



Rising Dengue Burden and Climate Signals in Nepal, 2019–2024: An analysis for early warning and public-health preparedness

Dr Mukesh Poudel

Ministry of Health and Population (Nepal)

Dengue has expanded rapidly in Nepal, with transmission increasing beyond the traditional lowland areas and shifting from an occasional concern to a significant public-health problem. This study aimed to describe recent dengue patterns and assess associated climate variables to support early warning and preparedness. We reviewed dengue cases reported to Nepal's Early Warning and Reporting System from January 2019 to December 2024. We assessed the relationship between dengue cases and climate variables using lagged Spearman correlations and multiple linear regression models. Nepal reported 96,031 dengue cases and 229 deaths over six years. Annual cases increased from 11,381 in 2019 to 30,512 in 2024. Adults aged 20–40 years accounted for the largest proportion of cases (42.7%). The mean age among deaths was 47.40 years (95% CI: 45.12–49.68). Lumbini Province had the highest CFR (4.30 per 1,000 cases), and Gandaki recorded the highest incidence (9.10 cases per 1,000 population). Rainfall showed the strongest association with dengue cases at a 12-week lag ($r=0.56$), followed by temperature at 10 weeks ($r=0.37$) and humidity at 8 weeks ($r=0.31$). In multivariable models, rainfall remained the strongest predictor ($\beta=14.85$; $p<0.01$). Dengue has become a nationwide threat in Nepal and now affects age groups and regions that previously reported fewer cases. The 12-week gap between rainfall and rising dengue cases provides a clear lead time for outbreak preparedness, including targeted risk communication and clinical readiness. Climate-based surveillance can strengthen Nepal's early warning system and guide timely intervention in high-risk provinces.

