Analysis on the Relationship between the Concentration of Particulate Matter and Mortality from Respiratory and Cardiovascular Diseases

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Concerns over particulate matter are growing rapidly as the number high concentration days are increasing. Since 2015, PM2.5 has been set as a national ambient air quality standard and frequency of Asian dust or mists and precursors coming from the west of Korea has increased. Various studies have been conducted on the distribution and composition of particulate matter. The particulate matter is known to be the main cause of respiratory and cardiovascular disease, such as vascular dysfunction, asthma and the occurrence of chronic bronchitis. As the paradigm of air quality management policy changes from controlling, treating and reducing sources to taking into account the damage of a receptor including assessing health risks, it is necessary to establish scientific policies by quantitatively assessing the health effects of the particulate matter and calculating health benefits. To do this, a quantitative assessment of the health risks of particulate matter is essential. The purpose of this study is to analyze the effects of changes in the daily average concentration of particulate matter on the mortality of respiratory and cardiovascular diseases in Busan, Korea. In this study, we employed a generalized additive model (GAM) with a quasi-Poisson to assess the association between daily mean particulate matter and mortality. A penalized spline function was used to adjust the seasonal pattern and long-term trend in daily mortality and the nonlinear mortality effects of the weather. Based on this, a model between the death rate and daily average particulate matter was established and the change in the mortality rate of respiratory and cardiovascular diseases was analyzed according to the change in particulate concentration. The daily mean particulate matter were calculated using hourly PM2.5 and PM10 data provided the Environment Ministry of Korea and the causes of death from 2015 to 2017 were provided by the National Statistical Office's 'Micro Data Service'.

Keywords: Particulate Matters, Mortality, Respiratory Diseases, Cardiovascular Diseases

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