
Arbuckle TE, Davis K, Boylan K, Fisher M, Fu J.

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Abstract

Childhood developmental disorders and related problems such as learning disabilities and attention deficit hyperactivity disorder (ADHD) account for a growing burden on the family, education and health care systems. Exposure to environmental chemicals such as bisphenol A (BPA) and phthalates may play a role in the development of child behavioral problems. Using cross-sectional data from Cycle 1 of the Canadian Health Measures Survey (CHMS), we examined the potential association between urinary concentrations of BPA and various phthalate metabolites and child learning and behavioral problems, considering important covariates such as gender, blood lead and environmental tobacco smoke (ETS). The Strengths and Difficulties Questionnaire (SDQ) outcomes of interest were emotional symptoms, hyperactivity/inattention, and a total difficulties score with borderline and abnormal scores grouped together and compared with children with normal scores. Other outcomes studied included any reported learning disability, a subset of learning disabilities reported as ADD/ADHD (attention deficit disorder) and use of psychotropic medications in the past month. Among children ages 6-11 years, the prevalences of any learning disability, ADD, and ADHD were 8.7%, 1.5% and 2.8%, respectively. Estimated prevalences for SDQ hyperactivity/inattention, emotional symptoms and total difficulties scores were 16.9%, 15.0%, and 13.0%, respectively. Child's urinary BPA was associated with taking psychotropic medications (OR 1.59; 95% CI 1.05-2.40). Urinary MBzP concentration was significantly associated with emotional symptoms in girls (OR 1.38 95% CI 1.09-1.75) but not in boys (OR 1.05 95% CI 0.82-1.36). Blood lead was significantly associated with several of the outcomes examined, with a significant interaction observed between prenatal smoking and blood lead for the total difficulties score (OR=10.57; 95% CI 2.81-39.69 vs. OR=1.98; 95% CI 1.41-2.79 if mother did not smoke during pregnancy). Although limited by the cross-sectional nature of the study which precludes examining causation, the results suggest that although some indicators of child behavior were significantly associated with their urinary BPA and phthalate concentrations, the major chemical associated with adverse behavioral indicators was lead.