

EFFECTS OF THE METAL COMPONENTS OF AIR PARTICLES ON PEAK EXPIRATORY FLOW RATE OF THE SCHOOLCHILDREN

Lina Madaniyazi, *Department of Occupational & Environmental Health Sciences, School of Public Health, Peking University, P.R. China*

Dae-Seon Kim, *National Institute of Environmental Research, South Korea*

Jiajia Wang, *Department of Occupational & Environmental Health Sciences, School of Public Health, Peking University, P.R. China*

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

Background and Aims: The acute effect of the metal components of air particles on schoolchildren's pulmonary function has not been adequately evaluated. This study was conducted to explore the relationship between the metal elements in ambient particulate matter and the peak expiratory flow rate (PEFR) of the exposed schoolchildren in China.

Methods: Panel study design. 225 primary schoolchildren in Baotou city were recruited for the studies in 2005 and in 2006, respectively. In the study the PEFR values of the subjects were measured with a mini-wright peak flow meter, three times a day and recorded by themselves for 40 days continuously with a standard procedure. The basic information such as gender, age, height, weight, asthma attack and family history of chronic respiratory disease, etc. were collected by the questionnaire from the children and their parents. The daily mass concentration of PM₁₀ and PM_{2.5} was monitored every day. The contents of K, Ca, Na, Mg in the PMs were determined with X ray emission spectrometry, while Pb, Cr and Cd were determined with Atomic Absorption Spectroscopy. The SPSS 13.0 was used for statistical analysis of the data.

Results: A negative correlation was observed between the average PEFR values of the subjects and the concentration of Ca, Na, Mg both in PM₁₀ and PM_{2.5} ($P < 0.01$). The PEFR level was negatively associated with one lag-day level of Pb both in PM₁₀ and PM_{2.5} ($P < 0.01$). The level of Cr in PM_{2.5} had a negative effect on the average PEFR values ($P < 0.01$), while the effect was shown more significantly 1 day after exposure to Cr ($P < 0.01$).

Conclusions: It suggested that the concentrations of metal elements in PM such as Na, Mg, Ca, Pb and Cr are negatively associated with PEFR values of the exposed schoolchildren.

Reference:

Yun-Chul Hong, Seung-Sik Hwang, Jin Hee Kim, Kyoung-Ho Lee, Hyun-Jung Lee, Kwan-Hee Lee, Seung-Do Yu and Dae-Seon Kim (2007) Metals in Particulate Pollutants Affect Peak Expiratory Flow of Schoolchildren . Environ Health Perspect 115:430–434.