

AIR POLLUTION AND BLOOD PRESSURE IN BEIJING, CHINA

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Background: Particulate Matter (PM) air pollution is critical in Beijing, China, due to very high population density, rapid increase in the number of vehicles, and limited control of industrial emissions. PM effects on blood pressure (BP) have been investigated as a mechanism mediating cardiovascular risks, but results have been inconsistent.

Methods: The Beijing Truck Driver Air Pollution Study (BT DAS) was conducted shortly before the Beijing 2008 Olympic Games (June 15-July 27, 2008) and included 60 truck drivers and 60 office workers in Beijing. PM_{2.5} measured during work hours using portable small-sized monitors and post-work BP measurements were obtained on two different days, separated by 1-2 weeks. We used ambient PM₁₀ data averaged for the 5 days before the study from 27 monitoring stations operating in Beijing. Mixed-effect regression models were used to examine associations of exposures (occupational group, personal PM_{2.5}, or ambient PM₁₀) with BP controlling for age, gender, BMI, day of the week, smoking, pack-years and cigarette/day, work hours/week, tea, alcohol, and outdoor temperature.

Results: Mean personal PM_{2.5} was 94.6 µg/m³ (SD=64.9) in office workers and 126.8 (SD=68.8) in truck drivers (p<0.001). Systolic (SBP), Diastolic (DBP) and mean (MAP) BP was not different between the two groups (p>0.14). Also, personal PM_{2.5} during work hours was not associated with BP. In all subjects combined, a 10 µg/m³ increase in 5-day ambient PM₁₀ was associated with BP increments equal to 0.63 (95%CI 0.09-1.16), 0.50 (95%CI 0.06-0.95), and 0.55 (95%CI 0.13-0.96) mmHg for SBP, DBP, and MAP, respectively.

Conclusions: Our study shows a delayed effect of ambient PM₁₀ on BP. The absence of associations with the exposure group and with personal PM_{2.5} measured during work hours indicates that the PM₁₀ effects are related to the background levels of particulate pollution in Beijing, rather than to traffic exposure.