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Metal-induced oxidative stress level in patients with fibromyalgia syndrome and its contribution to the severity of the disease: A correlational study

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Abstract

Background: Fibromyalgia syndrome (FMS) is an extra-articular rheumatological disease characterised by widespread chronic musculoskeletal pain. Metal-induced oxidative stress contributes to the severity of FMS.

Aims: First, this study evaluated the association between plasma levels of toxic heavy metals and essential metals with oxidative stress (OS) markers. Second, the OS markers and metal contents were correlated with the disease severity by assessing the Fibromyalgia Impact Questioner Revised (FIQR) and tender points (TP).

Method: A total of 105 FMS patients and 105 healthy controls of similar age and sex were recruited. OS parameter such as lipid peroxidation (LPO), protein carbonyl group (PCG), nitric oxide (NO) and essential metals such as zinc (Zn), magnesium (Mg), manganese (Mn), copper (Cu) and toxic heavy metals such as aluminium (Al), arsenic (As), lead (Pb) were estimated.

Results: Levels of LPO, PCG, NO ($p < 0.001$) and Cu, Mn, and Al ($p < 0.001$), were significantly higher, and Mg ($p < 0.001$) and Zn ($p < 0.001$) were significantly lower in patients compared to controls. A positive association was observed between OS parameters, FIQR and TP with Cu, Al and Mn. A significant negative association was observed between Zn and Mg with FIQR, TP and OS parameters.

Conclusion: Heavy metals such as Al induce OS parameters and decrease the levels of essential trace elements such as Mg and Zn, which may be responsible for the severity of FMS.

Keywords: Lipid peroxidation; essential trace elements; oxidants.

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