

TEMPERATURE MODIFICATION ON THE ASSOCIATION BETWEEN OZONE AND MORTALITY IN THE 3 MAJOR CITIES, SOUTH KOREA

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Background and Aims: Patterns of air pollutions are driven by weather. Particularly, ozone is correlated with temperature. Along with this, both temperature and ozone are associated with human health. Several studies have been suggested that apparent ozone effects could be to heat or an interaction between temperature and ozone could be plausible. In this study, we examined whether temperature modifies the associations between ozone and mortality.

Methods: The data consisted of daily time series of death counts, weather variables, and air pollutants from January 1999 to December 2009 in Seoul, Busan, and Daegu. We used a poisson regression model to fit a bivariate response surface in order to examine patterns of interaction of both ozone and temperature on mortality. To quantitatively estimate the ozone-mortality associations across different temperature levels, we separately fitted the stratification model.

Results: When temperature (lag 0) was high (above the threshold temperature), for a 10ppb increase in ozone concentration, the contributions of non-accidental deaths in all ages population were 1.13% (95% confidence interval [CI]: 0.45~1.80%), 1.88% (95% CI: 0.87~2.88%), and 4.51% (95% CI: 2.99~6.00%) in Seoul, Busan, and Daegu, respectively. When temperature (lag 0) was low (below the threshold temperature), for a 10ppb increase in ozone concentration, the contributions of non-accidental deaths in all ages population were 0.22% (95% CI: -0.25~0.69%), 1.15% (95% CI: 0.32~1.97%), and 0.68% (95% CI: -0.25~1.61%) in Seoul, Busan, and Daegu, respectively.

Conclusions: The results of this study show that temperature modified ozone-mortality associations. We recommend that public health strategies to minimize adverse health impact of heat and ozone should be considered within control and prevention of air pollution and weather-related health impacts.