

Effects of Outdoor Air Pollution on Outpatient Visits for Eye Diseases

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Abstract:

This study conducts an in-depth analysis of the impact of outdoor air pollution on eye diseases in Taiwan, examining the harmful effects of natural and anthropogenic air pollution on conjunctivitis and dry eye syndrome outpatient visits between 2000 and 2019, using data from the National Health Insurance Research Database (NHIRD) and Environmental Protection Administration. The study covers natural pollution sources such as Asian dust storms and anthropogenic pollutants from factories and motor vehicles, including PM10, PM2.5, NO₂, SO₂, O₃, and CO₂. Using the ARMA time series model, the analysis reveals that PM10, PM2.5, NO₂, and O₃ are significantly associated with increased outpatient visits, with NO₂ showing the strongest correlation. Specifically, PM10, PM2.5 and O₃ mainly affects conjunctivitis, while NO₂ has a significant impact on both conjunctivitis and dry eye syndrome. In contrast, natural pollutants like dust storms and anthropogenic pollutants like SO₂ show no significant impact on the aforementioned diseases. Among the two eye conditions, conjunctivitis is the most susceptible to changes in air pollution, with increases in PM10, PM2.5, NO₂, and O₃ concentrations leading to a rise in the number of outpatient visits for this condition. Dry eye syndrome is primarily affected by NO₂, while PM10, PM2.5, and O₃ have localized effects, particularly increasing the incidence of dry eye syndrome in specific age groups. The study suggests that relevant authorities should further reduce the concentration of these air pollutants to enhance public health.

Keywords:

Outdoor air pollution, eye diseases, conjunctivitis, dry eye syndrome.