Relationship between bisphenol A exposure and attention-deficit/ hyperactivity disorder: A case-control study for primary school children in Guangzhou, China.


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Abstract

Bisphenol A (BPA) is an endocrine-disrupting chemical. Studies have shown that the exposure to BPA is associated with attention-deficit/hyperactivity disorder (ADHD) during adolescent development. However the direct clinical evidence is limited. To investigate the possible association between environmental BPA exposure and the altered behavior of children, a case-control study was conducted with children aged 6-12 years in Guangzhou, China. Two hundred fifteen children diagnosed with ADHD and 253 healthy children from Guangzhou were recruited as the case and control groups, respectively. Urinary BPA and 8-hydroxy-2'-deoxyguanosine (8-OHdG, a biomarker of oxidative DNA damage) concentrations were determined by high-performance liquid chromatography/tandem spectrometry. The results showed that concentrations of urinary BPA for the case group were significantly higher than those for the control group (3.44 vs 1.70 μg/L; 4.63 vs 1.71 μg/g Cr. p < .001). A stepwise increase in the odds ratios for ADHD was observed with the increasing quartiles of children's urinary BPA (first quartile: reference category; second quartile adjusted OR: 1.79, 95% CI: 0.95-3.37; third quartile adjusted OR: 7.44, 95% CI: 3.91-14.1; fourth quartile adjusted OR: 9.41, 95% CI: 4.91-18.1). When the BPA levels were stratified by gender, the odds of ADHD among boys and girls increased significantly with urinary BPA concentrations (adjusted OR: 4.58, 95% CI: 2.84-7.37; adjusted OR: 2.83, 95% CI: 1.17-6.84). Urinary 8-OHdG concentrations in the ADHD children were significantly higher than those in the control group. Furthermore, the linear regression analysis results indicated that a significant relationship existed between BPA exposure and 8-OHdG levels (R = 0.257, p < .001). Our findings provide direct evidence that childhood BPA exposure may be related to ADHD and 8-OHdG concentrations for children. Moreover, BPA exposure could increase the higher occurrence of ADHD for boy than for girls.