ABSTRACT

Diarrhea is an environmentally based disease that remains a public health problem in Indonesia, including in the City of Surakarta. The data on the number of diarrhea cases in Surakarta constitute discrete (count) data that indicate the presence of overdispersion as well as spatial effects across areas, thus requiring an analytical approach capable of accommodating both characteristics. This study aims to model the number of diarrhea cases in the City of Surakarta in 2023 and to determine the best model and the influencing variables by considering spatial aspects. The methods used in this study are *Geographically Weighted Generalized Poisson Regression* (GWGPR) and *Geographically Weighted Negative Binomial Regression* (GWNBR). The predictor variables include population density, elevation, distance to health facilities, slope, distance to rivers, and distance to landfill sites (TPA). Spatial weighting was applied using an *adaptive bisquare kernel.* The best model was selected based on the *Akaike Information Criterion* (AIC). The results show that the GWGPR model produces 6 regional groups based on combinations of significant predictor variables, whereas the GWNBR model produces 5 regional groups. Based on the AIC values, the GWNBR model has the smallest AIC value, 617.50, indicating that it is the best model for modeling the number of diarrhea cases in the City of Surakarta in 2023. According to the best model (GWNBR), the variables influencing the number of diarrhea cases vary across regions, with combination of elevation, distance to health facilities, and distance to rivers being the most dominant variables.

Keywords: Diarrhea, Count Data, Overdispersion, *Geographically Weighted Generalized Poisson Regression, Geographically Weighted Negative Binomial Regression*