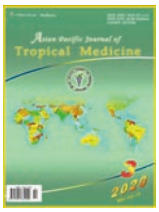

Letter to Editor

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Imported cases of 2019-novel coronavirus (2019-nCoV) infections in Thailand: Mathematical modelling of the outbreak

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Outbreak of a new emerging disease is usually an important consideration in medicine and public health. In December 2019, a new emerging disease started in China and becomes the global concern in early January 2020[1,2]. The disease, 2019-novel coronavirus (2019-nCoV) infection, already existed outside China and the importation of disease is the cause of emerging 2019-nCoV infections in new settings. Thailand, a tropical country in Indochina, is the first country that reported the first 2019-nCoV infection outside China. Until the present (31 January 2020), the number of cases is 29 and still increasing.

An interesting issue in dealing with the new disease outbreak is nature of disease spreading. The use of medical mathematical modelling technique can help clinical epidemiologist better understand the situation of outbreak[3]. Focusing on the situation of imported emerging disease, the specific knowledge on the disease epidemic is limited. Here, the authors use clinical mathematical modelling technique for explaining the disease outbreak of imported cases of 2019-nCoV infection in Thailand. The available data on imported cases of outbreak during the first month of outbreak (January 2020) of imported cases in Thailand are analyzed. The time function mathematical model was applied.

First, the local data on number of imported cases of 2019-nCoV infections from Thai Center of Disease Control are collected for further study. The accelerate rate of disease spreading is calculated. The definition of accelerate rate is "accelerate rate = velocity/time", which herby written as $A = V/T$ (or $V = AT$). Then, the integration was applied for prediction of accumulate imported cases of 2019-nCoV infections (I). The final equation based on the integration model can be written as $I = 2AT^2 + AT + C$ where C is a constant.

Based on the available data (Figure 1), the acceleration rate of disease spreading is equal to 0.42 case/day[4]. From integration modelling, the final model is derived as "$0.84T^2 + 0.42T + C$ where C is constant." This model can help better understand the nature of imported emerging disease and useful for planning for disease control and management.

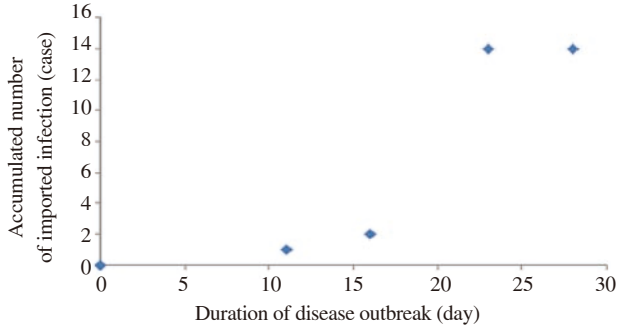

Figure 1. Accumulated number of imported Wuhan novel coronavirus infection in Thailand and duration of disease outbreak.

Conflict of interest statement

We declare that we have no conflict of interest.

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Authors' contributions

SP and WV conceived and drafted the manuscript. SP and WV were responsible for analyses and data interpretation.

References

[1] Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A Novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med* 2020 Jan 24. doi: 10.1056/NEJMoa2001017. [Epub ahead of print]

[2] Hsia W. Emerging new coronavirus infection in Wuhan, China: Situation in early 2020. *Case Study Case Rep* 2020; **10**(1): 8-9.

[3] Wu JT, Leung K, Leung GM. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: A modelling study. *Lancet* January 31, 2020. doi: 10.1016/S0140-6736(20)30260-9.

[4] Yasri S, Wiwanitkit V. Editorial: Wuhan coronavirus outbreak and imported case. *Adv Trop Med Pub Health Int* 2020; **10**(1): 1-2.