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## Co-Infection of Covid-19 and Dengue

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### Summary

This systematic review was carried out in order to gather current information that demonstrates the possibility of coexistence of covid-19 and Dengue infection. It is important to mention that the SARS-CoV-2 virus that produces the COVID-19 disease has not yet finished showing its scope, this is how new findings are discovered every day regarding forms of contagion, symptoms, evolution, new strains, immunity and association with other pathologies.

**Keywords:** Covid-19, Dengue, coinfection

### Introduction

The acute respiratory illness due to the new coronavirus (COVID-19) caused by the SARS-CoV-2 virus, has spread throughout the world in a pandemic that has carried more than 148 million reported cases and three million deaths as of May 2021. However, not all infected people have symptoms. Infection of an individual with SARS-CoV-2 can occur concurrently with other viral, bacterial, or fungal infections. In fact, the finding of patients with COVID-19 and other respiratory diseases is quite frequent. The cases of patients with coinfection are becoming more frequent, especially in pediatric patients who are immunologically more likely to contract one or more diseases such as: dengue and COVID-19 coinfection [1-4].

The concurrence of COVID-19 with dengue is of particular interest in the Region of the Americas. According to the Pan American Health Organization (PAHO), in 2019, 139,335 cases of dengue were reported in Region 3 (with an

incidence rate of 321.58 cases per 100,000 inhabitants), of which 0.9% corresponded to severe dengue. The fatality rate was 0.049% [10]. In the case of Argentina, in the 2019-2020 season, the largest of the outbreaks recorded before has been exceeded by more than 40% [5]. Of the total dengue cases registered during 2020, only 13 cases documented co-infection of covid-19 and Dengue.

### Materials and Methods

A detailed bibliographic search of information published since 2020 is carried out, in the databases pubmed, Elsevier, scielo, Update, medline, national and international libraries. We use the following descriptors: covid-19, Dengue, association between Dengue and covid-19. The data obtained oscillate between 5 and 15 records after the use of the different keywords. The search for articles was carried out in Spanish and English, limited by year of publication, and studies published since 2020 were used.

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## Results

A review of published work on the prevalence of asymptomatic people suggests that they represent between 40% and 45% of infected people, with a more conservative estimate of approximately 30%. Although it is established that asymptomatic people can transmit SARS-CoV, its role in contagion is still unclear. While some epidemiological studies suggest that transmissibility is similar in symptomatic and asymptomatic people, other authors find a lower transmission rate among the latter. The vulnerable group is made up of older adults and people with comorbidities such as lung problems, heart problems, diabetes, and arterial hypertension [6-8]. In April 2020, the World Health Organization (WHO) ruled on the situation of simultaneous transmission of both diseases and warned about a possible co-infection that leads to overlapping symptoms, misdiagnosis and extra difficulty in the management of the cases [9].

These outbreaks of dengue / covid-19 coinfection was a cause for concern in several countries in Latin America and Asia, and exposed the need for health management strategies [10-14]. In July 2020, PAHO declared an epidemiological alert for the dengue situation in the context of the pandemic. However, the impact on health and health systems is not yet clear. Recently, 13 cases of dengue and COVID-19 coinfection have been retrospectively identified in the Autonomous City of Buenos Aires (Argentina) and surroundings. A new study looking at the coronavirus outbreak in Brazil found a link between the spread of the virus and previous outbreaks of dengue, suggesting that exposure to mosquito-borne disease may provide some level of immunity against Covid-19 [15].

## Discussion

The etiological agent of dengue is the DENV arbovirus, of the Flaviviridae family, which has four serotypes. Infection with one serotype provides lifelong immunity against that serotype and short-term protection against heterologous serotypes. The main vector of dengue is the *Aedes aegypti* mosquito, also a transmitter of other arboviruses that cause Zika and Chikungunya. The most common presentation is with mild symptoms such as fever, headache, malaise, nausea, abdominal pain, and skin manifestations (rash). Dengue and COVID-19 do not share the etiological agent or the mode of contagion, they do show similarities, especially in the early stages. On the one hand, in both diseases, a large part of those infected have null or mild symptoms: fever, muscle aches and general discomfort. On the other

hand, both have the highest mortality in patients over 65 years of age [16].

The similarity in the early stages of both diseases could cause, in case of co-epidemic, delays in the diagnosis of dengue infection, SARS-CoV-2 or both. This adds additional difficulty to the diagnosis and suggests that a positive IgM or IgG serology result would not be sufficient for definitive confirmation of dengue [17]. On the other hand, the COVID-19 pandemic could negatively impact dengue control. One of the factors is that the population avoids or delays attending health centers due to the state of alert that is generated in society about the risks of contagion and the saturation of the health system. The increased stay in homes dictated by the mandatory social isolation measures being implemented in regions affected by COVID-19 could cause an increase in contagion. As another factor, we can mention the flow of health and economic resources towards COVID-19 that could affect the informational and environmental sanitation campaigns that are required to control a dengue outbreak [18]. The study led by Miguel Nicolelis, a professor at Duke University, which has not yet been published and which has been shared exclusively with Reuters, compared the geographical distribution of coronavirus cases with the spread of dengue between 2019 and 2020. The areas with the lowest rates of coronavirus infection and the slowest growth of cases were the places that had experienced severe outbreaks of dengue this year or last, Nicolelis found. This finding raises the intriguing possibility of a cross immunological response between dengue Flavivirus serotypes and SARS-CoV-2 in reference to dengue virus and novel coronavirus antibodies [19].

## Conclusion

Although there is still a lot of information to be analyzed, collected and documented, with the information found so far, we can infer that dengue and covid-19 coinfection, although it represents a complicated clinical case for the patient and health personnel, could mean an immunological advantage for those who present it since the studies carried out so far suggest the possibility that dengue could provide immunity to covid-19. The possibility of a growth in cases of patients coinfecting by both diseases after the Covid-19 pandemic should also be analyzed, as asymptomatic patients can become infected with dengue. For this reason, it is necessary to carry out molecular tests that rule out Covid-19 and to follow up from the appearance of clinical signs and symptoms even if the primary diagnosis is dengue or Covid-19 infection.

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