



Associations of prenatal and early childhood mercury exposure with autistic behaviors at 5 years of age: The Mothers and Children's Environmental Health (MOCEH) study



Jia Ryu^a, Eun-Hee Ha^a, Boong-Nyun Kim^b, Mina Ha^c, Yangho Kim^d, Hyesook Park^e, Yun-Chul Hong^f, Kyoung-Nam Kim^{f,g,*}

^a Department of Occupational and Environmental Medicine, School of Medicine, Ewha Womans University, Seoul, Republic of Korea

^b Division of Child & Adolescent Psychiatry, Department of Psychiatry and Institute of Human Behavioral Medicine, College of Medicine, Seoul National University, Seoul, Republic of Korea

^c Department of Preventive Medicine, College of Medicine, Dankook University, Cheonan, Republic of Korea

^d Department of Occupational and Environmental Medicine, Ulsan University Hospital, University of Ulsan College of Medicine, Ulsan, Republic of Korea

^e Department of Preventive Medicine, School of Medicine, Ewha Womans University, Seoul, Republic of Korea

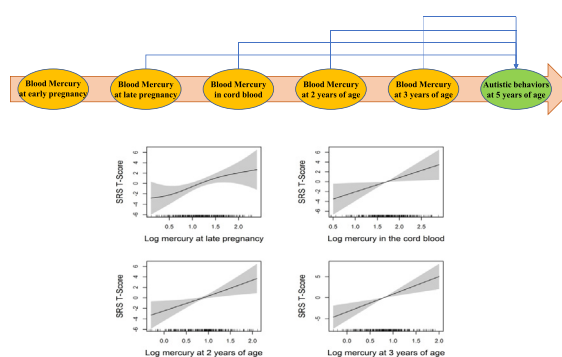
^f Department of Preventive Medicine, Seoul National University College of Medicine, Seoul, Republic of Korea

^g Institute of Public Health and Medical Service, Seoul National University Hospital, Seoul, Republic of Korea

HIGHLIGHTS

- We explored the associations between blood mercury levels and autistic behaviors.
- This study involved an ongoing multi-center prospective birth cohort.
- Blood mercury levels were repeatedly measured from early pregnancy to 3 years.
- Autistic behaviors were assessed at 5 years with the Social Responsiveness Scale.
- Prenatal and early childhood mercury levels were associated with autistic behaviors.

GRAPHICAL ABSTRACT



ARTICLE INFO

Article history:

Received 26 April 2017

Received in revised form 24 June 2017

Accepted 26 June 2017

Available online xxxx

Keywords:

Autistic behavior

Birth cohort

Blood mercury

Early childhood exposure

Prenatal exposure

ABSTRACT

Background: Although mercury is an established neurotoxin, only few longitudinal studies have investigated the association between prenatal and early childhood mercury exposure and autistic behaviors.

Methods: We conducted a longitudinal cohort study using an ongoing prospective birth cohort initiated in 2006, wherein blood mercury levels were measured at early and late pregnancy; in cord blood; and at 2 and 3 years of age. We analyzed 458 mother-child pairs. Autistic behaviors were assessed using the Social Responsiveness Scale (SRS) at 5 years of age. Both continuous SRS T-scores and T-scores dichotomized by a score of ≥ 60 or < 60 were used as outcomes.

Results: The geometric mean of mercury concentrations in cord blood was 5.52 $\mu\text{g/L}$. In adjusted models, a doubling of blood mercury levels at late pregnancy ($\beta = 1.84$, 95% confidence interval [CI]: 0.39, 3.29), in cord blood ($\beta = 2.24$, 95% CI: 0.22, 4.27), and at 2 years ($\beta = 2.12$, 95% CI: 0.54, 3.70) and 3 years ($\beta = 2.80$, 95% CI: 0.89, 4.72) of age was positively associated with the SRS T-scores. When the SRS T-scores were dichotomized, we

Abbreviations: ASD, autism spectrum disorder; CI, confidence interval; LOD, limit of detection; RR, relative risk; SRS, social responsiveness scale.

* Corresponding author at: Institute of Public Health and Medical Service, Seoul National University Hospital, 101, Daehak-Ro Jongno-Gu, Seoul 03080, Republic of Korea.

E-mail address: kkn002@snu.ac.kr (K.-N. Kim).