

Study protocol

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Effect of fire smoke on some biochemical parameters in firefighters of Saudi Arabia

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Abstract

Background: Firefighters who are facing fires, are frequently exposed to hazardous materials including carbon monoxide, hydrogen cyanide, hydrogen chloride, benzene, sulphur dioxide, etc. This study aimed to evaluate some relevant serum biochemical and blood hematological changes in activity involved firefighters in comparison to normal subjects.

Subjects and Methods: Two groups of male firefighters volunteered to participate in the study. The first included 28 firefighters from Jeddah, while the second included 21 firefighters from Yanbu, with overall age ranged 20–48 years. An additional group of 23 male non-firefighters volunteered from both cities as normal control subjects, of age range 20–43 years. Blood samples were collected from all volunteer subjects and investigated for some relevant serum biochemical and blood hematological changes.

Results: The results obtained showed that, there were statistically significant differences in liver function, kidney function, serum lipid profile, cortisol, creatine kinase, lactate dehydrogenase, iron and its biologically active derivatives, and blood picture in firefighters as compared with the normal control group. These results indicate that, fire smoke mainly affects serum biochemical and blood hematological parameters. Such results might point out to the need for more health protective and prophylactic measures to avoid such hazardous health effects that might endanger firefighters under their highly drastic working conditions.

Conclusion: Besides using of personal protective equipments for firefighters to protect them against exposure to toxic materials of fire smoke, it is recommended that, firefighters must be under continuous medical follow up through a standard timetabled medical laboratory investigations to allow for early detection of any serum biochemical or blood hematological changes that might happen during their active service life and to allow for early treatment whenever necessary.

Background

Fire Smoke is actually produced by two chemical processes: Combustion, (oxidation) and pyrolysis, [1]. Oxidation is the process by which oxygen chemically combines

with combustible molecules and degrades them to smaller compounds. Heat and light are generated as byproducts. Pyrolysis is purely a function of heat and refers to the direct liberation of combustible materials