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# Dengue Fever: The Threat of Emerging Diseases Coinciding the Corona Crisis in Southeastern Iran

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## *Dear Editor,*

Dengue fever is one of the main mosquito-borne diseases worldwide, the preferred regions for which are the warm and tropical climates. This viral infection encompasses a broad spectrum of symptoms, from extremely mild to severe cases requiring medical intervention and hospitalization. Although it has no specific treatment, the symptoms can be managed. According to the WHO, dengue fever accounted for 5.2 million persons in 2019. Its prevalence rate increased as much as eightfold over the last two decades. The reported deaths increased fourfold in 2015 (4032) in comparison with 2000 (960) (1).

*Aedes aegypti* (Linnaeus, 1762) and *Ae. albopictus* (Skuse, 1895) are considered the main vectors of dengue fever. Because of choosing small artificial habitats for egg-laying, they are known as container-breeding mosquitos. This behavioral feature enables them to reproduce even in arid areas. This virus can be transmitted to the next generation through the eggs of an infected adult mosquito. In other words, by the transovarial transmission, several consecutive generations are infected if the female parent bloodfeeds from the infected host. Moreover, unlike malaria vectors, their eggs are drought resistant, allowing them to move around easily (2). The detection of *Aedes* albopictus in the United States, followed by the transported cargo ships of discarded automobile tires from eastern Asia had occurred based on this mentioned biological characteristic (3). In the case of exposure to water as a stimulus, the eggs are hatched, and the larval development is done quickly (2). The aforementioned pointscan further highlights the importance of dengue fever and its vectors.

It is concluded that increasing global trade and transport can facilitate the global distribution of dengue fever and its vectors from the native areas in Southeast Asia. Due to the potential of both species to adapt to new environments, they could establish themselves in many countries.

Several countries in the Eastern Mediterranean region have reported imported and indigenous cases of dengue fever. The first collection of adult *Ae. albopictus* was recorded in Southeastern Iran in 2013. However, subsequent studies have not confirmed its establishment (4). Although the likelihood of its presence in the study area has been predicted based on modelling, this species seemingly have failed to adapt to the climatic conditions of these areas (5).

Similarly, *Ae. aegypti* was collected from Western Iran (Khuzistan) in 1921 and Southern Iran (Bushehr) in 1953; however, the species has not been recorded in Iran for above 70 years (6). Although some studies still confirm the absence of this species in Southern Iran, several studies have reported its collection (7, 8). In this regard, the misidentification of the species is possible, mainly if a valid key is not used, concerns have raised about the presence and establishment of this important vector in the southern parts of the country.

Sistan and Baluchestan Province is located in Southeastern Iran, the south parts of which have a climatic condition similar to the Hormazagn Province, where monsoon streams cause heavy precipitation (4). According to some documentes, dengue epidemics and transmission often peak after rainfall (1). This province has a long shared border with Pakistan and Afghanistan in the east and the Oman Sea in the south (4). The east neighbor, Pakistan, has been facing dengue outbreaks for years. It was first reported in Punjab in 1982 with 12 dengue seropositive pa-

tients. The last notable dengue outbreak in this country, accounting for 47,120 confirmed dengue cases and 75 deaths, was reported in 2019. The published papers indicate the establishment of *Ae. aegypti* and *Ae. albopictus* in this country (9).

On the other hand, there is international trade with Southeast Asia via through Chabahar Port. As another trading partner of Iran, India is tackling with dengue fever, and its goods are being exchanged via this port. These cases highlights the significance of the south of the province regarding the presence and occurrence of dengue and arouse concerns in the national health system.

Sistan and Baluchestan province is involved with manyvector-borne diseases such as malaria, leishmaniosis, and Crimean-Congo hemorrhagic fever, leading to the establishment of a vector surveillance system, equipment, and trained personnel (4). In this regard, the use of a malaria entomological surveillance platform can improve dengue entomological surveillance. According to some modeling studies, the northern areas of the country with vast forests and similarities to the natural biotopes of *Ae. albopictus* are more prone to the establishment of this virus (10). Nevertheless, it seems that there is not an extensive and capable infrastructure for entomological surveillance in this area like southern parts. Under such a critical conditions, the widespread distribution of the coronavirus crisis has involved all staff, even medical entomology technicians.

Like other countries, Iran is involved in the COVID-19 pandemic. This crisis has imposed a lot of costs, logistics, and efforts; hence, the vector surveillance system as well as quick intervention and vector control response can be affected in such cases. This virus can also reduce the quality and quantity of entomological field studies. Moreover, due to physicians and health workers' involvement in the treatment, control, and vaccination program of COVID-19, most training topics were related to this disease as a priority. At the executive level of healthcare, less attention has been paid to the issue of dengue since the beginning of the coronavirus epidemic across the country.

Accordingly, future researchers are recommended to improve the detection of dengue fever cases, assess the knowledge and attitudes of physicians, health officers, and entomological technicians, and hold training and retraining courses on dengue fever and its vector. Moreover, reinforcing the dengue vectors surveillance system and their control equipment is suggested.

## Footnotes

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