

## **ANALISIS SPASIAL, ENTOMOLOGI, DAN MOLEKULER KASUS DENGUE DI KABUPATEN BANTUL, DAERAH ISTIMEWA YOGYAKARTA**

Oleh:

Dila Hening Windyaraini

### **INTISARI**

Penyakit dengue termasuk dalam *re-emerging arboviral diseases* yang kasusnya meningkat seiring dengan mobilitas manusia dan efek pemanasan global. Kabupaten Bantul merupakan wilayah dengan kasus dengue tertinggi di DIY selama tahun 2020-2022. Penelitian ini bertujuan untuk mengidentifikasi pola spasial kejadian dengue, hubungan karakteristik demografis dan keberadaan hewan ternak/ peliharaan dengan kejadian dengue, kepadatan dan distribusi nyamuk vektor, transmisi transovarial dan serotipe virus dengue sampel nyamuk dari Kapanewon Banguntapan, Kasihan dan Sewon, Kabupaten Bantul. Analisis spasial diolah dengan *ArcGIS Desktop 10*. Parameter yang digunakan yaitu kasus dengue, kontainer positif larva, keberadaan kandang hewan ternak/ peliharaan, kepadatan penduduk dan kepadatan pemukiman. Pola persebaran kasus dianalisis dengan *Average Nearest Neighbor (ANN)*. Faktor risiko dengue dianalisis dengan kuesioner *Knowledge, Attitude and Practice (KAP)* dilanjutkan analisis bivariat dan multivariat. Kepadatan dan penyebaran nyamuk dianalisis dengan *House Index (HI)*, *Container Index (CI)* dan *Breteau Index (BI)* serta *Maya Index*. Transmisi transovarial virus dengue dilakukan dengan Imunositokimia Streptavidin-Biotin Peroxidase Complex (ISBPC), sedangkan deteksi serotipe virus dengue dilakukan dengan RT-PCR dengan primer *Lanciotti*. Hasil penelitian menunjukkan Kalurahan Banguntapan, Potorono dan Tirtonirmolo merupakan area *hotspot* dengue. Pola sebaran kasus dengue yaitu *clustered* (mengelompok). Jumlah anggota keluarga, riwayat dengue dalam keluarga, serta status pendidikan merupakan faktor risiko terhadap kejadian dengue. Keberadaan kandang ternak dan kontainer positif larva dapat menjadi salah satu faktor risiko dengue. Kapanewon Banguntapan dan Kasihan memiliki kepadatan dan penyebaran vektor yang tinggi, sedangkan Sewon memiliki kepadatan dan penyebaran vektor dengue yang rendah. Proporsi nyamuk vektor dengue yang terdeteksi positif virus dengue melalui transmisi transovarial di tiga kapanewon di Kabupaten Bantul yaitu 21,9% (*Ae. aegypti*) dan 18,8% (*Ae. albopictus*). Sementara itu, nilai MIR nyamuk *Ae. aegypti* dan *Ae. albopictus* di ketiga wilayah sebesar 5,7 sehingga belum berpotensi mengalami KLB dengue. Serotipe DENV-3 terdeteksi pada sampel nyamuk dari wilayah Kalurahan Potorono dan Wirokerten (Kapanewon Banguntapan) dan Kalurahan Pendowoharjo (Kapanewon Sewon), dan terkonfirmasi dengan sekuensing DNA. Semua hasil penelitian terintegrasi dalam *Geo-EntoHealth framework*. Hal ini mendukung penguatan *surveilans* dengue yang komprehensif di Indonesia.

Kata kunci: dengue, nyamuk, serotipe, spasial, transovarial

## **SPATIAL, ENTOMOLOGIC, AND MOLECULAR ANALYSIS OF DENGUE CASE IN BANTUL REGENCY, YOGYAKARTA PROVINCE**

By:  
Dila Hening Windyaraini

### **ABSTRACT**

Dengue fever is recognized as a re-emerging arboviral disease, with incidence rates escalating in association with increased human mobility and the impacts of global climate change. Bantul Regency had consistently reported the highest burden of dengue cases in the Special Region of Yogyakarta during the 2020–2022 period. This study sought to examine the spatial distribution of dengue incidence, the relationship between demographic characteristics and the presence of livestock or domestic animals with disease occurrence, the density and distribution of dengue vector populations, as well as the evidence of transovarial transmission and serotype identification of dengue virus in mosquito samples collected from Banguntapan, Kasihan, and Sewon sub-districts. Spatial analyses were conducted using *ArcGIS Desktop 10*, with parameters encompassing reported dengue cases, larva-positive containers, the presence of livestock/pet enclosure, population density, and settlement density. The spatial distribution of cases was further assessed using the Average Nearest Neighbor (ANN). Risk factor analyses were performed through a Knowledge, Attitude, and Practice (KAP) survey, followed by bivariate and multivariate statistical approaches. Vector density and distribution were evaluated using the House Index (HI), Container Index (CI), Breteau Index (BI), and Maya Index. Transovarial transmission of dengue virus was examined using the Immunocytochemistry Streptavidin-Biotin Peroxidase Complex (ISBPC), while virus serotyping was carried out by RT-PCR with Lanciotti primers. The results indicated that Banguntapan, Potorono, and Tirtonirmolo Villages represented dengue hotspots, with clustered patterns of case distribution. Household size, a family history of dengue, and educational status were identified as significant demographic risk factors. Moreover, the presence of livestock enclosures and larva-positive containers contributed substantially to the risk of transmission. Vector density and distribution were notably higher in Banguntapan and Kasihan, whereas Sewon exhibited relatively lower levels. The proportion of dengue vectors testing positive for dengue virus via transovarial transmission was 21.9% for *Aedes aegypti* and 18.8% for *Aedes albopictus*. The Minimum Infection Rate (MIR) value of 5.7 in the three sub-districts indicated that the potential for a dengue outbreak was still below the epidemic threshold. Serotyping confirmed the presence of DENV-3 in mosquito samples from Potorono, Wirokerten (Banguntapan Sub-district), and Pendowoharjo (Sewon Sub-district), further validated by DNA sequencing. Collectively, these findings were integrated within the Geo-EntoHealth framework, reinforcing the necessity of strengthening comprehensive dengue surveillance in Indonesia.

**Keywords:** dengue, mosquito, serotype, spatial, transovarial