EXPOSURE TO LEAD AND OXIDATIVE STRESS: A SYSTEMATIC REVIEW

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Abstract: Lead is considered a serious public health issue because it is one of the most widespread environmental and industrial toxins. Lead has been known to adversely affect many organs and systems in humans, as central and peripheral nervous system, hematopoietic system, cardiovascular system, liver, kidney and reproductive system. Therefore, there has been a considerable interest in studying the mechanisms involved in lead toxicity. Several researches have demonstrated that lead induce oxidative stress by increasing reactive oxygen species formation and decrease antioxidant system ability. The purpose of the current study is to present a review about lead exposure and oxidative stress in general population as well as in occupationally population exposed to lead. The search strategy aimed to identify all observational studies regarding the association between lead-related oxidative stress, as the indicators of the oxidative stress and the know indices of lead exposure that are accessed to evaluate this association. We searched PubMed, TOXLINE and Web of Knowledge, with no date limits and no language restriction. No original data, no human research, case series, case reports, ecologic studies, guidelines, studies with no data on lead exposure or no oxidative stress outcome were excluded. Using free text it was found a total of 1013 articles (408 in PubMed, 253 in TOXLINE and 352 in Web of Knowledge). After excluding articles by reading titles and/or abstracts, even as excluding the duplicates, we found 61 studies. Blood lead levels (BLL) was the most used biomarker for lead exposure presented in the studies. The most commonly used parameter to access lead toxicity was aminolevulinic acid dehidratase (ALAD), and to evaluate the lead-induced oxidative stress were: reduced glutathione (GSH), glutathione disulfide (GSSG) concentrations, glutathione peroxidase (GPx), superoxide dismutase (SOD), catalase (CAT) and malondialdehyde (MDA). Results of studies based on occupationally-exposed population, even as studies with general population have shown significant correlation between BLL, ALAD and oxidative stress markers. BLL were negatively correlated with ALAD activity. There was a significant positive correlation of BLL with MDA, CAT and SOD. GPx levels were significantly elevated in occupational lead-exposed population.

Key words: lead, blood lead level, oxidative stress, ALAD.

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