

MERCURY EXPOSURE DATA FROM GOLD MINERS IN INDONESIA, MONGOLIA, PHILIPPINES, TANZANIA AND ZIMBABWE

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Background and aims: In many developing countries, gold mining is performed using mercury. Mercury is used to extract gold from ore. Mercury exposure leads to negative health effects. The aim of this study was to provide a common data base using data from existing studies in gold mining areas to be able to compare with data from other areas.

Methods: Data of several existing studies from Indonesia, Mongolia, Philippines, Tanzania, and Zimbabwe were combined to analyze the relation between exposure in small-scale gold mining areas and body burden (n=1278). Relating to their intensity of contact with mercury four groups were formed: (i) a non exposed control group; (ii) a low exposed group with participants only living in mining areas, but not working as miners; (iii) a medium exposed group, miners living in exposed areas and working with mercury without smelting amalgam; and (iv) a high exposed group, miners living in exposed areas and smelting amalgam. Kruskal-Wallis test was used to test for possible differences over all groups. Mann-Whitney U test was used to compare the different exposure groups with the control group.

Results: Participants living in exposed areas and miners working in highly exposed areas have significant higher levels of mercury in urine, hair and blood compared to the non-exposed control group ($p < 0.001$). In urine the median mercury value is $< 0.2 \mu\text{g/l}$ for the control group and $11.9 \mu\text{g/l}$ (max. $5240 \mu\text{g/l}$) for the high exposed group. In blood the median mercury value is $< 1 \mu\text{g/l}$ for the control group and $7.61 \mu\text{g/l}$ (max. $429 \mu\text{g/l}$) for the high exposed group. In hair the median level is $0.21 \mu\text{g/g}$ for the control group and $2.43 \mu\text{g/g}$ (max. $792 \mu\text{g/g}$) in the high exposed group. The mercury levels are different between the different countries. Reasons are diverse background burdens due to different fish eating habits and different work place methods. The mercury levels of exposed participants are in a high percentage above threshold limits.

Conclusions: Gold miners in small scale gold mining areas in Indonesia, Mongolia, Philippines, Tanzania and Zimbabwe have high levels of mercury in urine, blood and hair.