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Metal exposure and risk of diabetes in the Jinchang cohort

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Statement of the Problem: With the global environment change, people begin to pay close attention to the correlationship between the heavy metals of environmental pollution and the development of T2DM. The research is to estimate the relationship on heavy exposure and T2DM , and to investigate the association between multiple metals exposure and dysregulation of glucose homeostasis on Jinchang cohort.

Methodology & Theoretical Orientation: In 2011-2013, we established Jinchang cohort including 47,998 participants in china. Logistic regression was used to study the association between three occupational groups categorized according to the likely metal exposure levels and risk of these diseases. Urinary arsenic, cadmium, cobalt, copper, nickel and zinc of 464 occupational workers in Jinchang cohort were detected by inductively coupled plasma quadruple mass spectrometry (ICP-MS). Logistic regression model was used to evaluate the association of metal exposure with high-FPG (≥ 75th percentile) and risk of dysglycemia (diabetes and impaired fasting glucose).

Findings: The overall prevalence of diabetes and prediabetes was 7.5% and 16.8%, respectively. The adjusted odds ratios (95% CI) for diabetes among mining/production workers and smelting/refining workers were 1.5 (1.3-1.7) and 3.8 (3.4-4.3), respectively, compared to office workers. Increasing levels of uninary Ni and Zn were both positively associated with risk of high-FPG and dysglycimia (Ptrend = 0.004 for Ni and Ptrend = 0.01 for Zn). The J-shaped dose-response realtionships between urinary Ni (P non-linearity= 0.03) and Zn (P non-linearity < 0.001) with FPG were also observed.

Conclusion & Significance: Occupations associated with higher levels of metal exposure were associated with an increased risk of diabetes in Jinchang cohort. Multiple urinary metals, particularly zinc and nickel were positively associated with elevated blood glucose and dysglycemia.

Key words: Metal exposure, Diabetes mellitus, Fasting blood glucose, Dysglycemia, Association

Recent Publications

1. Yana Bai*, Aimin Yang, Huangquan Pu,Min Dai, Ning Cheng,Jiao Ding, Juansheng Li, Haiyan Li, Xiaobin Hu, Xiaowei Ren,Jie He, Tongzhang Zheng. Cohort Profile: The China Metal-Exposed Workers Cohort Study (Jinchang Cohort). International Journal of Epidemiology, 2017;46(4):1095-1103.

2. Aimin Yang, Simin Liu, Zhiyuan Cheng , Hongquan Pu , Ning Cheng , Jiao Ding,Juansheng Li , Haiyan Li , Xiaobin Hu , Xiaowei Ren , Kehu Yang ,Tongzhang Zheng,Yana Bai*. Dose-response analysis of environmental exposure to multiple metals and their joint effects with fasting plasma glucose among occupational workers. Chemosphere 186 (2017) 314-321.

3. Aimin Yang, Simin Liu, Ning Cheng , Hongquan Pu , Min Dai , Jiao Ding, Juansheng Li , Haiyan Li, Xiaobin Hu , Xiaowei Ren ,Jie He, Tongzhang Zheng, Yana Bai*. Multiple metals exposure, elevated blood glucose and dysglycemia among Chinese occupational workers. Journal of Diabetes and Its Complications. 2017;31(1):101-107.

Biography

Yana Bai has established the Jinchang cohort in China, as the largest multi-metal exposure cohort in the world, who is mainly engaged in the research of prevention and treatment strategies and measures for diabetes and cancer. The risk factors, etiology, pathogenesis, early diagnosis and evaluation of intervention effect of diabetes and tumor were carried out through Jinchang cohort.

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