GSTM1 NULL GENOTYPE AND MERCURY LEVELS ASSOCIATION: EVIDENCE FOR GENETIC SUSCEPTIBILITY IN AN AMAZONIAN POPULATION

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INTRODUCTION: Mercury (Hg) is a highly toxic heavy metal, and in Amazonian riverine populations, the primary route of exposure is through the frequent consumption of fish contaminated with methylmercury (MeHg). Individual susceptibility to Hg toxicity may be influenced by genetic factors, including polymorphisms in genes involved in xenobiotic metabolism and detoxification, such as *GSTM1*. Deletion of this gene (null genotype) has been associated with reduced detoxification capacity, potentially contributing to the accumulation of Hg in the body. **OBJECTIVE:** To investigate the association between the *GSTM1* null genotype and elevated blood mercury levels among residents of riverine communities in the Amazon region. **MATERIALS AND METHODS:** This cross-sectional study included 384 individuals residing in riverside communities in the municipality of Santarém, Pará, located in the Lower Amazon mesoregion. Total mercury (HgT) concentrations were measured in blood samples using atomic absorption spectrometry (DMA-80), and levels exceeding 5.8 µg/L, as established by the EPA, were classified as elevated. The GSTM1 genotype was determined by conventional PCR, categorizing participants as gene carriers (present) or null (deletion). Associations between genotypes and Hg levels were assessed using the chi-square test and odds ratio (OR) with 95% confidence intervals. **RESULTS AND CONCLUSIONS:** Among the 384 participants, 351 (91.4%) exhibited elevated HgT levels, with 36.5% of them carrying the GSTM1 null genotype. In contrast, the null genotype was identified in 18.2% of individuals with normal HgT levels. Statistical analysis revealed a significant association between the GSTM1 null genotype and elevated mercury levels (OR = 2.58; 95% CI: 1.01–7.84; p = 0.0351), suggesting that individuals with the gene deletion are more likely to experience mercury accumulation. These findings emphasize the relevance of considering genetic susceptibility in populations environmentally exposed to toxic metals and support the development of more targeted and effective public health surveillance strategies.

Keywords: Mercury; GSTM1; Genetic polymorphism; Environmental toxicology; Genetic susceptibility.