

Impact of covid-19 pandemic on traffic volume and air quality in urban areas

ABSTRACT

The large transmission of COVID-19 has resulted in a deep impact on the surrounding urban environments, especially on air quality and traffic flows. The objective of this study was to analyze air pollutant concentrations (PM10, SO₂, NO₂, CO, and O₃) and traffic volumes at five congested districts (Bundaran HI, Kelapa Gading, Jagakarsa, Lubang Buaya, and Kebon Jeruk) within Jakarta city impacted by the large-scale social restriction (LSSR) policy. Air quality data during three periods; before, during, and after the LSSR at five observed districts was obtained from the Department of Environment of Jakarta using the Air Quality Monitoring (AQMS) tool. While vehicle speed data were obtained from the waze data during the study period. In this study, air pollutant data during three periods; before, during, and after the LSSR were compared with vehicle speed and meteorological data using a statistical analysis. Results revealed the mean traffic volume at all five districts has greatly reduced by 19% from before to during the LSSR period. It was consistent with the mean PM10, NO₂, CO, and SO₂ concentrations which also dropped about 46%, 45%, 30%, and 23% respectively. In contrast, the concentrations of air pollutants significantly increased after the LSSR period. During the LSSR period, the traffic volume was negatively associated with the O₃ concentration ($r = -.86, p < .01$), it was different with before the LSSR periods where the traffic volume associated with CO ($r = .88, p < .01$) and NO₂ ($r = .89, p < .01$). The broad analysis of changes in air pollutants and traffic volumes can be used by the authorities to arrange a good air quality management and an effective way for current and future scenarios.