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

Guoxing Li, *Occupational & Environmental Health Sciences Department, School of Public Health, Peking University Health Science Center,P.R.China.*

Maigeng Zhou, *Center for Public Health Surveillance and Information Service, Chinese Center for Disease Control and Prevention, P.R.China.*

Yajuan Zhang, *Occupational & Environmental Health Sciences Department, School of Public Health, Peking University Health Science Center,P.R.China.*

Yue Cai, *Center for Public Health Surveillance and Information Service, Chinese Center for Disease Control and Prevention, P.R.China.*

Xiaochuan Pan, *Occupational & Environmental Health Sciences Department, School of Public Health, Peking University Health Science Center,P.R.China.*

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 medication 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 cardiovascualr, 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 significancent on daily non-accidental, cardiovascular, cardiopulmonary mortalities. The effect estimates of the mean percentage of change in daily mortality per 10-ug/m3 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 mortaliy, and it is important to control and reduce the emission of air particles in Guangzhou, particularly in extremely high/low temperature days.

References:

Li G, Zhou M, Cai Y, Zhang Y, Pan X(2011) Does temperature enhance acute mortality effects of ambient particle pollution in Tianjin City, China. Sci Total Environ 409:1811-1817.

Kan H, Chen B(2003) Air pollution and daily mortality in shanghai: A time-series study. Arch Environ Health 58:360-367.

Baccini M, Biggeri A, Accetta G, Kosatsky T, Katsouyanni K, Analitis A, Anderson HR, Bisanti L, D'Ippoliti D, Danova J, Forsberg B, Medina S, Paldy A, Rabczenko D, Schindler C, Michelozzi P(2008) Heat effects on mortality in 15 european cities. Epidemiology 19:711-719.

Chung JY, Honda Y, Hong YC, Pan XC, Guo YL, Kim H(2009) Ambient temperature and mortality: An international study in four capital cities of east asia. Sci Total Environ 408:390-396.