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Anti-epidemic Measures for COVID-19 in Macao

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[Abstract] The Macao government attaches great importance to the anti-epidemic measures of the novel coronavirus pneumonia (coronavirus disease 2019, COVID-19). It had taken steps to deal with COVID-19 even before the first case was detected, and formulated stricter rules after the occurrence of several imported cases. These measures were to cut out the link of the epidemiological triangle, including: 1) controlling the infection source. Macao government quickly established a multi-sectoral response coordination team to isolate potential cases and detect cases early by closely tracing arrivals from outside Macao; 2) stopping the route of transmission. The government implemented a mask supply plan, shut down entertainment venues during the peak of the epidemic, and used public media to disseminate anti-COVID-19 information, such as maintaining social distance and frequent hand wash; 3) protecting susceptible people. The government took a series of measures to protect minors, the elderly in institutions and workers in medical institutions from infection. While Macao has done a better job in fighting COVID-19 than some of the neighboring regions, it is not a perfect performer. Suggestions for addressing weaknesses Macao has shown in the fight are offered in the article.

[Key Words] COVID-19 anti-epidemic measures Macao

澳門新型冠狀病毒肺炎的防疫措施

郭靜婷

【摘要】 澳門地區極為重視針對新型冠狀病毒肺炎（COVID-19）的防疫工作，在本地未出現個案前便已經採取應對措施，在出現數個輸入性個案後制定了更嚴格的防控措施，這些措施可以歸結為阻斷傳染病流行三角的三大舉措，即：1）控制傳染源。澳門政府迅速成立了多部門合作的應變協調小組以隔離潛在感染者及早期識別感染者，特別是針對入境澳門的人士；2）切斷傳播途徑。澳門政府實施了口罩供應計劃，在傳染高峰期關閉了娛樂休閒場所，並以大眾媒體宣傳保持社交距離、勤洗手等措施以阻斷傳播途徑；3）保護易感人群。政府採取了一系列措施保護未成年人、院舍長者，以及醫療機構從業人員免受感染。這些措施有效遏制了新型冠狀病毒肺炎的傳播。本文也分析了澳門防疫存在的不足，提出了改善措施。

【關鍵詞】 新型冠狀病毒肺炎 防疫措施 澳門

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1 Background

The novel coronavirus pneumonia (coronavirus disease 2019, COVID-19) was first discovered in Wuhan in December 2019, and then spread throughout China and globally (World Health Organization [WHO], 2020a). WHO (2020a) declared COVID-19 as a public health emergency of international concern (PHEIC) on January 30, 2020, and further confirmed as a pandemic on March 11. As of May 25, 2020, the cumulative number of COVID-19 infections worldwide had reached 5,304,772 cases, with 342,029 deaths and a mortality rate of 6.45% (WHO, 2020b).

The impact of the epidemic on Macao began in early 2020 (Illustrated in Figure 1). The first confirmed case was an imported one on January 22, 2020 (Serviços de Saúde de Macao [SSM], 2020a) and then increased to ten in about two weeks. From February 4, to March 15, 2020, the confirmed case of Macao remained at 10, and then the 11th confirmed case was added on March 15, 2020 (SSM, 2020a). As of May 25, 2020, there were 45 confirmed cases, of which 43 were imported cases and two were imported related (the cases who were transmitted by the imported cases in the local community) (Gabinete de Comunicação Social [GCS], 2020a). A total of 44 mild cases and one severe case were reported (GCS, 2020a). On May 19, 2020, all the patients were discharged from the hospital and no one died (GCS, 2020b; SSM, 2020a).

While the pandemic is still rampaging around the world and there is no available vaccine nor effective treatment for COVID-19 (Daga et al., 2019; He & Song, 2020; Hu, 2020), there should be no complacency for people in Macao. To protect the citizens of Macao and prevent the spread of the epidemic, the Macao government has formulated a series of epidemic prevention measures against COVID-19 since the first

wave of local epidemic appeared in the end of January 2020.

2 Anti-epidemic Measures for COVID-19 in Macao

Infectious diseases become possible because of three interplayed factors: host, environment and agent and interventions should be directed at cutting out the link of the epidemiological triangle, including controlling the infection source, stopping the route of transmission and protecting susceptible people (Van Seventer & Hochberg, 2017) (Illustrated in Figure 2).

In terms of COVID-19, the agent is severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2); the environment is extrinsic factor that affects infectious diseases. SARS-CoV-2 can flourish in various conditions and can transmit from one person to another via droplets and contacts. The host in the COVID-19 triangle can be animal or human and scientific evidence has confirmed that all human beings are susceptible to COVID-19 (Daga et al., 2019; He & Song, 2020; Hu, 2020; Suganthan, 2019). This article will categorize

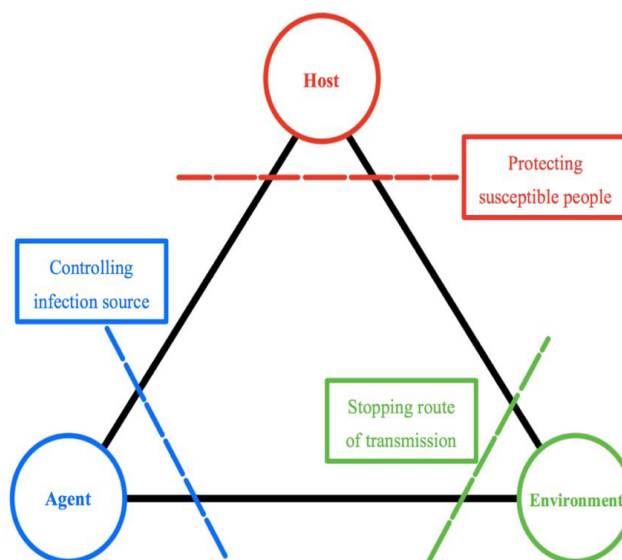


Figure 2 Cutting out the link of the epidemiological triangle

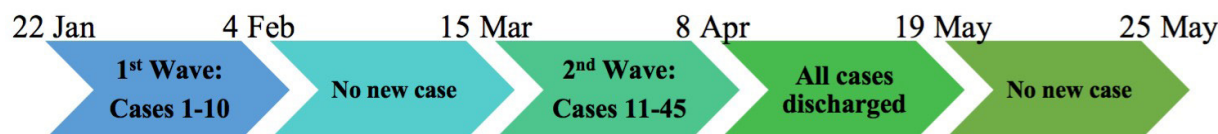


Figure 1 Timeline of the epidemic on Macao

the anti-epidemic measures for COVID-19 in Macao based on the epidemiological triangle and offer detailed descriptions on each of the three counter-infection ways.

2.1 Controlling the Infection Source

In terms of controlling the source of infection, through early detection, patients who have been infected with COVID-19 are isolated and treated, and the people contacted by the infected person are fully tracked to infer suspicious cases and isolate them. The Macao government formally set up an inter-departmental working group in January 2020, headed by the General Secretary of the Social and Cultural Affairs Office of the government, to deal with unexplained pneumonia and a new coronavirus infection response coordination center to fully respond to the COVID-19 epidemic (GCS, 2020c). As early as January 1, 2020, passengers from Wuhan flights were screened for the temperature at Macao International Airport and required to complete a health declaration form (SSM, 2020b). Due to the spread of the epidemic in the world later on, the Macao Health Bureau took more stringent measures, conducting temperature screenings at all ports of entry and requiring those from Hubei or who had been to Hubei within 14 days to enter Macao only they had presented a health certificate confirming free of the novel coronavirus pneumonia (SSM, 2020b). This preliminary screening had largely controlled the imported cases from Wuhan, reflected in the second half of the first wave of the epidemic in Macao, when no new cases of infection were reported between February 5 and March 14, 2020 (SSM, 2020a).

As the second wave of the epidemic in Macao began, the border-controlling measures became even tougher, including prohibiting all non-residents other than residents of mainland China, Hong Kong and Taiwan from entering Macao. But those residents of mainland China, Hong Kong and Taiwan who had entered a foreign country were not allowed to enter. People who were allowed to enter had visited countries or regions outside China within 14 days prior to entry, must undergo 14 days of medical observation at

designated locations, and those who took a flight from abroad to Macao must present a negative nucleic acid test report for the new coronavirus pneumonia issued by a local medical institution before boarding the aircraft (SSM, 2020b). Patients with infectious diseases must be detected and diagnosed as soon as possible and the government had tried to screen out suspicious cases through health declaration so as to isolate them and carry out medical observation. Quarantine or isolation was applied to those who had had close contact with the patients or suspicious cases, so as to stop the spread of COVID-19 effectively.

2.2 Stopping the Route of Transmission

The main transmission routes of COVID-19 are droplets and contact transmission (He & Song, 2020; Hu, 2020; Suganthan, 2019). Wearing masks, maintain hand hygiene, and ventilation are the most common ways to stop transmission. Wearing a mask is a simple, feasible, and low-cost way to stop the source of infection, and can effectively control epidemics (Jiang, Wang, Gao, & Jiang, 2020). A recent review shows that a surgical mask can filter 75% of particles between 0.02 μm to 1 μm , which implies that wearing a mask can reasonably reduce the spread of droplets transmission viruses (Howard et al., 2020).

Even before the first case was deleted in Macao, the news of unknown pneumonia was spreading in the mainland had driven people in Macao into panic and there was a panic buying of masks in Macao, a phenomenon observed in many other places later (Macao Daily, 2020a). Masks in local pharmacies were quickly run out of supply and prices for all kinds of masks soared. Macao government was quick to deal with the issue of mask supply shortage. The chief executive of the Macao government vowed to try his best to get a sufficient supply of masks for Macao people. On the afternoon of the first confirmed case in Macao, the Macao Health Bureau announced that Macao citizens and foreign workers would be able to purchase up to 10 masks per person in more than 50 designated pharmacies with Macao resident identification cards and

foreign employee identification cards. They could buy again after ten days when the next round of mask supply was available (SSM, 2020b). By the end of May, the government had carried out 10 rounds of mask supply and it is still going on with the "Mask Supply Plan". This plan had ensured that Macao citizens and foreign workers had sufficient masks for personal protection.

In order to reduce crowds and ensure ventilation, Macao government forced the closure of casinos, cinemas, playgrounds, Internet cafes, massage parlors, beauty salons, gym rooms, karaoke and other entertainment venues with large crowds on February 4, 2020 (SSM, 2020b). The government rescinded the closure of casinos on February 20 and reopened all entertainment venues on March 2 when the epidemic was under control (SSM, 2020b). The government established the electronic system for personal health declaration (SSM, 2020b), all entertainment venues were recommended to use it to record the health status of the incoming and outgoing population to facilitate flow monitoring. Also, the government uses the community's emergency broadcast system and electronic display to broadcast publicity slogans, calling on citizens to stay home, not to gather, wear masks and wash their hands frequently (GCS, 2020d).

2.3 Protecting Susceptible People

Since COVID-19 is a new virus and there is no effective vaccine against it, people are not immune to it (Daga et al., 2019; He & Song, 2020; Hu, 2020). In addition to the above-mentioned closure of entertainment venues to reduce crowd gathering, all higher education institutions, primary, secondary schools and kindergarten, private supplementary teaching aid centers and continuing education institutions were required to close by the government until the resumption of classes (Higher Education Bureau, 2020). Schools followed the requirement and switched to the internet to maintain the teaching schedule.

According to data from the Chinese Center for Disease Control and Prevention, the elderly, medical staff, and patients are at the highest risk of COVID-19

infection (BBC, 2020). To protect these vulnerable people, the government provided management advice to elderly service centers on the prevention of COVID-19, including temperature measurement for entrants, the use of masks, keeping a distance of at least one meter, maintaining indoor ventilation, etc. (SSM, 2020c). In medical settings, the government provides more detailed guidelines on infection control and procedures for handling suspected cases (SSM, 2020d; 2020e), such as the use of personal protective equipment (PPE) and the timing of hand hygiene, etc. The guidelines not only guaranteed the safety of workers in medical institutions but also protected the safety of other patients in hospitals.

3 The Strength and Weakness of the Controlling Measures in Macao

3.1 The Strength of the Controlling Measures in Macao

Macao has been faster to stabilize the COVID-19 outbreak compared to neighboring areas. As of May 31, 2020, a total of 1,084 confirmed cases had been reported in Hong Kong, of which 683 were imported, 236 were local cases and 165 were potential local cases (Hong Kong Centre for Health Protection [HKCHP], 2020a). The prevention measures in Hong Kong are generally similar to those in Macao, such as health declarations for entry and mandatory quarantine for 14 days (HKCHP, 2020b). Unfortunately, a panic buying of masks for some time in the early stages of the epidemic appeared in Hong Kong, with price was as high as 220 HKD for a box of surgical mask and even substandard mask (Fung, 2020). Until May 19, 2020, the Hong Kong government launched a local mask production subsidy scheme to promote local mask production, to help cope with the shortage of masks and to establish a stable market for masks in stock (Hong Kong Productivity Council, 2020). But it was too late, and there were chaos and anxieties among the public at the most serious epidemic time. In contrast, although Macao relied on imported ingredients, the mask policy implemented by the Macao government had met the most urgent needs of Macao

and enabled every Macao citizen and foreign worker to have access to the basic health protective equipment.

The first case of infection in Hong Kong occurred on January 23, 2020 (HKCHP, 2020a). On January 27, the Hong Kong government announced entry restrictions on Hubei residents and the persons who had traveled to Hubei province within 14 days, and on March 25, Hong Kong restricted all passengers who had traveled overseas (HKCHP, 2020b). In contrast, the Macao government had implemented control measures even before the first case was reported on January 22, including temperature screening and the requirement to provide a health declaration before entry. Hong Kong applied a different quarantine rules with Macao. It had allowed some of the people who arrived at Hong Kong from outside and did not show symptoms of COVID-19 with negative nucleic acid test reports to have quarantine at private homes (HKCHP, 2020b). The Hong Kong government adopted a variety of methods to monitor the home isolators, for example, location sharing by using instant messaging software, irregular home visits, video calls, and requiring home isolators to install mobile phone programs for monitoring, etc. (Wong, 2020). Despite enormous investments to ensure that people in the home isolation adhered to quarantine orders, home quarantine was proved later on to be responsible for some of the infected cases. Macao has a small population base, and the government could allocate all arrivals in designated places for quarantine, which had prevented the import-related community transmissions.

3.2 The weakness of the Controlling Measures in Macao

Education on ventilation and disinfection has been inadequate in Macao. Although the Macao government developed guidelines on personal protection and environmental hygiene on its official website, no publicity was made on this issue. Putting up information only on websites would have been problematic for some vulnerable groups to access. For example, the elderly might not know how to access the sites. Therefore, the government should have publicized epidemic prevention information via mass media, such as TV advertisements and bus posters.

On the other hand, since the outbreak of COVID-19 in January, Macao residents have been in urgent need of disinfectant products. The Macao Economic Bureau (2020) promoted the local production of disinfectant alcohol and alcohol hand rub-through accelerated industrial permits to meet the needs of Macao residents in March. However, there was still a shortage of disinfectant in public facilities in the next months. The government should have provided disinfectant or alcohol hand rubs in public places such as buses and shops to encourage the public to use it.

Workers in medical institutions are at high risk of infection of COVID-19, and they should be provided with sufficient protective equipment, such as PPE and sanitized items. At the beginning of the COVID-19 outbreak, the internet had the rumors that medical professionals in Macao were complaining of a shortage of medical supplies and insufficient protection. The hospital authorities were quick to respond to the stories, claiming these as fake news (Macao Daily, 2020b). However, a review should be made as to whether there will be a potential supply crisis in Macao should the epidemic get worse. Macao must establish a smooth medical supply chain against unexpected needs. In addition to relying on import supplies, the local production is also worth considering as the solutions. Alternative supply sources should be added when one or two supply chains are shut down due to border closure during pandemics.

During the first wave of the COVID-19 epidemic in Macao, the largest private hospital in Macao assigned waiting areas in the courtyard of the hospital for visitors in the outpatient department, preventing hospital-associated infection (HAI) (Xue et al., 2020). While this was a temporary measure in the peak of infections, authorities need to address the possibility of HAI in routine health care services in the future, given that airborne infectious diseases have regularly emerged in the past decade. There is a need to revise the procedures in respiratory and fever clinics. It should be mandatory that every visitor to these clinics wear masks. Re-

location of clinics should also be considered. If possible, the fever clinic and respiratory clinic should be separated from other outpatient clinics. Furthermore, temperature measurements and inquiry for the epidemiological signs and symptoms must be taken for all persons entering the medical facility.

4 Conclusion

Community is the foundation of epidemic prevention and control. The Macao government was quick to respond to the COVID-19 epidemic and carried out a series of measures to cut off the epidemiological triangle. According to the epidemiological curve of infected cases, Macao has won the battle against this infection. With the resumption of work and study and the opening up borders, there is no doubt that Macao will face renewed challenges as population flow increases. It should keep up with its momentums gained in fighting against COVID-19 since the first case was detected and make up its weakness, to be fully prepared for a possible resurgence in the future. Health care authorities in Macao should take the opportunity to look into the pitfalls in emergent occasions, such as sufficient supply for medical supplies in disasters and prevention of HAI from other airborne infections.

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