Attention deficit hyperactivity disorder and its association with heavy metals in children from northern Chile

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Abstract

Introduction: Exposure to lead and arsenic has been associated with child behavior problems. In Arica, a northern city of Chile, the natural presence of arsenic in water has been registered. Also, the city has a history of heavy metals contamination of anthropogenic origin. The purpose of this study was to explore the association between the concentration of blood lead and urinary inorganic arsenic with attention deficit hyperactivity disorder (ADHD) as reported by parents.

Methods: Cross-sectional design with data analysis of 2656 children between the ages of 3 and 17 enrolled at the Environmental Health Center of Arica between 2009 and 2015. The diagnosis of ADHD was made based on the parents' response to questions about health history. Multiple logistic regression models were used to adjust for confounding variables.

Results: The prevalence of ADHD was 6.4%. The means urinary inorganic arsenic and blood lead were 21 mu g/L and 1.5 mu g/dl, respectively. In the lead model adjusted for sex, age, housing material quality and exposure to secondhand tobacco smoke report; children with blood lead concentrations >= 5 mu g/dl were more likely to develop ADHD [Odds Ratio (OR): 2.33 95% confidence intervals (CI) 1.32-4.12)]. Regarding arsenic, the adjusted model revealed a higher chance of developing ADHD in the fifth quintile of exposure (OR = 2.02 IC 95% 1.12-3.61).

Conclusion: The findings of this study suggest that exposure of children to lead and inorganic arsenic was associated with ADHD. This study provides additional evidence to existing literature regarding the potential role of toxic metals such as lead and arsenic in children's behavior. However, our findings should be interpreted with caution due to the limitations of the study.

Keywords

Author Keywords: Arsenic exposure; Attention deficit hyperactivity disorder; Blood lead; Children; Population surveillance
KeyWords Plus:BLOOD LEAD LEVELS; ARSENIC EXPOSURE; DEFICIT/HYPERACTIVITY DISORDER; DOPAMINERGIC SYSTEM; ADHD; AYMARA

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