

ABSTRACT

Tuberculosis (TB) is a disease with a high case burden in Indonesia, especially on the island of Java, including Central Java Province. The risk of mortality in TB patients is influenced by various individual factors as well as the possibility of variation across regions. This study aims to analyze the factors that influence the risk of mortality in TB patients using the Cox Proportional Hazard (CPH) method and the Geographically Weighted Cox Proportional Hazard (GWCoxPH) method. The variables used include age, sex, anatomical location, history of diabetes mellitus, and HIV status. The results of the global analysis using the CPH model show that, in general, all covariates influence the risk of mortality, with most variables being significant based on p-values. The spatial analysis using GWCoxPH shows that the effect of covariates is not homogeneous across regions. Local estimation and map visualization show the existence of variations in effects across areas. Spatially, TB patients with the age category > 59 years and patients with positive HIV status have a risk of mortality based on the hazard ratio values of approximately 6 times and 5 times greater, respectively, compared to their reference categories. The comparison of model performance shows that GWCoxPH has a Takeuchi Information Criterion (TIC) value of 33,837.15, which is lower than the global CPH model value of 50,910.68, thus it is better in representing the data by considering spatial heterogeneity. These results emphasize the importance of a spatial approach in survival analysis to support more targeted health policy decision-making.

Keywords: Tuberculosis, Survival Analysis, Cox Proportional Hazard, Geographically Weighted Cox Proportional Hazard, Takeuchi Information Criterion