

POLYBROMINATED DIPHENYL ETHERS AND SOCIAL AND EMOTIONAL DEVELOPMENT IN TODDLERS

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Background and Aims: Polybrominated diphenyl ethers (PBDEs) are widely used flame retardants that have become ubiquitous environmental contaminants. PBDEs accumulate in breast milk and have been linked to adverse neurodevelopment in animals and humans, raising concerns about adverse health impacts of exposure during infancy. We investigated the association between breast milk exposure to PBDEs and social and emotional development in toddlers.

Methods: A longitudinal cohort study followed pregnant women and their children through 36 months of age in central North Carolina. Breast milk samples obtained at 3 months postpartum were analyzed for PBDEs. The Infant-Toddler Social and Emotional Assessment (ITSEA) was completed by mothers to assess children's social and emotional development at age 24 months (n=222). We assessed the relationship between the most commonly detected congeners in our study population, BDE28, 47, 99, 100 and 153, and child social and emotional development using multivariate regression analysis, adjusting for maternal age, parity, income and education, as well as child's age, gender, and breastfeeding duration.

Results: Median breast milk concentrations of BDE-28, 47, 99, 100, and 153 were 2.2, 28.7, 5.5, 5.3, and 5.6 ng/g lipid, respectively. A small but consistent positive dose-response relationship between BDE-47, 99, and 100 and increased externalizing behaviors, specifically impulsivity, was apparent. Externalizing behavior scores ranged from 30 to 87 with a mean of 48. Compared to those with BDE-47 exposures below the median, adjusted externalizing behavior scores were 1.5 and 2.4 points higher for children with exposures in the 3rd and 4th quartiles (99% Confidence Intervals: -2.3, 5.2 and -1.4, 6.2, respectively). PBDEs were not associated with other social and emotional developmental domains.

Conclusions: Our results, although imprecise, are consistent with an association between early life PBDE exposure through breast milk and increased impulsivity in childhood. Confirmation of these results is needed in other longitudinal studies.