Seasonality in Adult Asthma Admissions, Air Pollutant Levels and Climate: A Population-based Study

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Abstract

OBJECTIVE AND BACKGROUND: Most studies of asthma seasonal variations have not examined associations of environmental risk factors and climatic changes associated with seasonality in asthma hospitalizations. This study used population-based data to examine seasonality in asthma admissions and the associated seasonality in levels of air pollutants and climatic factors during a 4-year period in Taiwan. METHODS: A total of 126,671 asthma hospitalizations in Taiwan during 1998-2001 operationalized as monthly admissions per 100,000 population and monthly mean levels of criterion air pollutants and meteorological factors were subjected to Auto-Regressive Integrated Moving Average to test for seasonality and association between asthma admission rates and the pollutant and climatic factor levels. Owing to significant differences in seasonality between pediatric and adult age groups, this study was limited to 99,591 adult asthma cases to examine the seasonality issue as related to the criterion air pollutants and climatic factors using Spearman rank correlations. RESULTS: Seasonal trends showed a hospitalization peak in January through March and a sharp decline beginning in April to a trough in June for both sexes. Seasonal variations in adult asthma admissions were significantly positively correlated with levels of PM10, SO2, CO, NO2, and atmospheric pressure and negatively correlated with temperature and hours of sunshine. CONCLUSIONS: Adult asthma hospitalization propensity is highest in spring and is significantly correlated with air pollution and climate. Air quality control programs and early public warning systems on pollution and atmospheric factors are needed to enable predisposed individuals and their physicians to preempt attacks through primary and secondary preventive measures.