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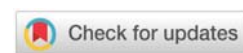
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Research article

Trend of Dengue Cases in Ecuador during the First Quarter of 2024

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Abstract

A retrospective cross-sectional descriptive study was conducted with the aim of describing the current situation of Dengue in Ecuador in the first quarter of 2024 and demonstrating the presence of an outbreak due to the significant increase in the number of cases. No sample calculation was performed as 100% of patients diagnosed with Dengue in the study period were used; 3 variables were addressed: frequency of cases, severe cases, and deaths, proportion statistics such as rate and percentage were used, and linear regression was used for trends. The study was extended to cases with warning signs to further visualize the alert situation in the country. The results showed a significant increase in cases in the context of a dengue outbreak in Ecuador, generating a warning of a significant increase in cases and a projection of an increasing number of cases in the coming years. Promoting the need to strengthen dengue control and prevention actions in the country.

Introduction

Dengue is the mosquito-borne arbovirus of greatest global concern because of its morbidity and mortality. It belongs to the Flaviviridae family, with a single-stranded RNA genome and a lipid envelope. It is transmitted through the human-mosquito-human cycle, with *Aedes aegypti* as the primary vector and *Aedes albopictus* as the secondary vector. Native to tropical and subtropical regions, the *Aedes* mosquito has spread to almost every continent, and its control is crucial for prevention [1]. *Aedes aegypti* and *Aedes albopictus* are effective vectors of the dengue virus, transmitting it from an infected person to a healthy one. They are diurnal and anthropophilic mosquitoes, preferring to bite humans. *Aedes aegypti* is endemic in tropical and subtropical regions, while *Aedes albopictus* is found in more temperate regions, and both are spreading due to international trade and climate change [2].

The highest number of dengue cases in the Americas was recorded in 2023, with a significant increase in the last decade [3]. In Ecuador, dengue is a public health priority due to the

numerous annual cases and epidemic cycles recorded. The WHO declared in 2019 that the only way to control dengue transmission is to control mosquitoes [4]. In the country, all four DENV serotypes are endemic and cause severe outbreaks in urban and rural areas.

Dengue control in Ecuador is crucial because of its impact on public health and the economy. Prevention and control of disease help to reduce the burden on health systems and protect the most vulnerable communities. Constant surveillance is essential for the adoption of timely measures to prevent outbreaks and minimize the impact of the disease [5].

Material and method

A descriptive cross-sectional study was conducted with the aim of describing the current situation of dengue fever in Ecuador, for which three strong indicators in the control and prevention of the disease were analyzed and compared: frequency of cases, frequency of severe cases, and case fatality rate. The study sample consisted of 100% of the reported cases of dengue in 2024 EW-11 (Epidemiological Week 11, 16 March

2024). Considering the current epidemiological situation of dengue in the Region of the Americas, as reported by the Pan American Health Organization, we compared the behavior of these indicators in the years 2023, previous years, and the course of the year 2024 up to epidemiological week 11. Basically, we used proportion statistics such as rate and percentage and linear regression for trends. Secondary databases obtained from reports and publications on the official pages of the country and the World and Pan American Health Organization were used.

Results

Analysis and discussion

In the first quarter of 2024, Ecuador reports a total of 13,075 with a percentage of severe cases of 0.35% (Table 1), which when compared to the percentage reported for the region in 2023 is below (0.45%). However, while it is true that this result is encouraging, as is the case fatality rate, which reaches a value similar to that reported in the Americas region in 2023 with 0.12%, it is worth noting that, if we analyse the fatality rate in terms of severe cases, but not in terms of the total number of cases, Ecuador would be reporting 32% versus 27% for the region. These results could raise several hypotheses, including that severe cases are diagnosed late, or that the integrated management of severe cases is not entirely effective. In the year 2023, Ecuador reported a case fatality rate with the same percentage of 0.12. Paradoxically, at the end of the year it reported a total of 27838 cases, while in just 11 weeks, i.e. in the first quarter of 2024, it reported 13,075 cases, i.e. 47% of the figure reported in 2023, which, if similar behaviour continues, would mean that by the end of the year, it would be reporting more than 52,000 cases, which would practically double the figure reported in 2023 [6]. This situation is not new in the region; countries such as Peru reported a similar situation in 2023 with a total of 270,000 reported cases and a case fatality rate of 0.17% (381 deaths), which is even higher than what Ecuador has been reporting [7,8]. In Colombia, during the same period, approximately 188,326 cases of dengue were reported, with an overall case fatality rate of 0.17% and a total of 325 deaths. Although the case fatality rate was like that of Peru, severe cases also contributed to mortality, with 701 cases classified as severe dengue [9,10].

The notable increase in the number of cases in Ecuador during the first quarter of 2024, together with the upward trend observed in recent years, is of significant health concern. When analysing Table 2, similar behaviour is evident in cases with warning signs. In addition, Graph 1, based on linear regression, projects an increase in these cases by 2024 [11]. The slope of 347.8 indicates that, on average, dengue cases with alarm signs increase by approximately 348 cases per year. The prediction for 2024 suggests that dengue cases with alarm signs could reach 3,369, which represents a significant increase compared to previous years. On a side note, it is important to mention that in 2020 there was a general decrease in the reporting of cases and therefore in cases with alarm signs, a situation possibly

attributed to the events triggered by the COVID-19 pandemic, it is very likely that if the expected reporting of cases had been maintained, the slope and the estimate of dengue cases in Ecuador would have been higher. This projected increase underlines the need for increased surveillance and monitoring for timely identification of cases, as well as efficient and comprehensive recognition of warning signs. In addition, comprehensive and effective management of cases with alarm signs and severe dengue is crucial. Therefore, there is a need to strengthen and develop the diagnostic and therapeutic capacities in place, as well as a greater expenditure of resources to address this situation.

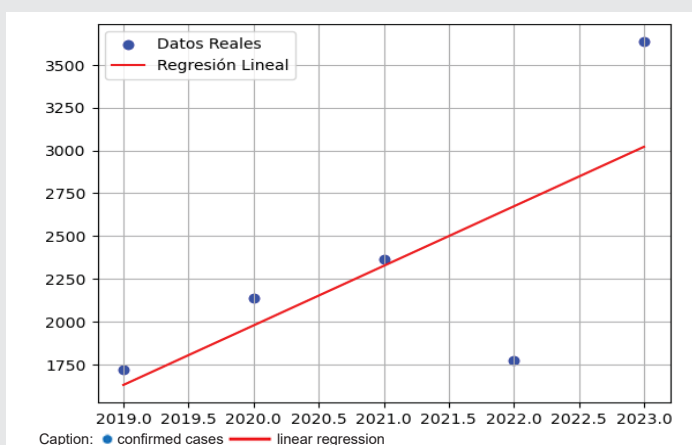
In the first quarter of 2024, the dengue situation in Latin America reached alarming figures, with more than 3.5 million cases reported and more than 1,000 deaths, representing a significant increase compared to the same period last year. This increase is attributed to climatic factors, such as climate change and high temperatures, which have favored the proliferation of the *Aedes aegypti* mosquito. Brazil remains the most affected country, with more than 2 million cases and a high number of deaths. The Pan American Health Organization (PAHO) has warned that this could be the worst dengue season in recent history, urging countries to redouble efforts in vector control and in training health personnel to detect severe symptoms. This critical situation highlights the urgent need to implement effective strategies to control the spread of dengue and protect vulnerable populations in the region [12-14].

Table 1: Frequency of cases, severe cases, and case fatality rate in the Americas 2023 versus First quarter (SE-11) Ecuador 2024.

Variables/ Indicators	Regions Americas 2023	2024 Ecuador SE 11.
Confirmed Cases	2053822	13075
Frequency of Severe Cases	9198	47
Percentage of serious cases	0,45%	0,35%
Deaths in frequency	2467	15
Fatality Rate	0,12%	0,12%

Table 2: Behavior in the frequency of severe dengue fever in Ecuador, 2019-2023.

Dengue	2019	2020	2021	2022	2023
Severe Dengue	38	51	79	109	112



Graph 1: Linear regression of dengue cases with alarm signs in Ecuador, 2019-2023.

Conclusion

In the first quarter of 2024, Ecuador reported 13,075 cases of dengue, representing 47% of the cases reported in all of 2023, with a percentage of severe cases of 0.35%, lower than the regional average of 0.45%. However, case fatality in severe cases is high (32% in Ecuador compared to 27% in the region), suggesting deficiencies in the early diagnosis and management of these cases. If current trends continue, Ecuador could double the number of dengue cases by the end of 2024, reaching more than 52,000 cases. This situation, like that observed in Peru and Colombia in 2023, underscores the urgent need to strengthen surveillance, improve training of health personnel, increase resources, and develop effective strategies to control the spread of dengue and protect vulnerable populations.

Recommendations

1. **Strengthen Surveillance and Training:** Implement ongoing surveillance and improve training of health personnel for early identification and comprehensive management of dengue cases, especially those with alarm and severe signs.
2. **Increase Resources and Control Strategies:** Allocate more financial and material resources for dengue prevention and control, including the development of diagnostic and therapeutic capacities, and the implementation of effective strategies such as insecticide use and community awareness campaigns.

References

1. Villacreses WL, Salazar JAS, Loor JAQ. Prevalence and risk factors in the global transmission of dengue. Multidiscip Peer-Rev Sci J PENTACIENCIAS. 2023;5(1):437-456. Available from: <https://doi.org/10.1371/journal.pone.0286789>
2. Aldridge RL, Gibson S, Linthicum KJ. Aedes aegypti controls AE. Aegypti: SIT and IIT-An overview. J Am Mosq Control Assoc. 2024;40(1):32-49. Available from: <https://doi.org/10.2987/23-7154>

3. Ministry of Public Health. Epidemiological Gazette. Government Platform for Social Development. March 16, 2024. Available from: <https://www.salud.gob.ec/wp-content/uploads/2024/03/GACETA-ENF-VECTORIALES-SE-11-2024.pdf>
4. Silverio-Calderón C. Dengue: Current events, clinical epidemiological characteristics and prevention. GESTAR Sci J Health Res. 2023;6(11 Esp Ed):2-17.
5. Loor-Frank LD, Mendoza-Rodríguez MC, Fuentes-Sánchez ET. Arboviruses in Ecuador: Epidemiology, diagnosis, clinical manifestations. MQRInvestigar. 2023;7(1):2929-2947. Available from: <https://doi.org/10.56048/MQR20225.7.1.2023.2929-2947>
6. Gacetas Vector 2023 - Ministry of Public Health. Gob.ec. Available from: <https://www.salud.gob.ec/gacetas-vectoriales-2023/>
7. Maguiña Vargas C. The dengue outbreak in Peru: Analysis and perspectives. Acta Med Peru. 2023;40(2):87-90. Available from: <https://doi.org/10.35663/amp.2023.402.2663>
8. Ledesma Negreiros G, Rodríguez Vásquez S, Valencia Hipólito JV. Clinical characteristics and epidemiological situation of dengue in Peru: A systematic review. Sci J Hum Med Nutr. 2024;17(1):2409. Available from: <https://cmhnaaa.org.pe/ojs/index.php/rcmhnaaa/article/view/2409>
9. Dengue Lethality During, EC. E. Colombia. 17-23 March 2024. Gov. co. Available from: https://www.ins.gov.co/buscador-eventos/BoletinEpidemiologico/2024_Bolet%C3%ADn_epidemiologico_semana_12.pdf
10. Martínez-Vega R, Sarti E. Epidemiological situation of dengue in Colombia: Analysis of recent outbreaks and projections for 2024. Rev Peru Med Exp Salud Publica. 2023;40(1):67-72. Available from: <https://doi.org/10.17843/rpmesp.2023.401.1234>
11. Gacetas Vectoriales - Ministry of Public Health. Gob.ec. Available from: <https://www.salud.gob.ec/gacetas-vectoriales/>
12. Maguiña Vargas C. The dengue outbreak in Peru: Analysis and perspectives. Acta Med Peru. 2023;40(2):87-90. Available from: <https://doi.org/10.35663/amp.2023.402.2663>
13. Dengue - Region of the Americas. World Health Organization. Available from: <https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON475>
14. Munayco CV. Notes from the field: Dengue outbreak - Peru, 2023. Centers for Disease Control and Prevention. February 1, 2024. Available from: https://www.cdc.gov/mmwr/volumes/73/wr/mm7304a4_ensp.htm

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