
Children's Environmental Health Research Findings
November 2014

Topic: Lead and behavior problems in Chinese children

Title: Blood lead concentrations and children's behavioral and emotional problems: a cohort study

Conclusion: Blood lead concentrations, even at a mean concentration of 6.4 μg/dL, were associated with increased risk of behavioral problems in Chinese preschool children.

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Abstract: The association between lead exposure and children's IQ has been well studied, but few studies have examined the effects of blood lead concentrations on children's behavior. OBJECTIVE: To evaluate the association between blood lead concentrations and behavioral problems in a community sample of Chinese preschool children with a mean blood lead concentration of less than 10 μg/dL. DESIGN, SETTING, AND PARTICIPANTS: A prospective cohort study was conducted at 4 preschools in Jintan, Jiangsu province of China. Participants included 1341 children aged 3 to 5 years. MAIN OUTCOMES AND MEASURES: Blood lead concentrations were measured in children aged 3 to 5 years. Behavioral problems were assessed using Chinese versions of the Child Behavior Checklist and Caregiver-Teacher Report Form when children were aged 6 years. RESULTS: The mean (SD) blood lead concentration was 6.4 (2.6) μg/dL, with the 75th and 90th percentiles being 7.5 and 9.4 μg/dL, respectively. General linear modeling showed significant associations between blood lead concentrations and increased scores for teacher-reported behavioral problems. A 1-μg/dL increase in the blood lead concentration resulted in a 0.322 (95% CI, 0.058 to 0.587), 0.253 (95% CI, 0.016 to 0.500), and 0.303 (95% CI, 0.046 to 0.560) increase of teacher-reported behavior scores on emotional reactivity, anxiety problems, and pervasive developmental problems, respectively ($P < .05$), with adjustment for parental and child variables. Spline modeling showed that mean teacher-reported behavior scores increased with blood lead concentrations, particularly for older girls. CONCLUSIONS AND RELEVANCE: Blood lead concentrations, even at a mean concentration of 6.4 μg/dL, were associated with increased risk of behavioral problems in Chinese preschool children, including internalizing and pervasive developmental problems. This association showed different patterns depending on age and sex. As such, continued monitoring of blood lead concentrations, as well as clinical assessments of mental behavior during regular pediatric visits, may be warranted.

Keywords: lead, behavior, child