Introduction

Knowledge on skin exposure and the occurrence of hand eczema (HE) among workers handling drilling waste from oil and gas drilling is scarce.

M and M WEA included seven waste management plants. Samples of oil drilling waste were analysed with gas chromatography with flame ionization detection (GC-FID). Dry solids from thermal treatment of cuttings fluids were incubated in an artificial sweat solution and analysed with inductively coupled plasma mass spectrometry (ICP-MS). pH of dry solids in the sweat solution was measured with Panpela™ pH indicator strips.

Sixty-eight workers got an invitation to participate in a structured interview and skin examination. The Nordic Occupational Skin Questionnaire 2002 assessed the occurrence of skin problems and HE. Transepidermal water loss (TEWL) and hydration of the stratum corneum (SC) were measured in 55% of the workers. TEWL and hydration of SC values were associated to the occurrence, were measured in 55% of the workers. TEWL and hydration of SC were assessed using Tewameter 300 and Corneometer CM 825 (Courage and Khazaka Electronic GmbH).

Results

WEA identified scenarios for potential skin exposure. The profile of hydrocarbons in oil-based drilling waste was similar among the different plants. The soluble fraction of dry solids in artificial sweat solution contained bioavailable metals such as Cr (from 22 to 210 ng/g), Co (from 20 to 94 ng/g), Ni (from 0.13 to 0.72 µg/g). The pH ranged from 6.5 to 12.0.

The participation frequency was of 97%. The one-year prevalence for HE and work-related HE was 30.3% and 12.0. Ninety-three percent of the workers reported glove use for two hours or more. TEWL values>2.3 g/h/m² on the dorsal side of the hands, indicating skin barrier disruption, were measured in 55% of the workers. TEWL and hydration of SC values were associated to the occurrence of HE.

Conclusion

Potential skin exposure to irritants, allergenic metals, skin occlusion from gloves, skin barrier disruption and high occurrence of HE among workers handling oil and drilling waste are of concern.