

Prof Wieslaw Antoni Jedrychowski
Jagiellonian University
7 Kopernika street
31-014 Krakow
Poland
Email: myjedryc@cyf-kr.edu.pl

Fish consumption during pregnancy, mercury exposure and neurobehavioural development in infancy

Wieslaw Jedrychowski*, Frederica Perera, Jeffery Jankowski, Virginia Rauh, Elzbieta Flak, Kathleen L. Caldwell, Robert L. Jones, Agnieszka Pac, Ilona Lisowska-Miszczuk (Chair of Epidemiology and Preventive Medicine, Coll. Med. Jagiellonian University in Krakow. Poland; Columbia Center for Children's Environmental Health, Mailman School Public Health, Albert Einstein College of Medicine, Department of Pediatrics, Bronx, NY; CDC, Atlanta; Chair of Obstetrics and Gynecology - Neonatology Clinic. Coll. Med. Jagiellonian University in Krakow. Poland)

Background: There is an indication that supplementation of infant formula with long-chain polyunsaturated fatty acid supplementation with fish oil is beneficial for development of infants. However, fish consumption during pregnancy may be implicated in adverse effects for children's cognitive development since fish is a common source of methylmercury. The purpose of the study was to describe the usual pattern of fish consumption during pregnancy in Poland and explain the variability of prenatal mercury exposure due to fish intake by mothers. Subsequently, we assessed the cognitive and psychomotor development of infants related to prenatal mercury exposure over the 3-year follow-up.

Material and methods: The material consisted of 374 infants who were born at 33-42 weeks of gestation between January 2001 and March 2003 to mothers recruited in the cohort study from ambulatory prenatal clinics in the first and second trimesters of pregnancy. Total mercury in whole cord blood was measured by vapour atomic spectrometry following chemical reduction of mercury compounds. The Bayley Scales of Infant Development (BSID-II) was used to assess the mental (MDI) and psychomotor developmental index (PDI) in children at 12, 24 and 36 months of age.

Results: Self-reported weekly amount of fish consumption during the first two trimesters of pregnancy correlated positively with umbilical cord mercury concentrations ($r_s = 0.22$, $p < 0.0001$). The corresponding correlation coefficient for the fish consumption in the third trimester of pregnancy was 0.21, ($p < 0.0001$). There was an inverse association between mercury exposure and both MDI (beta regression coeff. -2.8 , $p = 0.01$) and PDI scores (beta coeff. $= -2.3$, $p = 0.04$) at 12 months of age. Subsequent BSIDII testing at 24 and 36 months did not confirm significant association between exposure and cognitive or psychomotor function. The estimates of association between prenatal mercury exposure and the development of infants, which were based on the longitudinal analysis of all BSIDII measurements done in the follow-up (generalized estimating equations statistical model) showed that the performance deficit observed at 12 months of age was of borderline statistical significance.