Analysis of the Distribution of Tuberculosis Disease (A15) Based on Geographical Conditions Using Quantum GIS in Jember Regency in 2021–2024

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ABSTRACT

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosisand remains a global and national public health problem. Indonesia ranks second in the world for the number of TB cases, and East Java is one of the provinces with the highest incidence. Jember Regency recorded 2,665 TB cases in 2024 with a prevalence of 102.3 per 100,000 population. This study aims to map the distribution of TB cases in Jember Regency from 2021 to 2024 and analyze the influence of physical and social environmental factors on their distribution. The study used a quantitative descriptive method with the assistance of a Geographic Information System (GIS) based on Quantum GIS (QGIS). The data used were secondary data from the Jember Regency Health Office as well as population and environmental data, including air temperature, humidity, rainfall, altitude, and population density. The results show that the distribution of TB in Jember Regency is spatially uneven and tends to be concentrated in the central and southern regions, such as Sumbersari, Mayang, Pakusari, and Ambulu Districts, which have high population densities. Conversely, the northern and western regions such as Sumberjambe and Gumukmas have a lower prevalence. Physical environmental factors such as an average temperature of 26.9–28.7°C, humidity above 70%, and an altitude of 100–500 meters above sea level are conditions that support the spread of TB. Overall, social factors have been shown to be more dominant than physical factors in influencing the spread of TB in Jember Regency. Population density, education level, and socioeconomic conditions have a strong correlation with the increase in cases. The results of this study are expected to serve as a basis for the Jember Regency Health Office in formulating a region-based TB control policy that integrates medical, social, and environmental aspects.

Keywords: Tuberculosis, Physical Environmental Factors (Geographic), Social Environmental Factors, Quantum GIS