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OPINION

Tackling the COVID-19 Pandemic

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Received for publication April 9, 2020; accepted April 21, 2020 (ARCMED_2020_462).

After the initial outbreak of the SARS-CoV-2 epidemic (now called COVID-19)—in Wuhan, China—and its subsequent fast dispersion throughout the world, many questions regarding its pathogenesis, genetic evolution, prevention, and transmission routes remain unanswered but fast explored. More than 100,000 confirmed, infected cases within a relatively short period of time globally corroborated the presumption that a pandemic will develop; such a pandemic will require a suite of global intervention measures. Consequently, different countries have reacted differently to the COVID-19 outbreak, but a uniform global response is necessary for tackling the pandemic. Managing the present or future COVID-19 outbreaks is not impossible but surely difficult. Barring the live-animal trade at the markets; revising the regulations and rules of customs, import or export across borders; supporting and expediting projects to develop vaccines and antiviral drugs; immediate quarantine of the involved regions; and also producing and supplying a large number of protective facemasks and preventing its stockpiling or smuggling are the main actions suggested to deal with the present or a forthcoming COVID-19 outbreaks. Increasing numbers of infected cases had heightened concerns about the public health and welfare. Thus, preparing for the next probable pandemic of COVID-19 demands scrutinization of the lessons we have learnt so far. © 2020 IMSS. Published by Elsevier Inc.

Key Words: COVID-19, MERS, Outbreak, Pandemic, Prevention, SARS, Wuhan.

The COVID-19 Pandemic

During celebrations of the Chinese New Year in Wuhan, China, a novel coronavirus, SARS-CoV-2 caused the emergence of the newest disease, COVID-19. Initially, the trade of live animals was blamed for the transmission of the virus to many travelers, visitors, and the local population frequenting the markets (1). Subsequently, the mysterious virus initiated an epidemic that has now morphed into a pandemic (2–5). Although the biochemical interaction of the receptor-binding domain of the surface-spike glycoprotein of SARS-CoV-2 with angiotensin-converting enzyme 2 in complex with the amino acid transporter B⁰AT1 (SLC6A19) has recently been resolved by cryo-EM (6), many epidemiological aspects of the virus are yet to be explored (7). The growing number of confirmed cases with

the ever-expanding geographical spread of the infection has attracted much concern and attention (World Health Organization (WHO) situation reports; <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/>). The COVID-19 pandemic stands with more than 118,326 confirmed cases as of March 12, 2020 (2).

Outbreaks of the severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) in 2003 and 2012, respectively, preceded the present pandemic by the newly emerged member of the *coronaviridae*, SARS-CoV-2 (8,9). In contrast to SARS and MERS, COVID-19 is mostly spread *via* close contact within a community; thus, prevention measures to limit close contact are necessary to overthrow the present and potential future outbreaks. The crucial question is why the virus have rapidly crossed the borders of 114 countries within two months. The two previous outbreaks caused by SARS or MERS did not get to be classified as pandemics, but COVID-19 is apparently more contagious because of its potent spread among vulnerable targets or other individuals who may remain asymptomatic but carry and transmit the virus. In

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contrast to SARS and MERS, COVID-19 seems to be less fatal (35 and 10 vs. 2%, respectively). Because SAR-CoV-2 is a new infectious agent to humans, the initial exposure to it may lead to severe clinical manifestations. The above question may also be explained by the unpreparedness of the involved countries to control the outbreak. Speculating that problems in the hygiene and health-management systems may have helped the virus spread more easily seems obvious. The most referred recommendations by the health and hygiene authorities across the world so far have included frequent handwashing, wearing the protective facemasks, avoiding the suspected cases, and self-isolating at home.

Predictably, the present pandemic will wane, but future waves of COVID-19 outbreaks may emerge (10–12), potentially seasonally. Any forthcoming outbreak is predicted to cause grave concerns among the public-health authorities, healthcare workers, politicians, and the general public (11,13,14). Different countries affected by the COVID-19 outbreak have responded discrepantly, but a uniform strategy is required to tackle this pandemic. Here, we propose five mandatory measures to efficiently control and tackle any present or future outbreaks of COVID-19.

First, illegal wildlife trading and selling the meat products, mostly processed in the open without standard food-safety and biosafety measures, are the two contributing factors that have caused the censure and shutdown of trading at the live-animal markets. Undoubtedly, stopping the Huanan wholesale seafood markets in Wuhan was a favorable decision by the Chinese government. Therefore, national and international support to urgently and permanently close all similar markets throughout the mainland China and other countries is required to reduce the chance of future outbreaks. Such a measure, while drastic, could be implemented by the Chinese government or other governments over the world. However, the nonhygienic, live-animal meat markets may not remain closed forever in Wuhan. The present epidemiologic knowledge suggests that mass-gatherings—for example festivals, religious ceremonies, sporting events, conferences, and concerts—increase the risk of the person–person COVID-19 transmission while collective knowledge about the exact routes of transmission is still insufficient (4,15–17).

Second, the world needs to prepare for exceptional travel and quarantine regulations when an outbreak is first reported. Limiting international travel, customs checks, and rules on export or import of goods should be revised and renewed (18–20). Such rules and regulations should be implemented by all the countries based on the large body of knowledge of, and experience with, the COVID-19 outbreak (21).

Third, the previous outbreaks of MERS and SARS subsided without interventions, such as therapeutic or prophylactic vaccines (22–24). So far, no approved vaccine for

COVID-19 exists. Similarly, there is no FDA-approved antiviral drugs effective against COVID-19 (25,26). Some putative measures have been suggested to be administered in patients with COVID-19, but under clinical settings, no effective option is available (26), hindering the fight against the virus and the pandemic. Undertaking many vaccine-development projects over the next few decades will prove the prophylactic or therapeutic value of any potential vaccine against the present COVID-19 outbreak. Presumably, this pandemic may abate within the coming two months from now but supporting the vaccine research into the future will be valuable.

Fourth, despite the allegedly less transparent initial reporting by the relevant authorities in China early in the outbreak, a quick decision to implement quarantine measures in Wuhan and other initially involved districts could have limited the chance of rapid and successful spread of the virus into other Chinese provinces or abroad. No immediate intention to implement quarantine in a city or a province where COVID-19 first emerges will likely be detrimental. Although such quick decisions in a suspected region are difficult to make, they should be considered as an important priority against any new COVID-19 outbreak (27), especially at the beginning of an epidemic to prevent an ensuing catastrophe (28). Implementing quarantine measures by encouraging the people to avoid public gatherings or self-isolate at home may be easier in some but not all other countries. Implementing quarantine in less developed or developing countries may be the most difficult. The social media and public broadcasting through national radio or television stations may play a big and important role.

Fifth, supplying the immediate necessities to the infected cases around the world is a difficult logistic mission. For example, protective facemasks were reportedly smuggled in March in some countries (29–31). Although wearing a facemask alone does not fully protect against the spread of COVID-19, face-masking will drastically reduce the chance of successful transmission among healthy or infected cases (32). Hygiene supplies are also crucial, but we should be aware of some potential limitations of such products. For example, the prescribed use of facemasks cannot prevent the potential conjunctival exposure to aerosols, and a potential viral entry route through the nasolacrimal ducts or the conjunctiva itself must be considered, though a facemask may prevent the spread of aerosol-borne viral particles to wide radiuses. Smuggling the facemasks or lack of their timely distribution could negatively affect the attempts to control the outbreak. We suggest that sufficient numbers of masks should be made available to all the regions and rural areas affected by an outbreak. Ideally, everyone should be allowed to have at least one protective mask. This suggestion will help the epidemiologists to efficiently manage the outbreak and reduce its mortality and morbidity within a short period.

Conclusive Remarks

Tackling the COVID-19 pandemic now and its future outbreaks is not impossible but is difficult. A quick explosion in the number of infected cases has increased concerns about the public health globally. The first rational step is to control the current outbreak and then design better plans for tackling the viral problem in the future. Preparing well for the next probable pandemics of COVID-19 will be supported by the lessons and experiences learnt from this initial outbreak.

Conflict of Interest

None.

Funding

Nil.

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