HEALTH EFFECT OF FINE PARTICULATE MATTER ON DAILY EMERGENCY ROOM VISITS OF CARDIOVASCULAR DISEASE: A TIME-SERIES STUDY

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Background and Aims: Beijing, as the host of Olympics 2008, is developing quickly in economic and social areas. The air pollution pattern has been changing from the traditional coal burning pollution to complex pollution with vehicle exhaust, biomass combustion, dust from nature and construction, energy power and others. To evaluate the association between air particulate matter and daily hospital emergency room visits (HERVs) of cardiovascular disease, we performed a time-series analysis on health effects of air pollution. in Beijing.

Methods: A Poisson regression for the association of the daily air pollutants with daily HERVs for cardiovascular disease in Beijing from 2007.1.1-2008.12.31 was performed using generalized additive model. The effects of time trend, seasonal variations, temperature and humidity were adjusted by smooth functions. Daily mean concentration of SO_2, NO_2, PM_{10} and $PM_{2.5}$ were introduced into the core model. Relative risks (RR) of cardiovascular disease (per10ug/m3 increase in air pollutant concentration) were calculated. Lagged effects of air pollutants and multi-pollutant model were concerned as well.

Results: The results showed consistent correlation between air pollutants and daily HERVs. The increase of daily number of HERVs for cardiovascular disease for a 10ug/m3 increase in SO_2, NO_2, PM_{10}, $PM_{2.5}$ were: 0.36% (0.29%~1.01%), 1.02% (0.00%~1.74%), 0.32% (0.09%~0.55%), and 0.41%(0.19%~0.90%), respectively. The relative risks for daily HERVs in sub-categories and elderly were slightly higher. The multi-pollutants models showed the effects of SO_2 were the most stable, while the $PM_{2.5}$ had small increase when the gases were introduced into model. This study also found lagged effect of particulate matter on daily HERVs for cardiovascular disease.

Conclusions: The current air pollution in Beijing has a harm effects on daily cardiovascular emergency room visits. The effects of particulate matter were more considering, while the elder population is the most sensitive.