

# THE BIOLOGICAL EFFECTS OF AMBIENT FINE PARTICLES ON CARDIOVASCULAR RISK IN CITY RESIDENTS

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**Background and Aims:** Several studies have found that long-term exposure to particulate matter is an important environmental risk factor for cardiopulmonary disease morbidity and mortality, especially for particles with aerodynamic diameters under 2.5 micron fine particles. It is a challenge to elucidate the underlying pathophysiological mechanisms linking specific characteristics of fine particles and cardiovascular toxicity. The study aims to explore the association between long-term exposure to traffic-related fine particles air pollution and biological effects in cardiovascular system.

**Methods:** The participants included 420 men and women aged from 45-75. The distances between participants' residences and major roads were categorized as • 50 m, 51–100 m, 101–200, and > 200 m. Concentration of fine particles were measured using SIDEPAKTM AM510 (TSI, USA) in 2010. Personal exposure to traffic particle was measured using AM510. Aortic augmentation index (AI) and heart rate variability (HRV) were determined using Model SKY-A4 Bioelectric Signals Processing System. Meanwhile, heart rate and blood pressure were measured. The association between long-term exposure to fine particles and AI, HRV, heart rate and blood pressure were analyzed with sex-stratified multiple linear regression analyses.

**Results:** The results showed that the concentrations of fine particles were 125, 94, 57 and 67• g/m<sup>3</sup> in January, April, July and October, respectively. Meanwhile, fine particles concentrations were correlated with residential proximity to major road. The concentrations were 108, 99, 71 and 64 • g/m<sup>3</sup>, respectively. In the adjusted analysis, fine particle exposure was associated with the decrease of HRV and increase of AI and blood pressure.

**Conclusions:** Traffic-related fine particles air pollution was associated with the cardiovascular risk. These results added to the evidence that long-term exposure to ambient fine particles associated with increased cardiovascular injury.