

The Double Burden of COVID-19 and Dengue in Nepal: The challenges ahead

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INTRODUCTION

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is the causative agent of ongoing coronavirus disease 2019 (COVID-19) pandemic responsible for over 98 million cases and 2.1 million deaths as of 2021/1/23.¹ Although an increasing availability of clinical data have furthered our understanding of COVID-19, its clinical spectrum and transmission are still unclear and often unpredictable. The disease has spread to every corner of the world including Nepal, located between the world's two most populated countries, India and China. While the numbers of COVID-19 cases have decreased dramatically since the onset of the pandemic in China, cases in India continue to climb significantly.¹ The COVID-19 cases are reported from all ecological regions and 77 districts of Nepal. In 2019, dengue

ABSTRACT

Coronavirus disease 2019 (COVID-19) pandemic has caused significant impact on the health care system. As a consequence, diagnosis and treatment of vector borne diseases including dengue has been equally affected. Nepal is no exception to this, where COVID-19 cases is exponentially increased and all resources are concentrated on its prevention, control and management. Dengue, one of the major vector-borne diseases in Nepal, is apparently overlooked despite approaching the peak season of the disease. The aim of this paper is to describe the double burden of COVID-19 and dengue in Nepal, particularly highlighting the co-circulation and possible co-infections. This has posed higher risk of increased severity, more severe cases and deaths in Nepal. Moreover, potential misdiagnosis of these viral diseases may lead to delayed or, inappropriate treatment and poor allocation of resources.

KEY WORDS

Co-infection, COVID-19, Dengue, Nepal

cases were also reported from all ecological regions and 68 districts of Nepal. The COVID-19 is placing a pressure on health care systems which could have an impact on the diagnosis and treatment of vector-borne diseases (VBDs) such as dengue which resemble signs and needs laboratory confirmation for differential diagnosis. As dengue is one of the important VBDs which requires active and continuous activities resource limited countries like Nepal. There is the single government body [Epidemiology and Disease Control Division (EDCD)] to control the infectious diseases which is now focusing on COVID-19. As most of the efforts are on the COVID-19 prevention and control, dengue outbreak might be overshadowed and there is possibility of large outbreaks in coming days. In this study, we are presenting

the double burden of COVID-19 and dengue scenario and showing how COVID-19 has impacted on dengue control taking Nepal as an example.

COVID-19 AND DENGUE CASES

Since the first COVID-19 case reported on 2020/1/23 in Nepal, there have been 268,948 cases and 1986 deaths recorded, as of 2021/1/22.² It took 127 days to reach the first 1000 cases, and next 25 days to reach 10,000 (> 10-fold increase) (fig. 1). More than 88% of the COVID-19 infections recorded were asymptomatic during the first peak of the pandemic in Nepal, however, more symptomatic cases, severe cases and deaths have been reported during the ongoing phase of rapid transmission. Since the partial lifting of the control measures on 2020/7/22, Nepal has challenged to cope with the increase in COVID-19 cases brought about by increased public movement, and massive entry through the open border shared with India. While the country has put all efforts on COVID-19 control, dengue season started with cases reported from different parts of the country. The country will suffer more dengue burden amidst the existing COVID-19 crisis (fig. 1).

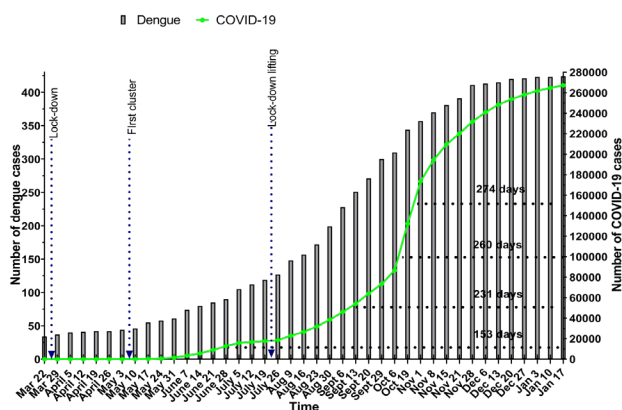


Figure 1. Increasing trend of COVID-19 and dengue cases in Nepal, March 2020 to January 2021 (Source: EDCD).

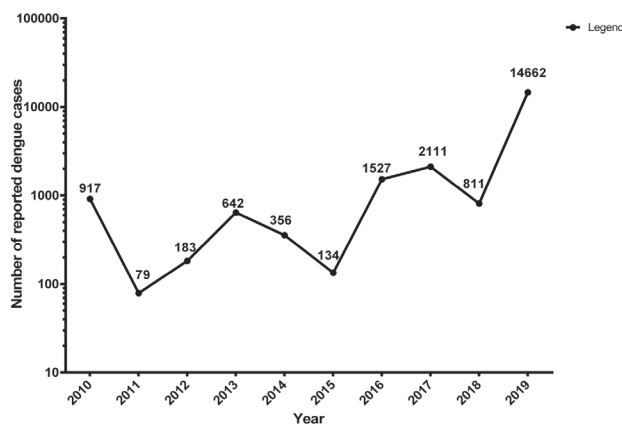


Figure 2. Number of reported dengue cases from 2010-2019 in Nepal (Source: EDCD).

In Nepal, dengue virus (DENV) was first reported in 2004.³ Since then, DENV are continuously rising (fig. 2).^{4,5} In 2019, a massive dengue outbreak took place, resulting in 14,662 cases and 6 deaths from 68 of the 77 districts of Nepal.⁶ The dengue vector *Aedes aegypti* has been reported at least from 2000 m above mean sea level in Nepal indicating wider distribution of DENV transmitting mosquitoes in Nepal.⁷ As of 2021/1/17, a total of 424 cases of DENV infection including 4 deaths have been reported from different districts across the country.² This year, there have been no big outbreaks of dengue reported in Nepal yet. This has to be cautiously considered since the dengue is largely overlooked due to the COVID-19 crisis and underreported due to lack of attention, inadequate diagnostics, and left undiagnosed. Therefore, it is likely that there has been active transmission of dengue as in the past years and there will be greater eruption of dengue cases as the lockdown is already lifted and people are coming out of their homes for work and other purposes. The most of the medical staffs are currently diverted to COVID-19 response; so, the community participation in vector control activities should be continued along with surveillance of VBDs including dengue. There is a need to sustain efforts to prevent, detect, and treat VBDs, such as dengue, chikungunya and malaria as the season peaks, during this pandemic.

As these two viruses (SARC-CoV-2 and DENV) are concurrently circulating in the country, the health care situation may deteriorate in the coming days. The impact of combined dengue and COVID-19 epidemics could have potentially devastating consequences. A case COVID-19 and DENV co-infection was reported on Nepal. It is likely that there are many more similar cases undetected, exacerbated by co-morbidities as dengue is no more new disease to Nepal. These two viral diseases represent a synergistic double burden in the country as they are likely to represent higher risks of severity and death.⁸ COVID-19 is known to cause severe disease and critical conditions in patients with other diseases (co-morbidities), and this suggests increased severity in the patients, a rise in more severe cases and more deaths with the increasing dengue infections in Nepal.⁸ There should be messages for control of both diseases using hand washing with soap or hand sanitizer against COVID-19 and insect repellents and larva destroying activities against VBDs like dengue. These two diseases together may cause higher burden to the country's health system challenging the control strategies. Diagrammatic pamphlets regarding the both diseases may be more effective in the control of diseases.

In dengue-endemic areas, risk of false dengue-positive was reported in serological tests, which might result into misdiagnosis or delayed diagnosis of a COVID-19 case.⁹ This may subsequently end with poor clinical outcomes since both infections lead to severe complications. In the early stages, COVID-19 and dengue share some of the clinical features including fever, headache, malaise, myalgia,

diarrhea, and weakness, making the differential diagnosis more challenging. The possible misdiagnosis of the two diseases may lead to delayed or, inappropriate treatment and poor allocation of available resources. Failing to recognize dengue timely, may lead to dengue related death which is preventable with appropriate management. In Nepal, all age group people are found infected with COVID-19 with highest number of cases in 20-60 years age group. COVID-19 related death mainly the older age people, low/no immune patients with co-infection with other health related diseases whereas dengue affects both younger and old age people.

CONCLUSION

As the country is focusing on COVID-19, the control of dengue disease may get inadequate attention, furthering

widespread transmission of these viruses. The country needs to take precautionary measures against both viral diseases and promptly devise strategies to address the potential double burden of these infections before it is too late. Strengthening of diagnostic facilities for both infections in all COVID-19 testing centers, and increasing the public awareness would help in prevention and control of these two viral diseases. Perhaps, testing COVID-19 among dengue suspects (or negatives) and vice-versa will also contribute to correct and timely diagnosis thereby prevent the patients from progressing into critical conditions. This is time for the dengue control program to resume all control activities in the country.

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REFERENCES

1. Wordometer.info [Internet]. 2020 [cited 2021 January 23]; Available from: <https://www.worldometers.info/coronavirus/>
2. EDCD. Epidemiology and Diseases Control Division, Ministry of Health and Population. COVID 19 Situat. Updat.2020; <https://www.edcd.gov.np/>. Accessed January 23, 2021.
3. Pandey BD, Rai SK, Morita K, Kurane I. First case of Dengue virus infection in Nepal. *Nepal Medical College Journal: NMCI*. 2004 Dec 1;6(2):157-9.
4. Poudel P, Sharma K, Dumre SP, Bastola A, Chalise BS, Shrestha B, et. al. Molecular study of 2019 dengue fever outbreaks in Nepal. *Trans R Soc Trop Med Hyg*. 2020; tra096.
5. Pandey BD, Pandeya K, Neupane B, Shah Y, Adhikary KP, Gautam I, et. al. Persistent dengue emergence: The 7 years surrounding the 2010 epidemic in Nepal. *Trans R Soc Trop Med Hyg*. 2015; 109:775-82.
6. Dumre SP, Acharya D, Lal BK, Brady OJ. Dengue virus on the rise in Nepal. *Lancet Infect Dis*. 2020; 20 (8):889-890.
7. Dhimal M, Gautam I, Joshi HD, O'Hara RB, Ahrens B, Kuch U. Risk factors for the presence of chikungunya and dengue vectors (*Aedes aegypti* and *Aedes albopictus*), their altitudinal distribution and climatic determinants of their abundance in central Nepal. *PLoS Negl Trop Dis*. 2015 Mar 16;9(3):e0003545.
8. Lansbury L, Lim B, Baskaran V, Lim WS. Co-infections in people with COVID-19: a systematic review and meta-analysis. *Journal of Infection*. 2020 Aug 1;81(2):266-75.
9. Lustig Y, Keler S, Kolodny R, Ben-Tal N, Atias-Varon D, Shlush E, et al. Potential Antigenic Cross-reactivity Between Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and Dengue Viruses. *Clinical Infectious Diseases*. 2020.