Erythrocyte functional status and lipid profile of coal mine workers of West Bengal, India

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ABSTRACT

Purpose: Despite people suffering from several forms of ill health, constant exposure to toxic wastes and chronic diseases as a result of mining, there is a tragic gap in the availability of 'scientific' studies and data on the health hazards of mining in India. This study was proposed to understand better the relationship between occupational exposure to coal, blood lipid profiles and red blood cell (RBC) functional status of coal workers.

Materials and methods: Blood samples were obtained from coal miners (n=32) of an underground mine in West Bengal. Blood lipid profiles and RBC functional status were determined. Students' *t*-test and Pearson correlation analyses were completed to analyze the data.

Results: Compared to the control subjects, significantly higher levels of cholesterol ($p<0.01$), triglycerides ($p<0.01$), LDL ($p<0.001$), and VLDL ($p<0.001$) were observed in coal miners. HDL, Hb, Na^+-K^+ATPase and SOD activity were significantly ($p<0.001$) lower in coal miners, whereas MDA levels ($p<0.001$) and osmotic fragility in coal miners were increased significantly ($p<0.01$).

Conclusions: Our study indicates that elevated MDA and antioxidant insufficiency caused disruption in the structural integrity of erythrocyte, which may be a pathophysiological mechanism in the progression of disease in coal miners. Also, cardiovascular disease risk factors were more prevalent in the coal miners.

Keywords: Coal miners, blood lipid profiles, erythrocyte osmotic fragility, oxidative stress, antioxidant insufficiency