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MERCURY EXPOSURE AND CO-EXPOSURE OF OTHER TRACE METALS IN GOLD WASTE SEPARATORS IN SMALL-SCALE JEWELLERY SECTOR IN SRI LANKA

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Mercury (Hg), commonly used in the separation of gold waste in the small-scale jewellery sector (SSJS), is known to pose a high risk of exposure. In Sri Lanka, SSJS is an important industrial sector and consumes a significant amount of Hg in the separation of gold from gold-contaminated waste. Currently, no biomonitoring studies have been conducted on Hg exposure in SSJS in Sri Lanka. A case-control study was carried out to analyse Hg exposure and concurrent exposure to 15 other trace metals among gold workers engaged in SSJS. In this study, urine samples from 39 subjects and 18 control subjects involved in SSJS were analysed for trace metals using Inductively Coupled Plasma Mass Spectrometry (ICP-MS). The urine creatinine levels were analysed using an automatic biochemical analyser. There was a striking difference between Hg concentrations in subjects and controls ($p < 0.05$), with the average total Hg concentrations of 6.95 ± 17.9 and 0.46 ± 0.86 the /g, respectively. A recent study on Hg exposure and health problems in urban gold mining in Indonesia, which follows a similar process to gold waste recovery in SSJS Sri Lanka, also found a high difference in the total Hg concentration in gold workers and the control group (10.8 and 6.6 µg/g, respectively). The results of both studies showed that the total Hg concentration in the subject group was higher than in the control group. Almost 12.8% of subjects in the present study had urinary Hg concentrations above Human Biomonitoring Level I (5.0 µg/g Cre). Of these, 7.7% exceeded the biological tolerance limit (25.0 µg/g Cre). Mercury had strong positive correlations with V, Cr, Mn, Zn, As, Pd, Ag, Cd, Pt and Au. The levels of Co, Ag, and Cd were significantly high in the studied subjects, which could be attributed to unknown factors and warrants further investigation.

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