Special Article

Impact of COVID-19 on Public Health

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Throughout human history, zoonotic pandemics have periodically resulted in catastrophic human morbidity and mortality. Vulnerabilities have increased with unprecedented world population growth, greater interaction with wildlife, and the dramatic expansion of international travel. Viral diseases from animal populations continue to emerge in the 21st century to cause human epidemics, ***challenging public health systems in Thailand and other countries around the world.***

Recently, a novel coronavirus (SARS-CoV-2), which emerged in the city of Wuhan, China in December 2019, causes a disease known as COVID-19. It rapidly became a global pandemic, affecting more than 50 million people worldwide as of early November 2020.

Thailand confirmed its first case of COVID-19 in a traveler arriving from Wuhan on January 13, 2020; in March 2020, two initial domestic clusters of the disease occurred in Bangkok among spectators at a boxing stadium and in a group of bar hoppers. The Thai government promptly implemented several stringent public health measures to avoid further spread of the coronavirus: quarantine of arriving travelers, imposition of social distancing, wearing of face masks, frequently washing of hands, measurement of body temperature, closure of entertainment venues, restricting on travel, closure of schools, and imposition of a nighttime curfew. However, it was found that such interventions aimed at curbing transmission of the coronavirus are prone to causing anxiety and psychopathy among the general population by creating new lifestyles and enforcing behavioral changes, and closing institutions and interrupting supply chains.

On the whole, the spread of the coronavirus has the potential to overburden all health systems. COVID-19 has already had significant impacts on health services for non-communicable diseases (NCDs), i.e. prevention and treatment services for NCDs have been severely disrupted since the COVID-19 pandemic began. The situation is of significant concern because not only are the people living with NCDs at higher risk of developing severe COVID-19 illness and death, but also many of them need treatment for such other diseases as cancer, cardiovascular disease, diabetes and hypertension. Yet, because of the overload of COVID-19 patients in hospitals and health care facilities, they have not been receiving the health services and medicines they need since the start of the pandemic.

Spikes in coronavirus patients are straining hospital resources not just in terms of the availability of beds and protective equipment, but also staff members who are coming down with COVID-19 themselves. An illustration of how dire the staffing situation has become, if staffing shortage continue, people such as those who are involved in car accidents or who have had heart attacks may be turned away from health facilities swamped with COVID-19 patients. It is necessary therefore to make sure people are aware of how serious this situation really is.

Some public health consequences of COVID-19 can be seen in the case of African countries in terms of malaria, especially in Sub-Saharan Africa, where there have been disruptions to anti-malaria services and treatments for that disease because of COVID-19. Fortunately, such event has not occurred to any degree in Thailand because of the success of the country's containment measure.

On the bright side, the Food and Drug Administration granted emergency authorization for the use of an antibody treatment similar to the one President Donald Trump received while he

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was stricken with COVID-19. Health experts have said antibody treatment could be powerful tool to change the course of the pandemic and bridge the gap until a vaccine becomes available. The same idea was advocated by Thai virologists with the use of convalescent plasma from cured COVID-19 patients, but no further activity has been heard.

A small group of Stanford University researchers published their attempt to get around the problem. Their paper, analyzed 18 communities in the United States that hosted Trump election rallies between June and September 2020 - from Yuma, Arizona, to Pittsburgh, Pennsylvania. Using statistical analysis, they estimated that 18 of the Trump rallies led to 30,000 new cases of COVID-19 and 700 deaths. The findings were particular striking with dramatic spikes in new cases occurring some days after the respective rallies. The Stanford team concluded that the communities in which Trump rallies took place paid a high price in terms of disease and death. Similarly, after attending an election night party, several people are now in self-quarantine; while that was not a rally, the gathering was equally lax about asking guests to wear masks and practice social distancing.

The Era of Precision Public Health?

Human genome-wide association studies (GWAS) have been proposed as a way to investigate the "super-spreader phenomenon" observed during the COVID-19 pandemic. Advances in technology now make it possible to analyze host genomic factors while an outbreak is underway. It is hoped that the ability to quickly and accurately identify vulnerable and protective host factors could expand the effectiveness of public health approaches to COVID-19 control.

Within two weeks of the first reported cases, Chinese scientists rapidly sequenced COVID-19 and post the results internationally. Ongoing research into the current pandemic includes the priorities of devising rapidly deployable diagnostic tests, better understanding transmission mechanisms, developing and testing antiviral drugs, and ultimately, developing a protective vaccine. Both viral and human genomic information would achieve these goals aimed at providing useful information and developing therapeutics targeting those pathways. Information on human genetic variants associated with susceptibility to severe infection could be useful for prevention within families and healthcare workers or for directing clinical care on hospital admission.

Research publications have suggested the potential of ACE2 genetic variants, interleukin-6, HLA antigens, and blood groups to be risk factors in COVID-19 severity and outcomes. An emerging global COVID-19 host genetics initiative is bringing together the human genetics community to generate, share and analyze data to better understand the genetic determinants of COVID-19 susceptibility, severity and outcomes.[1-5]

Ideally, studies of COVID-19 risk factors for transmission and severity should include both viral and human genomes and the interaction of these two genomes. Together, such studies could not only accelerate development of the knowledge base but contribute to **a new era of precision public health.**

References

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