Underdiagnosis Does Not Account for the Decrease in Dengue Cases in Bandung, Indonesia

Lia Faridah1,2*, Savira Ekawardhani3, Hesti Lina Wiraswati1, Nisa Fauzia1, Fedri Ruluwedrata Rinawan3, Wulan Mayasari4, Kozo Watanabe5

1Parasitology Division, Department of Biomedical Science, Faculty of Medicine Universitas Padjadjaran, Bandung 45363, Indonesia
2Foreign Visiting Researcher at Department of Civil and Environmental Engineering, Ehime University, Matsuyama, Ehime 790-8577, Japan
3Department of Public Health, Faculty of Medicine Universitas Padjadjaran, Bandung 45363, Indonesia
4Anatomy Division, Department of Biomedical Science, Faculty of Medicine Universitas Padjadjaran, Bandung 45363, Indonesia
5Department of Civil and Environmental Engineering, Ehime University, Matsuyama, Ehime 790-8577, Japan

Corresponding author: Lia Faridah
Email: lia.faridah@unpad.ac.id

Keywords: DENV; COVID-19; co-pandemic

ABSTRACT

INTRODUCTION

Dengue virus (DENV) epidemics have been a common occurrence in Indonesia since it was first reported in 1968. Bandung, the capital city of West Java, Indonesia, is one of the regions where dengue is the most prevalent in Indonesia. Since late 2019, however, the coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2, has become a worldwide public health challenge. Concurrently, a peculiar pattern of DENV incidence has emerged beginning in early 2020. Based on data from the West Java Provincial Health Office, a significant decrease in DENV cases occurred from January to July 2020 compared with that in 2019. One possible cause could be the underdiagnosis of dengue due to the overlap of clinical features with COVID-19.

METHODOLOGY: To test this hypothesis, we explored the possibility of under diagnosis or co-infection with COVID-19 and DENV by conducting multiplex real-time PCR of common arbovirus (DENV, Zika, Chikungunya) and SARS-CoV-2 on sera from patients with positive or COVID-19 swab test PCR results.

RESULTS: Of the 284 sera tested, 41 were positive for SARS-CoV-2, and one serum was positive for both SARS-CoV-2 and DENV, whereas the rest were negative for arbovirus (DENV).

Conclusions: These results indicate that the co-infection of DENV and COVID-19 occurs only very rarely. We concluded that an underdiagnosis of DENV from January to July 2020 did not account for the significant decrease in cases in West Java, Indonesia.

Keywords: DENV; COVID-19; co-pandemic

Correspondence: Lia Faridah
Email: lia.faridah@unpad.ac.id

METHODOLOGY

A total of 284 patients were tested for COVID-19 by real-time PCR with the AllplexTM 2019-nCoV Assay (Seegene, South Korea). They were then further tested by multiplex
real-time PCR using a Dengue, Zika and Chikungunya Virus Multiplex kit (GeneSig, United Kingdom). The samples were collected in Indonesia at the reference hospitals in the West Java.

RESULTS
Forty-one patients were confirmed positive for COVID-19. Of the total 284 sera from both positive and negative COVID-19 patients tested for DENV, Zika and Chikungunya, all except one were negative for arbovirus. Furthermore, the one serum that did test positive for DENV also tested positive for COVID-19 by the swab PCR test. The graph from the amplification curve (Fig. 2) indicates the infection of DENV of the patient (Sample 34). The results showed that the co-infection of COVID-19 and DENV was incredibly low, and the underdiagnosis of cases of DENV infection was not found. Our results also verified that, although very rare, the co-infection of COVID-19 with the endemic DENV is possible and has occurred in West Java.

DISCUSSION
Based on the data, the phenomenon of a decrease in dengue cases is most likely caused by the reduced mobility of people due to the social distancing measures implemented in cities. It is known that the transmission of dengue is mediated by the travel of infected individuals since the mosquito vectors only move short distances during their lifetimes [10].

Certainly, the research findings are limited because of the limited pool of samples, and more significant interpretations will require further, larger studies. Overall, the results reflect the dynamic epidemiology of the tropical environment in West Java, Indonesia, in the months following the onset of the COVID-19 pandemic. Furthermore, these data have elucidated that the decrease in dengue cases in Bandung is not due to underdiagnosis.

CONCLUSION
To conclude, our study confirmed that the sudden decrease of Dengue in the Bandung region was not likely due to underreporting or the underdiagnosis of cases. When faced with such concerning matters, the use and reconfirmation with RT-PCR testing are advisable and, in this case, illuminating. Additionally, in tropical countries, especially those with low- to middle-income country such as in Indonesia, co-epidemics still represent a considerable challenge for clinicians [11]. Further studies are required to better determine the accuracy of the SARS-CoV-2, DENV, Zika and Chikungunya diagnostic tests as well as on the impact of social measures on the dynamics of epidemiological phenomena such as those occurring in Bandung, Indonesia.

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Figures

![Figure 1. Detection of DENV by arbovirus multiplex rRT-PCR.](image)

One patient with confirmed COVID-19 by swab-PCR test also tested positive for Dengue (Sample 34, in duplicates). Positive (PC) and negative (NC) controls were as expected.

Tables

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<td>3</td>
<td>March</td>
<td>479</td>
<td>3</td>
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Table 1: West Java Provincial Health Office Dengue Case Recapitulation. The result showed decreased reported cases of DENV between January–July of 2019 and 2020.
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REFERENCES