ENVIRONMENT EXPOSURE OF HEAVY METAL LEAD TO CHILDREN, P. R. CHINA: AN INVESTIGATION FROM SYSTEMATIC LITERATURE

Xiaoping Li¹, Ting Wu, Yanan Zhao and Dongmei Liu

¹Department of Environment Science, Shaanxi Normal University, No. 199 Chang’an South Street, Xi’an, Shaanxi, 710062, P.R.China
Center of Nano-environment Science and Health, Shaanxi Normal University, No. 199 Chang’an South Street, Xi’an, Shaanxi, 710062, P.R.China

Abstract: Lead (Pb) is a kind of toxic metal, widely distributing in the environment. It has seriously effects on the children’s abilities of mentality and behavior. This paper presents a systematic analysis from the lead dataset in urban soils (n=11365) and children Blood Lead (BL) (n=50038) in 35 Chinese cities collected from 2000-2014. We combine SPSS software, ArcGis techniques and assessment model to evaluate the spatiotemporal complexity of lead in soil and in children’s blood variables with an aim to understand their relationship and its spatiotemporal changes. Thematic analysis results that the soil lead (SL) with the mean of 50.82 mg·kg⁻¹ and mean of 66.39 μg·L⁻¹ in children blood. The studies identify an empirical curvilinear association between children’s BL and SL dataset in tracts: BL=21.06+11.92×ln(SL+0.17) R²=0.2838 (28.38%). The relatively low R² value shows the contribution of SL to children's blood lead is about 30%. The spatiotemporal maps of BL and SL are observed that the distributions of them in eastern China are higher than others, smaller observed in the middle areas of China, and the southern areas are higher than those of north. However, the extram are observed in bigger cities or industrial urban. Extrapolating from the results, it is not neglected the environment exposure of lead to children in China even though lead in gas line was phased out after the year of 2000. These results reinforce the proposal that prevention of childhood Pb exposure must include SL remediation as demonstrated by a Chinese pilot project and a proactive Chinese government program.

Key Words: Environment exposure; lead; blood lead (BL); soil lead (SL); children’s health

Acknowledgements: The authors gratefully acknowledge the financial support of the National Natural Science Foundation of China (41471420 and 41571512), the Natural Science Foundation of Shaanxi Province (2015JXM4124) and Fundamental Research Funds for the Central Universities (GK 200902024, GK201402032 and GK201503052).