

Study reveals link between oil spill exposure and hematologic and hepatic toxicity

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A new study reports that workers exposed to crude oil and dispersants used during the Gulf oil spill cleanup display significantly altered blood profiles, liver enzymes, and somatic symptoms compared to an unexposed control group. Investigators found that platelet counts were significantly decreased in the exposed group, while both hemoglobin and hematocrit levels were notably increased. Their findings, reported in *The American Journal of Medicine*, suggest that oil spill cleanup workers are at risk for developing hepatic or blood-related disorders.

In April 2010, Deepwater Horizon, an offshore drilling rig owned by British Petroleum (BP) exploded, spewing over 200 million gallons of oil into the Gulf of Mexico. In order to break down the oil slick, BP used nearly 2 million gallons of dispersants like COREXIT, and an estimated 170,000 workers participated in the cleanup effort. Currently, COREXIT is banned in the United Kingdom because of its potential risk to [cleanup workers](#).

While other studies have identified a relationship between oil spills, dispersants, and human health, this new research from the University Cancer and Diagnostic Centers, Houston, TX, led by G. Kesava Reddy, PhD, MHA, and Mark A. D'Andrea, MD, FACRO, focuses primarily on the link between oil spill exposure and hematologic and hepatic functions in subjects who had participated in the oil spill cleanup operation. The investigators looked at a total of 247 subjects between January 2010 and November 2012, with 117 subjects identified as exposed to the oil spill and [dispersants](#) by participating in the cleanup

over the duration of three months. The unexposed control group of 130 subjects was comprised of people living at least 100 miles away from the Gulf coast of Louisiana.

Using medical charts, demographic and clinical records, the team reviewed specific data points such as white blood cell (WBC) counts, [platelet counts](#), hemoglobin, hematocrit, blood urea nitrogen (BUN), creatinine, serum beta-2 microglobulin, alkaline phosphatase (ALP), aspartate amino transferase (AST), and alanine amino transferase (ALT) for both groups.

While no significant differences were noted in the WBC counts of the two groups, the study did find that platelet counts were notably decreased in the oil spill exposed group. Also, BUN and creatinine levels were substantially lower in the exposed group, while hemoglobin and hematocrit levels were increased compared to the unexposed subjects. Furthermore, considered indicators of hepatic damage, the serum ALP, AST, and ALT levels in the exposed subjects were also elevated, suggesting that the exposed group may be at a higher risk for developing blood-related disorders.

"Phosphatases, amino transferases, and dehydrogenases play critical roles in biological processes. These enzymes are involved in detoxification, metabolism, and biosynthesis of energetic macromolecules that are important for different essential functions," says lead investigator G. Kesava Reddy. "Alterations in the levels of these enzymes result in biochemical impairment and lesions in the tissue and cellular function."

Participants also reported [somatic symptoms](#), with headache reported most frequently, followed by shortness of breath, skin rash, cough, dizzy spells, fatigue, painful joints, night sweats, and chest pain. "The health complaints reported by those involved in oil cleanup operations are

consistent with the previously reported studies on major [oil spills](#). However, the prevalence of symptoms appears to be higher in the present study compared with the earlier findings of other investigators," added Dr. Reddy.

The investigators acknowledge that the lack of pre-disaster health data on the subjects involved in the study is the greatest limiting factor; however, the data collected have shown significant health effects on the cleanup workers.

"To our knowledge, no previous study has explored the effects of the oil spill specifically assessing the hematological and hepatic functions in [oil spill cleanup](#) workers," explains Dr. Reddy. "The results of this study indicate that oil spill exposure appears to play a role in the development of hematologic and hepatic toxicity. However, additional long-term follow-up studies are required to understand the clinical significance of the oil spill exposure."

More information: [dx.doi.org/10.1016/j.amjmed.2013.05.014](https://doi.org/10.1016/j.amjmed.2013.05.014)

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