

SELENIUM AND MERCURY OPPOSING INFLUENCES IN FISH-EATING POPULATIONS OF THE BRAZILIAN AMAZON

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Background and Aims: Amazonian riverside communities have the highest reported mercury (Hg) exposure in the world today. Selenium (Se), an essential element, is involved in several body functions through selenoprotein expression. Some studies suggest that selenium (Se) may be protective for Hg toxicity, however, data from animal and human studies are inconsistent and some epidemiological studies show toxic effects of elevated Se, notably hyperinsulinemia, alopecia and paraesthesia. The objective of the present study was to examine the relations between biomarkers of Se and visual and motor functions, taking into account co-variables and Hg exposure.

Methods: Participants (n = 448, 15-87y), were recruited from 12 communities along the Tapajós River. B-Se, P-Se and blood Hg (B-Hg) were measured by ICP-MS. Interview-administered questionnaires served to collect information on socio-demographics and medical history. All participants underwent a complete visual examination and performed several tests of motor functions.

Results: Se status ranged from normal to high (B-Se median: 228µg/L, range 103-1500µg/L). Few participants reported diabetes (1.1%), and despite high levels of Se in some individuals, no signs and symptoms of Se toxicity were observed. P-Se concentrations were associated with beneficial outcomes: lower prevalence of age-related cataracts, better near visual acuity and motor performance; regression estimates were stronger when adjusting for B-Hg. When stratifying at the median B-Hg concentrations, P-Se consistently presented associations with the outcomes only at high B-Hg concentrations.

Conclusions: In this population with high Hg exposure, Se intake may play a role in offsetting some deleterious effects of Hg, but the beneficial effects of Se may not be present in populations with low Hg exposure, and Se may not offset all Hg-induced toxic effects in fish-eating populations. Further studies should address the risks and benefits of dietary Se in order to better understand the complex Se-Hg interactions in human populations.