

VARIABILITY IN ASSOCIATIONS BETWEEN MATERNAL PRENATAL URINARY PHTHALATE METABOLITE CONCENTRATIONS AND CHILD MENTAL, MOTOR AND BEHAVIORAL DEVELOPMENT BY CHILD SEX

Robin M. Whyatt, Columbia University, United States

Xinhua Liu, Columbia University, United States

Virginia A. Rauh, Columbia University, United States

Antonia M. Calafat, Centers for Disease Control and Prevention, United States

Allan C. Just, Columbia University, United States

Lori Hoepner, Columbia University, United States

Frederica P. Perera, Columbia University, United States

Pam Factor-Litvak, Columbia University, United States

Background and Aims: Epidemiologic evidence suggests that effects of prenatal phthalate exposure on child executive function and behavior are sexually dimorphic. We reported (ISEE 2010) adverse associations between prenatal phthalate concentrations and child age 3 mental, motor and behavioral development. Here we evaluate whether the associations varied by child sex.

Methods: 168 girls and 151 boys from inner-city communities in New York City were followed from pregnancy. Mono-*n*-butyl phthalate (MnBP), mono-benzyl phthalate (MBzP), and mono-isobutyl phthalate (MiBP) concentrations were measured in spot urine collected from the mothers during the 3rd trimester. At child age 3 years, mental and motor development were assessed using the Bayley Scales of Infant Development II and behavior problems was assessed by maternal report on the Child Behavior Checklist (1 ½ - 5).

Results: Controlling for specific gravity and potential confounders, log_e MnBP concentrations were significantly associated with motor development among boys only (adjusted estimated B= -3.1 [95% CI -5.8, -0.3]) and with mental development among girls only (B=-2.6 [95%CI -4.6, -0.6]). The child sex-by-MnBP interaction on risk of mental delay was significant (p=0.04). Among boys only, log_e MnBP concentrations were associated with significant increases in emotionally reactive behavior (p=0.005), somatic complaints (p=0.007), withdrawn behavior (p=0.02) and internalizing behaviors (p=0.006). Child sex-by-MnBP interaction on emotionally reactive behavior was significant (p=0.03) and on somatic complaints was of borderline significance (p=0.059). Among girls only, log_e MBzP concentrations were associated with significant increases in anxious/depressed behavior (p=0.004), somatic complaints (p=0.01), withdrawn behavior (p=0.0003) and internalizing behaviors (p=0.0001). Child sex-by-MBzP interaction on withdrawn behavior was of borderline significance (p=0.054).

Conclusions: Associations between prenatal exposure to these phthalates and child mental, motor and behavioral development appear to vary by child sex.

References

Engel SM, et al. 2010. Prenatal phthalate exposure is associated with childhood behavior and executive functioning. *Environ Health Perspect* 118(4): 565-571.