Pemodelan Spasial Determinan Sosio-Ekonomi, Lingkungan, dan Karakteristik Populasi terhadap Prevalensi Diabetes Melitus Tipe 2 di Pulau Jawa Tahun 2023

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Abstrak

Diabetes melitus tipe 2 (DMT2) merupakan masalah kesehatan masyarakat yang terus meningkat di Pulau Jawa dengan variasi prevalensi antar kabupaten/kota. Perbedaan tersebut diduga berkaitan dengan karakteristik wilayah, namun variasi spasial hubungan determinan DMT2 masih belum banyak dikaji. Penelitian ini bertujuan menganalisis variasi hubungan antara determinan sosio-ekonomi, lingkungan, dan karakteristik populasi dengan prevalensi DMT2 pada tingkat kabupaten/kota di Pulau Jawa tahun 2023. Penelitian menggunakan desain studi ekologi dengan unit analisis 119 kabupaten/kota. Data sekunder diperoleh dari Survei Kesehatan Indonesia (SKI) 2023, Badan Pusat Statistik (BPS) 2023, dan Badan Pangan Nasional (Bapanas) 2023. Analisis meliputi analisis deskriptif, pemetaan sebaran, autokorelasi spasial, dan Geographically Weighted Regression (GWR). Hasil penelitian menunjukkan prevalensi DMT2 memiliki variasi yang cukup besar dan cenderung lebih tinggi pada wilayah administrasi kota. Analisis autokorelasi spasial menunjukkan pola pengelompokan (I=0,1891; p=0,001), dengan hotspot terkonsentrasi di kawasan Jakarta–Tangerang–Bekasi dan bagian utara Jawa Timur, sedangkan coldspot ditemukan di sebagian wilayah Banten, Jawa Barat, dan Jawa Tengah. Berdasarkan uji diagnostik dan perbandingan model, GWR merupakan model terbaik yang menunjukkan adanya heterogenitas spasial hubungan antara determinan dan prevalensi DMT2. Ketersediaan fasilitas kesehatan, Indeks Ketahanan Pangan (IKP), hipertensi, obesitas, dan riwayat merokok memiliki signifikansi serta kekuatan keterkaitan yang berbeda antarwilayah. Hasil ini menunjukkan bahwa pengendalian DMT2 memerlukan pendekatan berbasis karakteristik wilayah melalui penguatan deteksi dini, pengendalian faktor risiko, pemerataan layanan kesehatan, dan penguatan ketahanan pangan sesuai kondisi masing-masing wilayah. <hr /> Type 2 diabetes mellitus (T2DM) has become an increasingly important public health concern in Java, Indonesia, with substantial variation in prevalence across regencies and municipalities. These variations are likely related to differences in regional characteristics, however, the spatial heterogeneity in the relationships between T2DM determinants and disease prevalence remains underexplored. This study aimed to examine the spatial heterogeneity in the relationships between socioeconomic, environmental, and population characteristics and T2DM prevalence at the regency and municipality levels in Java in 2023. An ecological study design was employed using 119 regencies and municipalities as the unit of analysis. Secondary data were obtained from the 2023 Indonesian Health Survey (SKI), Statistics Indonesia (BPS), and the National Food Agency (Bapanas). The analyses included descriptive statistics, spatial distribution mapping, spatial autocorrelation analysis, and Geographically Weighted Regression (GWR). The findings revealed substantial geographic variation in T2DM prevalence, with higher prevalence predominantly observed in municipalities rather than regencies. Spatial autocorrelation analysis indicated a clustered pattern (I = 0.1891; p = 0.001), with clusters of high prevalence concentrated in the Jakarta–Tangerang–Bekasi metropolitan area and northern East Java, while clusters of low prevalence were identified in parts of Banten, West Java, and Central Java.

Based on diagnostic tests and model comparisons, GWR provided the best model fit, demonstrating significant spatial heterogeneity in the relationships between determinants and T2DM prevalence. Healthcare facility availability, the Food Security Index, hypertension, obesity, and smoking history showed differences in both statistical significance and the strength of local associations across regencies and municipalities. These findings suggest that effective T2DM prevention and control require geographically tailored strategies that strengthen primary healthcare, promote risk factor prevention and management, improve equitable access to health services, and enhance food security according to local contexts.