DOES TEMPERATURE MODIFY THE MORTALITY EFFECTS OF AMBIENT PARTICLE POLLUTION IN GUANGZHOU CITY, CHINA

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Background and Aims: Adverse health effects of PM$_{10}$ and high temperature on mortality are widely accepted. However, only a few studies have focused on evaluating the temperature modification effects on the association of PM$_{10}$ and mortality in Asia. The aim of this study was to explore the modification effects of temperature on the association between PM$_{10}$ and cause-specific mortality for cardiovascular, respiratory, cardiopulmonary, stroke, as well as non-accidental mortality in Guangzhou from 2008 to 2009.

Methods: This present study used a generalized additive model to analyse PM$_{10}$, mortality and covariate data. The estimates of temperature modification on PM$_{10}$ effects on mortality were obtained from the main effects and PM$_{10}$-temperature interaction models.

Results: The PM$_{10}$ effects were strongest on extremely high temperature days, less strong on extremely low-temperature days, and weakest on normal-temperature days. The interactions between PM$_{10}$ and high temperature were found statistically significant on daily non-accidental, cardiovascular, cardiopulmonary mortalities. The effect estimates of the mean percentage of change in daily mortality per 10-$\mu g/m^3$ increase in PM$_{10}$ concentrations at the average of lags 0 and 1 day in hot temperature level were 3.01% (95% CI: 0.93-5.14) for non-accidental, 4.26% (0.92-7.70) for cardiovascular, 5.26% (1.14-9.55) for respiratory, 4.67% (1.90-7.52) for cardiopulmonary, 5.35% (-0.04-11.04) for stroke mortalities.

Conclusions: This suggests that extreme temperature can modify the effects of particulate matter on mortality, and it is important to control and reduce the emission of air particles in Guangzhou, particularly in extremely high/low temperature days.

References:

