Association between peripheral manganese levels and attention-deficit/hyperactivity disorder: a preliminary meta-analysis

Shih JH, Zeng BY, Lin PY, Chen TY, Chen YW, Wu CK, Tseng PT, Wu MK.


Abstract

Evidence has suggested that dysregulation of the dopaminergic system may play a significant role in the pathogenesis of attention-deficit/hyperactivity disorder (ADHD) in children. Manganese, a neurotoxicant, has been reported to exert its neurotoxicity by affecting the dopaminergic system. However, the association between peripheral manganese levels and ADHD has not been comprehensively reviewed. This study aimed to investigate the association between peripheral manganese levels and ADHD in children. An electronic search was performed on databases including PubMed, ProQuest, ClinicalKey, Cochrane Library, ClinicalTrials.gov, Embase, Web of Science, and ScienceDirect with last search on March 25th, 2018. As per the inclusion criteria, human observational studies investigating peripheral manganese levels in children with ADHD and controls were included. The meta-analysis was performed using a random-effects model, and possible confounders were examined by subgroup analysis. In total, four articles with 175 ADHD children and 999 controls were recruited. The manganese levels were significantly higher in ADHD children than in controls (p=0.033), when studies investigating blood levels and those investigating hair levels were included. However, when only studies investigating blood levels were included, there was no significant difference between ADHD children and controls (p=0.076). Our results support higher peripheral manganese levels in children diagnosed with ADHD than those in controls. Further primary studies are needed to clarify this association.