

Short communication

Health of people working/living in the vicinity of an oil-polluted beach near Karachi, Pakistan

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صحة الأشخاص الذين يعملون أو يعيشون بجوار الشواطئ الملوثة بالبترو، بالقرب من كراتشي، في باكستان

رخشان خورشيد، مبشر شيخ، شاهد إقبال

الخلاصة: أجريت دراسة قصيرة الأمد في أعقاب حدوث تسرب بتزولي من الناقل «تاسمان سبيريت»، وذلك بتحليل عينات من ماء البحر والرمال، أخذت من شاطئ كراتشي، للكشف عن وجود أي محتويات هيدروكربونية أو عضوية. وأخذت عينات دم من الأشخاص الذين عملوا أو عاشوا في مناطق مجاورة للشاطئ. وتبين وجود ارتفاع طفيف في عدد اللمفاويات والبيزينات. ووجد لدى 11 شخصاً ارتفاع في المستويات المصلية لناقل الأمين الغلوتامية البيروفية، ولو أنه لم يكن ارتفاعاً يُعتدُّ به إحصائياً. وتُعدُّ مثل هذه الخطوات حاسمة للتأكد من عدم وجود آثار خطيرة للبترو على صحة الناس، على المدى الطويل.

ABSTRACT A short-term study was conducted after the oil spillage from the tanker *Tasman Spirit* to analyse seawater and sand samples taken from Karachi beach for hydrocarbon/organic contents. Blood samples were collected from people who were working or living in the vicinity of the beach. Lymphocyte and eosinophil levels were slightly increased. About 11 people had raised serum glutamic pyruvic transaminase, but this was not significant. Such steps are vital to ensure that there are no long-term hazardous effects of oil on human health.

Santé de la population travaillant et/ou résidant à proximité de la plage cible d'une pollution par hydrocarbures près de Karachi au Pakistan

RÉSUMÉ Une étude à court terme a été menée après le déversement du pétrole brut du tanker *Tasman Spirit*, afin d'analyser des échantillons d'eau de mer et de sable prélevés sur le rivage au niveau de la plage de Karachi pour en déterminer la teneur en hydrocarbures et polluants organiques. Des échantillons de sang ont été prélevés sur la population travaillant ou résidant à proximité de la plage. Il est apparu une légère augmentation du nombre des lymphocytes et éosinophiles. On a pu noter une élévation, toutefois non significative, des transaminases glutamiques pyruviques sériques chez 11 sujets. Une telle démarche est vitale si l'on veut s'assurer de l'absence d'effets délétères à long terme des produits pétroliers sur la santé humaine.

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Introduction

The recent oil spillage from the tanker *Tasman Spirit*, which went aground on 30 July 2003, attracted a great deal of criticism from medical circles concerning the effects, both short-term and long-term, on the health of people living or working in the vicinity of the affected area. The wreckage represented a minor, but potentially chronic, source of pollution to the surrounding environment through delayed releases of oil, antifouling compounds and other toxic chemicals. Oil spillage may cause respiratory, hepatic and kidney problem to the people living in the vicinity of the affected area.

But what exactly are the hazards to human health? Crude oil contains a complex mixture of aliphatic, aromatic, polyaromatic and heterocyclic hydrocarbon compounds. It has been observed that crude oil exposure caused marked changes in the activities of several cytochrome P450-linked polysubstrate monooxygenase enzymes in liver, kidney and lung tissue [1].

Polycyclic aromatic hydrocarbons (PAHs) may be classified as gaseous phase and particle bound. Many polyaromatic and heterocyclic compounds such as polychlorinated biphenyls, polychlorinated dibenzop-dioxins and polychlorinated dibenzofurans are persistent environmental pollutants [2]. These may cause dermal and ocular lesions, irregular menstrual cycle and altered immune response; in other words, disruption of endocrine activity [3].

A study carried out in the Center for Clinical Research and Evidence-Based Medicine, University of Texas, reported that polychlorinated biphenyls are ubiquitous environmental contaminants that are potential hazards to human and wildlife populations. Low frequency auditory impairment was documented in experimental rats [4].

Fish and shellfish are exposed to a wide range of PAHs following oil spills at sea, and can become contaminated as a result. It has been reported that fish have an effective mixed-function oxidase enzyme system, through which they are able to metabolise and excrete these chemicals. Thus, contamination by high-molecular weight PAHs, including those with carcinogenic potential, is of concern to human consumers [5].

This short term study was conducted to analyse the organic contents in samples of sea water + oil and of sand + oil that are toxic for human/animal health. The effect of the oil spillage on the health of people living on the coast of Karachi beach was also studied.

Methods

The MT *Tasman Spirit*, carrying 62 000 metric tons of crude oil for the Pakistan Oil Refinery, was scheduled to arrive in the Port of Karachi on Saturday 26 July 2003. The vessel was ruptured, and the spilled oil spread to Clifton beach, Karachi [6].

Blood samples were collected at the end of August 2003, approximately 1 month after the oil spillage, from people living in the vicinity of the affected area. The samples were kept in a cool container until analysed. In the laboratory, the sera were separated and analysed using standard Merck kits.

Five samples of seawater + oil and of sand + oil were collected from Clifton beach which was heavily polluted and is within 1 km of where the tanker was wrecked. The samples were analysed for hydrocarbon/organic content. Analysis was carried out by gas chromatography at Nimir Chemicals Pakistan Ltd.

Blood samples were collected from 100 people who were working in restaurants and clubs on Karachi beach. Samples from peo-

ple working or selling food products on the carrier *Thebas* and in small shops were also collected. Blood samples were also taken from families living in nearby residential areas (only adult family members were sampled). All participants were informed about the reasons for taking the samples and there were no refusals to give a sample.

The samples were sent to the Civil Diagnostic Laboratory Centre, Karachi for a complete blood picture. Haematological parameters, haemoglobin level, total and differential leukocyte counts, red blood cell count and platelet count were estimated by auto-analyser (Sysmex) at the Clinical Pathology Laboratory of Jinnah Postgraduate Medical Centre, Karachi.

A liver function test was also done. Biochemical parameters, serum bilirubin, serum glutamic pyruvic transaminase (SGPT), alkaline phosphatase, total protein, albumin and globulin, blood urea and serum creatinine were determined by auto-analyser using standard Merck kits.

Renal function tests (including blood urea and serum creatinine) were carried out by similar technique using standard Merck kits.

Results

The age range of the people from whom samples were taken was 30–50 years. The socioeconomic status of the people from the residential area was generally middle class, while that of the people working in the vicinity was generally lower.

Normally seawater has no traces of hydrocarbon content. The sample of oil-polluted seawater had a 0.20% organic content. The organic content of the sample of sea sand was 0.19%.

The levels of lymphocytes and eosinophils were slightly raised. A few workers (approximately 11) had raised SGPT, but this was not notably raised.

A renal function test was also carried out (data not shown). Both blood urea and serum creatinine were within normal limits.

A few cases of skin rash in children were also observed.

Discussion

Following the *Sea Empress* oil spill, the heaviest contamination of sediments by oil was reported to have occurred in the lower reaches of the Milford Haven waterway, although waterborne hydrocarbons were thought to have penetrated throughout the area. Generally, the communities showed little impact of contamination by oil, but some changes were evident at the population level [7]. In our investigation, we also observed organic material in both oil polluted seawater and in sea sand.

As the period of blood sample collection was quite soon after the exposure to oil pollution, the results did not show very serious effects. It is possible if we took samples after 4–6 months that the subjects would show a different picture, a normal blood picture due to good immunity or possibly a diseased blood picture.

A few workers had raised SGPT. It is possible this may have been raised before the oil tragedy, therefore SGPT tests should be repeated and the reasons investigated.

Recommendations

Blood samples should be collected from those affected by oil pollution every 3 months for a period of 3–5 years (follow-up study). In addition, respiratory disorders and any changes in the skin should be noted.

Such steps are vital to monitor and minimize the long-term effects of oil on human health which may possibly affect the next generation.

References

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Environmental health in emergencies and disasters: practical guide

The WHO Centre for Environmental Health Activities (CEHA) has just published the Arabic version of the WHO publication *Environmental health in emergencies and disasters: practical guide*. This document distills what is known about environmental health (EH) during an emergency or disaster. It is intended for practitioners, as well as for policy-makers and researchers, and thus covers both general and technical aspects of EH. This publication is available online at: <http://www.emro.who.int/ceha/pdf/EHemerg.pdf>