Gac Sanit. 2026;40(S4):395

Gaceta Sanitaria

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266 - ENVIRONMENTAL EXPOSURE TO HEAVY METALS, LIFESTYLE AND LOSS OF Y CHROMOSOME IN THE ARAGON WORKERS HEALTH STUDY (AWHS)

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Resumen

Background/Objectives: Mosaic loss of the Y chromosome (LOY) in blood cells is a common somatic genetic variation linked to shorter life expectancy, cancer, and cardiovascular diseases. Although age and tobacco smoking are well-established determinants, gaps remain regarding the role of other environmental exposures. Therefore, the objective of this study was to evaluate the associations between a panel of environmental determinants (urinary metal biomarkers and lifestyle factors) and the presence of LOY.

Methods: A cross-sectional study was conducted among 1,763 workers from the AWHS cohort (Zaragoza, Spain). The presence of LOY was determined using microarrays (Illumina GSA) and the Forsberg method. Thirteen metals were measured in urine samples via ICP-MS, and lifestyle data were collected. Statistical analysis included logistic regression for individual associations, Elastic Net for variable selection, and Bayesian Kernel Machine Regression (BKMR) to evaluate the mixture of exposures and interactions.

Results: Participants with LOY were characterized by older age, higher smoking burden, and lower educational attainment, as well as lower adherence to healthy lifestyle patterns and the Mediterranean diet. These subjects also presented higher mean concentrations of metals, particularly molybdenum, titanium, and barium. The three main associations identified in separate age-adjusted models were current smoking, with a GMR of 1.471 (95%CI: 1.136, 1.905); higher educational attainment, which showed an inverse association with a GMR of 0.740 (95%CI: 0.605, 0.904); and urinary antimony (Sb) concentration, which presented a GMR of 0.280 (95%CI: 0.082, 0.958).

Conclusions/Recommendations: Despite the individual associations for metals and dietary factors selected by Elastic Net being mostly suggestive, the BKMR analysis revealed a positive and linear joint association between the total mixture of metals and lifestyle factors with the risk of LOY. This highlights a complex interaction between specific food groups and metals in relation to LOY. These findings suggest that diet may modulate metal-induced toxicity on genomic stability; however, further studies in larger populations are needed to better understand these environmental factors and their long-term health effects.

Funding: AESI PI20CIII/0029, PID2023-147163OB-C22 and AESI ICI25III/00005.

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