



High Maternal Blood Mercury Level Is Associated with Low Verbal IQ in Children

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The objective of the present study was to investigate the relationship of IQ in children with maternal blood mercury concentration during late pregnancy. The present study is a component of the Mothers and Children's Environmental Health (MOCEH) study, a multi-center birth cohort project in Korea that began in 2006. The study cohort consisted of 553 children whose mothers underwent testing for blood mercury during late pregnancy. The children were given the Korean language version of the Wechsler Preschool and Primary Scale of Intelligence, revised edition (WPPSI-R) at 60 months of age. Multivariate linear regression analysis, with adjustment for covariates, was used to assess the relationship between verbal, performance, and total IQ in children and blood mercury concentration of mothers during late pregnancy. The results of multivariate linear regression analysis indicated that a doubling of blood mercury was associated with the decrease in verbal and total IQ by 2.482 (95% confidence interval [CI], 0.749–4.214) and 2.402 (95% CI, 0.526–4.279), respectively, after adjustment. This inverse association remained after further adjustment for blood lead concentration. Fish intake is an effect modifier of child IQ. In conclusion, high maternal blood mercury level is associated with low verbal IQ in children.

Keywords: Blood Mercury; Blood Lead; Fish; IQ; WPPSI-R

INTRODUCTION

Mercury is a well-known toxic metal, and exposure can be from natural sources or from the products or waste of industrial activities in medicine, agriculture, and manufacturing (1). Workers may be exposed by inhalation of elemental or inorganic mercury. Exposure may also arise through dental amalgams, thermometers, batteries, pesticides, mines, incineration plants, and other sources. Organic mercury from the diet, especially seafood, is the major source of exposure in the general population (1). Methyl mercury is a potent neurotoxin and its toxicity to the human fetus became evident after the discovery of congenital Minamata disease, which developed in the fetuses of mothers exposed to methyl mercury from wastewater (2). Other research reported that mercury-contaminated bread exposed an Iraqi population to high doses of methyl mercury, and had neurotoxic effects on human fetuses (3). However, the effect of low-level mercury exposure from fish consumption on child development remains uncertain. Prenatal exposure to mercury can affect long-term child neurodevelopment (4,5), but the results of epidemiologic studies of such exposures have been inconsistent (6-10). The present study investigated the effect of low-level blood mercury concentration of mothers during late pregnancy on the IQ levels of their children.

MATERIALS AND METHODS

Subjects

The present study is a component of the Mothers and Children's Environmental Health (MOCEH) study, a multi-center prospective birth cohort project of 1,751 pregnant women that was conducted in Korea from May 2006 to December 2010 (11). The study co-