Commentary: Post-deepwater horizon blowout seafood consumption among children in Mobile County, Alabama

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The Deepwater Horizon (DWH) oil spill was a major industrial disaster that occurred in the Gulf of Mexico in April 2010. It is considered as the largest marine spill in history to date. The spill released more than 4.9 million barrels of crude oil along the coastline of four states in the United States including Florida, Alabama, Mississippi and Louisiana affecting humans (response workers and communities) and disrupting ecosystems. A massive disaster response followed to prevent further spread of oil to the coastline using floating booms, skimmer ships, controlled burns and oil dispersants.1

In the past, the human health effects of oil spills have been studied in only seven of 38 oil spills worldwide; generally, rescue efforts and services take precedence over research. Most of the available studies focused on short-term and intermediate health effects and results have shown evidence of acute toxic and psychological effects that decreased with time; data are sparse on the long-term health effects.2 The paucity of oil spill-related research indicate the challenges of conducting research in a scenario that is fraught with several difficulties including legal and ethical issues, community barriers and financial constraints.

With regard to the DWH, many studies were conducted immediately to assess the ecologic effects. However, studies on human health effects were slow to begin.3 The National Institute of Environmental Health Sciences-funded long-term follow-up of response workers was launched in September 2010 and data collection began in February 2011.4,5 The loss of this crucial time window of exposure imposes major limitations to the study such as recall bias of workers’ exposure history, exposure misclassification due to the inability of some biomarkers to persist over time and/or to be confounded by other exposures, and recruitment of participants hindered by lost to follow-up or by litigation.

Exposure studies among communities affected by the DWH oil spill were also slow to begin. We conducted an exposure study 11-months following the DWH oil spill in Mobile County, Alabama, among early school-aged children on exposure-related activities that included using the beaches for recreational purposes and sea food eating patterns.6,7 Exposure activities were ascertained six months after the beginning of the oil spill (post-oil spill) as we did not take into account the initial six-month time period when beaches and fishing/shrimping operations were closed.

We found that post-oil spill, children in coastal schools (20 mile radius within the shoreline) were less likely to reduce their exposure-related activities, including eating caught fish, visiting beaches, and indirectly through parental activities that included fishing, selling caught fish and participating in cleanup activities, than children in inland schools (20 mile radius or greater from the shoreline). The study also found higher than average seafood consumption among children in the coastal area compared to the inland area and to national estimates from the National Health and Nutrition Examination Survey. We found the estimated levels of concern (LOCs) of polycyclic aromatic hydrocarbons, arsenic and diocetyl sodium sulfosuccinate in seafood were 1–2 orders of magnitude higher than contaminant levels detected in the seafood tested by the Food and Drug Administration (FDA) and National Oceanic and Atmospheric Administration, post-oil spill.8 Surveys as in this study are limited by cross-sectional nature of the data and self-reporting/recall biases.

Despite the limitations, our study provides useful data. The initial FDA protocol for seafood safety assessment that guided the reopening of federal and state fisheries in the Gulf of Mexico used national seafood consumption rates rather than local seafood consumption rates, with possible underestimation.9 Studies such as our provide data on local seafood consumption rates in a sample segment of the population. Further, in the absence of quantified data on exposure, detailed questionnaires are a useful methodological tool for exposure characterization. Using the study data, we were able to conduct qualitative risk characterization based on LOCs for selected chemicals. Thus, in the aftermath of a disaster such as the DWH oil spill, small community-based studies conducted across segments of the population have the potential to yield valuable information.

References


