does not recommend screening of passengers screening even from areas with recent local transmission, all Member Countries of SEAR have instituted this kind of screening.

The screening ranges from filling up a Health Declaration Card, temperature measurement (using various types of thermometer and cutting edge technology such as thermal scanner costing around US$ 130,000) and voluntary or mandatory quarantine for those coming from areas with local transmission.

It was also noted that in some countries, screening of incoming passengers was based on the list of countries reporting cases to WHO (which is not necessarily countries having recent local transmission). This policy, although going far beyond the measures recommended by WHO, shows that many countries are really serious in trying to prevent importation of cases that may have serious repercussions on their tourism industry and economy. The ASEAN Health Ministers + 3 (China, Japan and South Korea) at their meeting in June 2003 in Cambodia recommended screening for both outgoing and incoming
passengers, to its members who are able to do so, regardless of the status of SARS in their respective countries.

7. TRAVEL ADVISORY

WHO’s Travel advisory recommends postponement of all but essential travel to areas with local transmission. From time to time this travel advisory is updated based on the epidemiological situation of SARS in the respective country. Please note that “areas” refer to parts of a country such as province or region and not the whole country, except for Singapore, due to its small size. However, in practice it is very difficult to differentiate between areas and countries. As a result, almost all Member Countries refer to country in place of area when instituting screening for both outgoing and incoming passengers.

Not all countries reporting cases are included in the travel advisory. Criteria for including a country in the travel advisory are patterns of local transmission, case exportation to other countries and capability of the country to deal with the outbreak/epidemic.

A country will be removed from the list of WHO travel advisory after 20 days (twice the incubation period of SARS) have elapsed without any new cases reported from the last case(s).

8. SEARO INITIATIVES

- Following the Global Alert on 12 March 2003 and the Travel Advisory on 15 March 2003, the Regional Director appointed a Task Force on SARS in SEARO on 17 March 2003. On 18 March 2003, the Regional Director issued policy guidelines on SARS prevention and control to all the WHO Representatives in the Region.

- On 20 March 2003, the Regional Director held a teleconference with all the WRs and briefed them on the current status of SARS and provided further guidelines with regard to measures to be undertaken by them.

- There was a lot of media interest locally and appropriate briefing was provided to TV, newspaper and other mass media regularly to avoid panic and confusion among the public.

- In order to cater to possible demands from countries for emergency supply such as face masks and goggles, SEARO purchased a limited amount of these items for immediate distribution to Member Countries. SEARO in collaboration with WPRO, purchased emergency kits for containing the SARS outbreak.

- There was strong collaboration between SEARO and WPRO, the Region with the most affected areas, on the use of various guidelines developed by WPRO. Guidelines on barrier nursing were developed jointly. Collaboration was also forged in mobilizing Asian Development Bank assistance to some countries in SEAR and WPR.

- SEARO created a webpage on 4 April 2003 on SARS – first on the intranet and subsequently on the SEARO website with links to other sites such as WHO/HQ, CDC Atlanta and WPRO.

- During the WRs meeting in April 2003, a comprehensive briefing on the current status of SARS was given.

- Briefing on SARS was also given at high level meetings such as the Eighth Meeting of Health Secretaries and senior officials in Kathmandu, Nepal.
Technical support along with WPRO was provided to ASEAN + 3 Ministers Meeting on SARS in Kuala Lumpur in April 2003 and Siem Reap/Cambodia in June 2003, ASEAN+ 3 Heads of States Meeting, Bangkok in April, Emergency Meeting of SAARC Health Ministers on SARS in Male, 29 April 2003, as well as the APEC Health Minister's Meeting on 28 June 2003 in Bangkok.

Frequently Asked Questions were developed for the general public and mass media.

Consultants on infection control and an epidemiologist were recruited to improve the countries' preparedness for SARS.

Specific guidelines on the use of masks and the need to maintain anonymity of SARS cases to prevent stigmatization were issued.

Designated three laboratories, two in India (the National Institute of Virology, Pune and the National Institute of Communicable Diseases, New Delhi) and one in Thailand (National Institute of Health, Bangkok) to conduct laboratory testing on SARS for other Member Countries.

Conducted training on Good Infection Control at Mumbai (last week of June 2003) and organized a Regional Consultation on Strengthening National Capacity for Prevention and Control of SARS at Chennai (first week of July 2003). During the training on Good Infection Control it was revealed that many Member Countries need to strengthen infection control in various health institutions. During the regional consultation, two important recommendations namely, the need to revise the case definition and to review the current screening practice were agreed upon.

9. CONCLUSION

Timely and rigorous action taken by WHO and Member Countries helped to prevent panic and confusion with regard to the SARS outbreak. Vigilance and political commitment need to be sustained to deal with other new, emerging or re-emerging infectious diseases possibly more infectious and deadly than SARS in the near future. Of particular importance is the need for improving infection control in various health care institutions. Keeping the mass media informed with valid data and facts is of prime importance to avert unnecessary panic among the general public.

Several initiatives have been taken by Member Countries, in some even beyond WHO recommendations, to prevent and control this dreadful disease. A review undertaken by Member Countries of various screening measures will be useful for policymakers if such a need arises in the near future. The outcome of this review will enable WHO to offer more appropriate advice to Member Countries related to the same. WHO will also need to revise the case definition and to hasten the development of laboratory tests that can be used at the point of care.

The lessons learnt from the SARS epidemic will facilitate the revision of the International Health Regulations due for adoption by the World Health Assembly in 2005.