

COVID-19 and dengue coepidemics: A double trouble for overburdened health systems in developing countries

To the Editor,

With the deadly coronavirus disease 2019 (COVID-19) caused by novel severe respiratory syndrome coronavirus (SARS-CoV-2) spreading every corner of the developing and developed countries, the threat of another viral disease is now looming large on the horizon. In the coming days, the developing countries might face the dengue fever outbreak, a viral disease known to spread by mosquito vectors, *Aedes aegypti* and *A. albopictus*.¹ Compared with the havoc being wreaked by COVID-19, in terms of economic and fatalities loss, dengue is less deadly and is a minor health problem. Yet, for developing countries, it could be a serious problem if significant awareness-building programs among their population are not launched timely.

About 100 to 400 million infections per year are reported due to dengue fever around the globe with ~25 000 deaths annually.² The incidence of dengue infection has grown alarmingly around the globe in recent years. Most of the cases are asymptomatic or mild, hence the actual figures of infected cases are underreported. The majority of the cases were misdiagnosed as other febrile diseases.³ Despite the risk of infection exists in 129 countries, about 70% of the burden exist in Asia.^{4,5}

Over the last two decades, the number of dengue cases reported to WHO has been increased over eight folds from 0.5 million in 2000 to 4.2 million in 2019 along with an increase in deaths from 960 to 4032 between 2000 and 2015. The largest number of dengue cases ever reported globally was in 2019.² Meanwhile, COVID-19 is yet to reach its peak during the coming days in developing countries. The temporal coincidence implies that the two outbreaks could occur simultaneously and could cause drastic effects on the population and economy. In such a scenario, public and private health care sectors must work together to tackle these health nemesis.

There are also cases of misdiagnosis and coinfection of both the outbreaks as they share clinical manifestation and laboratory features.⁶ The two cases of coinfecting patients were reported from Singapore. Basically, both the cases first tested negative for dengue and shared similar diagnoses and disease course. After their discharge from the hospital, they returned due to constant fever and were diagnosed with SARS-CoV-2 and dengue coinfection.⁷ Similarly, cases of coinfection were also reported in other countries such as Thailand, Malaysia, Brazil, and Southeast Asia. Measures should be taken to distinguish cases with fever and headache from COVID-19 and dengue fever and these atypical symptoms must trigger alerts in developing countries with high dengue fever incidence.

Currently, the community transmission of COVID-19 is on the rise in developing countries and it is feared that the number of cases and deaths would increase in near future. None is certain that when the pandemic could start abating. The real risk of disease resurgence could be expected when the authorities start relaxing the lockdowns.


The second wave of COVID-19 in the coming few months could also be predicted using Influenza, SARS, and Middle East respiratory syndrome as key models. Scientists have urged that the COVID-19 can last for more than 3 years and can be halted when 60% to 70% of the world population is immune.⁸ As there are less chances that vaccines will be clinically available by this year, it is expected that the current wave of the pandemic will be followed by repetitive smaller waves that are likely to be appeared consistently. The waves are also expected to be geographically distinct and their intensity will depend on the regional control measures such as avoiding social gatherings. The worst scenario of a larger second wave before the end of 2020 followed by smaller waves is expected. Such predications are based on the trends exhibited during the influenza pandemic of 1918 to 1919 which resulted in about 50 million deaths, and 2009 to 2010 pandemic of H1N1.⁹ In case of COVID-19, some fear that ease in restrictions and public ignorance regarding preventive measures may make the second wave of cases greater than the initial bursts. With the countries planning to ease restrictions imposed due to coronavirus, there is a concern about resurgence or second wave. Experts worry if the efforts of social distancing, wearing masks, hand washing, and symptoms screening are not sustained, a larger number of cases are likely to occur which will lead to reimposing self-quarantine policies. Some experts are hoping to gaze into the future by observing the behavior of previous respiratory illnesses.

Forecasting the second wave, if dengue and COVID-19 coinfection occurs, the current health crises could surely aggravate further. In developing countries like Pakistan, thousands of people have stopped visiting hospitals or physicians for several weeks and even the outpatient department in hospitals is not properly working due to the COVID-19 pandemic. In such a scenario, if dengue infection in the coming monsoons reaches to the previous year level, a more alarming health crisis could be triggered.


Moreover, there are certain concerns by keeping in mind the weak health care systems. First, developing countries are at the edge of multiple socioeconomic collapses because there is a lack of specific amounts of diagnostic testing kits which may result in difficulty in early detection of the virus and eventually in preventing the onward

transmission.¹⁰ Second, due to underfunding and under staffing, there is also inadequate public health care infrastructure.

With such concerns, developing countries are struggling hard to cope with COVID-19. A significant number of asymptomatic cases and the limited numbers of tests might lead to some undetected cases moving freely and infecting the masses that can eventually result in more clusters of infections. However, to restrain both these epidemics, drastic measures such as greater investment in preparing diagnostic kits, medical supplies, and vaccine development must be taken.

Misbahud Din 

Madiha Asghar

Muhammad Ali 

Department of Biotechnology, Quaid-i-Azam University Islamabad,
Islamabad, Pakistan

Correspondence

Muhammad Ali, Department of Biotechnology, Quaid-i-Azam
University Islamabad, Islamabad 44000, Pakistan.
Email: muhammad.ali@qau.edu.pk

ORCID

Misbahud Din  <http://orcid.org/0000-0002-6248-5942>

Muhammad Ali  <https://orcid.org/0000-0002-7835-0663>

REFERENCES

1. Khan E, Hasan R, Mehraj V, Nasir A, Siddiqui J, Hewson R. Co-circulations of two genotypes of dengue virus in 2006 out-break of dengue hemorrhagic fever in Karachi, Pakistan. *J Clin Virol*. 2008; 43(2):176-179.
2. World Health Organization. 2020. <https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue/>. Accessed June 27, 2020.
3. Waggoner JJ, Gresh L, Vargas MJ, et al. Viremia and clinical presentation in Nicaraguan patients infected with Zika virus, chikungunya virus, and dengue virus. *Clin Infect Dis*. 2016;63: ciw589-ciw1590.
4. Bhatt S, Gething PW, Brady OJ, et al. The global distribution and burden of dengue. *Nature*. 2013;496(7446):504-507.
5. Brady OJ, Gething PW, Bhatt S, et al. Refining the global spatial limits of dengue virus transmission by evidence-based consensus. *PLoS Negl Trop Dis*. 2012;6(8):e1760.
6. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 2020;395(10223): 507-13..
7. Yan G, Lee CK, Lam L, et al. Covert COVID-19 and false-positive dengue serology in Singapore. *Lancet Infect Dis*. 2020; 20(5):536.
8. Kissler SM, Tedijanto C, Goldstein E, Grad YH, Lipsitch M. Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period. *Science*. 2020;368(6493):860-868.
9. Saunders-Hastings PR, Krewski D. Reviewing the history of pandemic influenza: understanding patterns of emergence and transmission. *Pathogens*. 2016;5(4):66.
10. Rodriguez-Morales AJ, Gallego V, Escalera-Antezana JP, et al. COVID-19 in Latin America: the implications of the first confirmed case in Brazil. *Travel Med Infect Dis*. 2020;35:101613.