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Title: Blood oxidative markers in glass industry workers and related respiratory outcomes

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Body: Aim: Workers from a glass factory were investigated by a longitudinal study to detect respiratory outcomes and their relations with working conditions. Material/methods: 229 nonsmoker workers (40% men) with mean age 35+/-9 yrs and mean exposure in glass industry 14 +/-9 yrs were examined by clinical, spirometric and biochemical tests. Blood superoxide dismutase (SOD), glutathione peroxidase (GSHPx) and serum lipoperoxides (LP) were assayed as effect markers. Occupational risk was estimated by workplace air contaminants (WAC), Pb in blood, urine (U-Pb), and by urinary delta-aminolevulinic acid (ALA). Results: Although WAC (inorganic Pb, acetone, toluene, white spirit, varnishes) ranged under TLVs, cumulative toxic index was 2.6, indicating a potential hazard risk. 33% of subjects had respiratory changes: 28% cough, 19% sputum production, 8% dyspnea, 18% reported all three symptoms and 15% had obstructive distal sd. In the subgroup of glass painters (n=35), SOD and GSHPx activities correlated significantly ($r=0.77$, $p<0.001$), each of them depending of exposure length ($r=0.32$, $p<0.05$). U-Pb correlated with ALA releases ($r=0.52$, $p<0.01$). SOD activity varied directly with U-Pb ($r=0.36$, $p<0.05$) and ALA content ($r=0.38$, $p<0.05$) showing the link between oxidative imbalance and Pb exposure. Respiratory symptoms incidence correlated with LP level in subjects with > 15 yrs exposure in glass industry ($r=0.29$, $p<0.05$, $n=45$), revealing how the increase of this oxidative marker parallels respiratory consequences. Conclusions: Glass workers encounter cumulative occupational risks which affect their health. Though non-specific, oxidative stress markers are useful as early signals which could foresee health impairment.