

Health effects of gulf oil spill exposure among subjects participating in clean-up activity along the Louisiana coast

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Objective: Crude oil is a complex mixture of both known and suspected toxins, including volatile organic compounds and polycyclic aromatic hydrocarbons. Oil spills with volatile organic compounds such as benzene have been associated with hematopoietic malignancies, respiratory irritation, and immune system alterations and central nervous system abnormalities. The purpose of this study was to investigate the potential health effect of the oil spill exposure by the Deepwater Horizon oil rig explosion in the Gulf of Mexico and dispersant use in subjects who were involved in the oil spill clean-up activity along the coast of Louisiana.

Methods: The study included subjects that had been exposed to the oil spill and others that had not been exposed to the oil spill. Blood samples were collected and analyzed for various hematologic and hepatic parameters. Hematologic toxicity was determined by measuring the white blood cells (WBC), platelets, hemoglobin, hematocrit, blood urea nitrogen (BUN) and creatinine levels in the serum. Hepatic abnormality was assessed by measuring the alkaline phosphatase (ALP), aspartate amino transferase (AST) and alanine amino transferase (ALT) levels in the serum. The outcomes were compared between the exposed and unexposed subjects.

Results: A total of 247 subjects (benzene exposed, n=117 and unexposed, n=130) were included in this analysis. The mean age of the subjects was 35.8 and 49.9 years respectively, in the exposed and unexposed groups. Hematologic analysis showed that platelet counts were significantly decreased in the exposed group compared with those in the unexposed group to the oil spill (252.1 ± 51.8 versus 269.6 ± 77.3 , $P=0.024$). Conversely, the mean hemoglobin and hematocrit levels were significantly increased among oil spill exposed subjects compared with the unexposed subjects. Similarly, oil exposed subjects had significantly higher levels of ALP (76.3 ± 21.3 versus 61.2 ± 26.9 IU/L, $P=0.000$), AST (31.0 ± 26.3 versus 22.8 ± 11.8 IU/L, $P=0.004$), and ALT (34.8 ± 26.6 versus 29.8 ± 27 IU/L, $P=0.054$) compared with those unexposed to the oil spill.

Conclusion: The results of this pilot study indicated that clean-up workers exposed to the oil spill experience significant health effects, specifically, altered blood profiles and liver enzymes that may lead to the development of hepatic or blood related cancer. Thus, clean-up workers are at a higher risk of developing health problems following exposure to the oil spill.

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