Effects of ambient air pollutants on cardiovascular disease hospitalization admission

ABSTRACT

BACKGROUND AND OBJECTIVES: Air pollution is associated with population growth and economic advancement. Severe cardiovascular complications that require extensive medical service are aggravated by air pollutants. This study illustrates the trend and correlation of cardiovascular disease hospital admission with air pollutants in Sabah for the past 9 years (2010–2019). The additional information obtained from this study will be useful to enhance proper environmental management and reduce air pollution in the cities of Sabah. METHODS: Ecological study design was utilized with cardiovascular disease hospital admission and ambient air pollutants in Sabah retrospective data. Data were collected from four districts with established continuous air quality monitoring stations. Collected data were analysed spatially and statistically. Autoregressive integrated moving average modelling was implemented to forecast the cardiovascular disease hospital admission. FINDINGS: Kota Kinabalu recorded the highest hospital admissions for cardiovascular disease, followed by Sandakan, Tawau and Keningau. The cardiovascular disease hospital admission prevalence rate in Kota Kinabalu was 12.45 per 1,000 population, followed by Sandakan, Tawau and Keningau (4.54; 4.18; and 5.88 per 1,000 population) in 2019. The cardiovascular hospital admissions increased in Kota Kinabalu, Sandakan and Tawau. The nitrogen dioxide (<0.04 ppm), carbon monoxide (<9 ppm), ozone (<0.05 ppm) and PM10 (<100 μg/m^3) gases detected are below the national standard limit levels. In the later years of the series, the ozone and fine particulate gases intensify. Carbon monoxide has the highest positive correlation with cardiovascular disease hospital admission compared to other air pollutants. The autoregressive integrated moving average (0,1,1) with carbon monoxide and ozone as external regressors is the model with minimum Akaike information criterion. CONCLUSION: The carbon monoxide concentration in ambient air illustrates a potential risk for the increasing cardiovascular disease hospital admission number in Sabah. The study findings provide evidence-based source for the healthcare management team, policymakers, and community to sustain clean and safe ambient air.