

Incidence of dengue virus in Peru during the COVID-19 pandemic.

Incidencia del virus de dengue en Perú, a lo largo de la pandemia de COVID-19

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Abstract

Dengue is a viral infection that causes approximately 400 million cases worldwide each year. **Methods:** an ecological study was conducted using secondary data. Several databases were constructed in Microsoft Excel for each of the regions studied. **Results:** there was an increase in the incidence of dengue cases throughout the COVID-19 pandemic. 2020 (1.75/100,000 inhabitants), 2021 (4.84/100,000 inhabitants), and 2022 (3.35/100,000 inhabitants). **Conclusion:** the number of cases of dengue increased in endemic regions and nationally throughout the COVID-19 pandemic.

Keywords: COVID-19, dengue, SARS-CoV-2, Peru

Resumen

El dengue es una infección viral que causa aproximadamente 400 millones de casos en el mundo cada año. **Métodos:** se realizó un estudio ecológico con datos secundarios. Se construyeron varias bases de datos en Microsoft Excel para cada una de las regiones estudiadas. **Resultados:** hubo un aumento en la incidencia de casos de dengue a lo largo de la pandemia de la COVID-19. 2020 (1,75/100 mil habitantes), 2021 (4,84/100 mil habitantes) y 2022 (3,35/100 mil habitantes). **Conclusión:** el número de casos por la infección de dengue aumentó en las regiones endémicas y a nivel nacional a lo largo de la pandemia de COVID-19.

Palabras claves: COVID-19, dengue, SARS-CoV-2, Perú

Dengue is a viral infection transmitted by the *Aedes aegypti* mosquito, which causes approximately 400 million cases worldwide each year. Globally, most cases are mild or asymptomatic, but a quarter of cases are clinically symptomatic and require hospitalization¹. Due to new epidemics, public health issues such as dengue have been neglected in Peru because of excessive prioritization and control of these new diseases. In March 2020, the World Health Organization (WHO) declared coronavirus disease (COVID-19) as a pandemic caused by SARS-CoV-2². While the Americas have reported the highest number of cases of COVID-19 infection to date, the Latin American region continues to suffer the ravages of dengue epidemics causing medical, socioeconomic and human overload¹⁻⁴.

Trends between COVID-19 and dengue epidemics in other countries will allow preventive measures to be taken to control both infectious diseases. The objective of this study is to determine the incidence of the number of dengue cases during the pandemic season in Peru.

Material and methods

An ecological study was conducted using secondary data. In addition, data on dengue cases in the last two years were evaluated as the unit of analysis and the regions defined as endemic by the Ministry of Health (MINSA), such as Loreto, Amazonas, Ucayali, San Martín, Piura, Huánuco and Ica, were considered. Information on the number of dengue cases was obtained from the Virtual Health Situation Room of the National Center for Epidemiology, Prevention and Disease Control (CDC) Peru⁵. This database contains the updated epidemiological information needed to know the health situation and trends of diseases subject to epidemiological surveillance in order to guide, prioritize and focus national, regional and local health interventions to control the health problems identified. Several databases were constructed in Microsoft Excel for each of the regions studied, as well as a database for all the regions of Peru. A formal narrative synthesis of the information obtained was made; a formal statistical synthesis was not performed. This study did not require approval from the ethics committee because it was an analysis of aggregated secondary data obtained from an open access public domain that does not allow the identification of the cases evaluated.

Results

In Peru, on March 6, 2020, the first case of COVID-19 was confirmed in a male patient approximately 25 years old with a recent travel history from Europe. Unfortunately, the country

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was facing a national emergency due to a dengue outbreak that began in late 2019⁶. Thus, in 2020, the Ministry of Health of Peru (MINSA-Peru) reported an incidence of 1.75/100,000 inhabitants, in 2021 an incidence of 4.84/100,000 inhabitants was reported, and by early 2022, MINSA had reported an incidence of 3.75/100,000 inhabitants⁷ (Table 1).

Simultaneously, from the first reported case of COVID-19, the infection by the SARS-CoV-2 virus saw an exponential increase in infections in the following months. From March 6, 2020, to February 8, 2022, MINSA reported 3,363,489 positive cases, 206,984 deaths, and a case fatality rate of 6.15% for COVID-19⁸. Moreover, regions in Peru (Ucayali, San Martín, Junín, Loreto, Piura, and Ica) not only have a considerable number of Dengue cases but also rank among the highest in lethality and mortality nationwide for COVID-19 (Table 2).

In the last two years of the pandemic, the total number of dengue cases was 13,399 in the Loreto region, 13,349 in the Ucayali region, 11,349 in the San Martín region, 11,823 in the Ica region, and 97,893 dengue cases with 17 deaths nationwide. Therefore, the number of dengue cases per million increased during the COVID-19 pandemic throughout Peru, especially in various endemic regions, except in Piura and Huánuco, where there was a decrease in dengue cases in the last two years of the pandemic, demonstrating that the incidence of dengue has changed between the pre-pandemic and pandemic years in Peru (Table 2).

The national graph shows an increase in the number of cases and deaths from dengue since the first notification of COVID-19 cases in these last two years (2020-2022), compared to the pre-pandemic years (2017-2019) (Figure 1).

Discussion

Since the first case of COVID-19 was reported in Peru, there has been a decrease in the number of reported Dengue cases in various endemic regions of Peru, a pattern consistent with those found in Brazil¹¹. This could be attributed to the epidemiological alert triggered by the surge in COVID-19 cases in Peru, affecting the epidemiological surveillance of Dengue, which may result in an underreporting of Dengue cases in regions and at the national level due to excessive prioritization for the prevention and control of emerging diseases, leading to the inadvertent neglect of endemic infectious diseases.

The Dengue virus is primarily carried by infected travelers across different regions of Peru, but as the government imposed mandatory quarantine, inter-regional travel was limited, causing a decrease in screening tests and fewer cases of Dengue virus diagnosis in the various endemic regions of Peru¹¹. Therefore, social isolation, quarantine, difficulties in accessing a Dengue diagnosis or other diseases, along with the population's concern about the risk of COVID-19 infection in health centers, in addition to other preventive measures implemented in Peru to counter the rise in COVID-19 cases, could have led to an actual increase in the incidence of the Dengue virus during the COVID-19 pandemic¹².

It is worth mentioning that both diseases share some epidemiological characteristics, such as increased incidence and difficult control. Moreover, COVID-19 and Dengue infections can be challenging to distinguish because they also share some clinical (fever, cough, myalgia, anorexia, headache) and laboratory characteristics^{6,9}. Therefore, the medical management of patients with either of these diseases represents a real public health challenge. Furthermore, although the fatality rate of Dengue in Peru is lower than that of COVID-19, some of the clinical manifestations of Dengue with warning signs may require hospitalization and admission to the Intensive Care Unit (ICU), according to Peruvian guidelines¹⁰.

Peru implemented drastic measures to mitigate the impact of COVID-19/Dengue. These included the issuance of two supreme decrees (N°044-2020-PCM and N°004-2020-SA). However, various limitations emerged in reducing the impact of the COVID-19 pandemic, for example, the scarcity of ICU and hospitalization beds, PCR diagnostic tests, oxygen in hospitals, healthcare personnel, and excessive iatrogenesis by doctors due to a lack of knowledge in diagnosing and treating this new disease, which, in sum, led to high COVID-19 mortality worldwide⁶.

Conclusion

The number of Dengue cases per million inhabitants has increased in various endemic regions of Peru, except in the Piura and Huánuco regions, where it has decreased during the COVID-19 pandemic. Therefore, co-epidemics of Dengue and COVID-19 in endemic countries, especially in Latin America and Asia, constitute a significant health, social, and economic burden. Moreover, it is essential to implement

Table 1. Dengue cases, incidence and deaths, Peru 2017*-2022*.

Year	2017	2018	2019	2020	2021	2022
N° Cases^a	227	183	175	578	1600	1105
Incidence per						
100 thousand	0,71	0,57	0,54	1,75	4,84	3,35
inhabitants						
Deaths^a	0	1	11	0	2	0

Source: National Center for Epidemiology, Disease Prevention and Control
MINSA, 2021. (*) Until week 16 of 2022.

Table 2. Number of cases and deaths due to Dengue and COVID-19, Peru 2020*-2022**.

REGION	Dengue		COVID-19	
	CONFIRMED CASES OF DENGUE (2020*-2022**)	NUMBER OF DEATHS DUE TO DENGUE (2020*-2022**)	COVID-19 CONFIRMED CASES (2020*-2022**)	NUMBER OF COVID-19 DEATHS (2020*-2022**)
HUANUCO	4,614	1	51,416	2,830
CAJAMARCA	4,309	■	94,781	4,366
CUSCO	4,627	0	115,317	5,055
PIURA	4,580	4	155,740	11,761
UCAYALI	13,349	2	39,175	3,130
TUMEN	8,954	2	114,082	7,348
SAN MARTIN	11,349	2	61,377	3,102
LORETO	11,899	2	57,566	4,351
AMAZONAS	3,364	1	43,279	1,325
ATAQUEO	5,335	■	47,825	2,280
PASCO	1,031	0	23,611	1,080
TUMBES	4,751	■	25,539	1,668
MADRE DE DIOS	4,593	3	17,548	827
ANCASH	57	■	111,948	7,006
LIMA	1,592	0	1,582,977	91,987
ICA	11,823	■	101,758	8,851
LAMBAYEQUE	1,447	0	104,403	9,111
LA LIBERTAD	875	■	144,735	10,823
PUNO	44	■	64,486	4,606
CALLAO	13	0	145,360	10,399
APURIMAC	0	■	37,260	1,597
AREQUIPA	7	0	208,663	10,100
MOQUEGUA	0	■	47,871	1,585
HUANCAVELICA	0	0	24,988	1,239
TACNA	0	■	52,384	2,080
PERU	97,893	17	3,496,009	209,468

Sources: Prepared by the author from the Center for Disease Control and Prevention dashboard, MINSA, 2022. (*)From week 18 of 2020; (**) Until week 06 of 2022.

control measures in conjunction with health facilities for the prevention of epidemics, as well as health measures that allow the proper deployment of healthcare personnel in highly endemic areas.

Declaration of conflict of interest:

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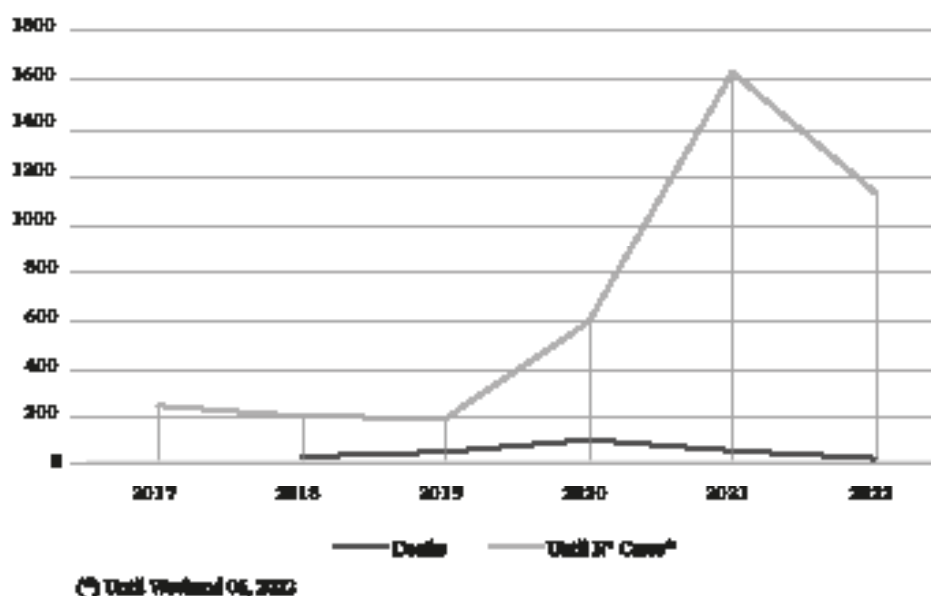


Figure 1. Number of cases and deaths due to Dengue and COVID-19, Peru 2020*-2022**.

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