

Skin cancer has been deemed one of the large, unmet challenges to modern medicine given that it's the most frequently occurring and fastest growing malignant disease in terms of incidence and prevalence. Occupational solar ultraviolet radiation (UVR) exposure is a skin cancer risk factor. Outdoor workers have long exposure hours and need photoprotection against solar UVR, an IARC group 1-defined human carcinogen. In South Africa, skin cancers account for one third of all histologically-diagnosed cancers. Physiological presentation of non-melanoma skin cancers (NMSC) is most common on the head in all population groups. It is expected that occupational exposure plays a role in NMSC aetiology in South Africa, although such data are presently lacking. We aimed to estimate the number of outdoor workers potentially exposed to solar UVR in South Africa. Building on CAREX Canada methods, we used a combination of 2011 Statistics South Africa data and Canadian job prevalence assumptions. Of 51 770 560 South Africans in 2011, the working population was ~13 204 496. Estimated total working population exposed to solar UVR was 1 156 000 (8.7% of the working population). Riskiest job categories were subsistence agricultural and fishery workers and related labourers, and extraction and building trades workers and labourers in mining, construction, manufacturing and transport. Results suggest that solar UVR exposure among outdoors in South Africa may be high. More research is required to identify high-risk groups that may differ in the South African context, perform better risk assessment and inform skin cancer prevention awareness campaigns.

## Poster Presentation

### Neurological Effects

0052

#### ODOUR AS A DETERMINANT OF PERSISTENT PHYSICAL AND PSYCHOLOGICAL HEALTH COMPLAINTS AFTER AN OIL TANK EXPLOSION, A LONGITUDINAL STUDY

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**Background** Foul-smelling environmental pollution was a major concern following a chemical workplace explosion. Malodorous pollution has previously been associated with aggravated physical and psychological health. Furthermore, in persons affected by a trauma, an incidence-related odour can act as a traumatic reminder. Olfaction may even be of significance in the development and persistence of post-traumatic stress symptoms (PTSS).

**Aims** To assess whether perceived smell related to malodorous environmental pollution in the aftermath of the explosion was a determinant of subjective health complaints (SHC) and PTSS among gainfully employed adults before and after clean-up of the malodorous pollution.

**Methods** Questionnaire data from validated instruments, the Subjective Health Complaints Inventory and the Impact of Event Scale-Revised, were analysed using mixed effects models in a longitudinal study design comprising three surveys. Individual odour scores were computed, and the participants (n=486) were divided into high (n=233) and low (n=253) odour score groups.

**Results** Participants in the high odour score group reported more SHC and PTSS than those in the low odour score group, before and also after the pollution was eliminated. The difference between the groups lasted for at least three years after the pollution was eliminated.

**Conclusion** Perception of malodorous environmental air pollution was a determinant of both SHC and PTSS. Prompt clean-up might be important to avoid persistent health effects after malodorous chemical spills.

## Poster Presentation

### Musculoskeletal

0053

#### EVALUATION OF THE OUTCOME OF THE APPLIED ERGONOMICS TRAININGS IN A CEMENT FACTORY

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This study sought to present the outcomes of the applied trainings delivered in a cement factory on the ergonomic risks of a cement factory.

Applied ergonomics trainings were given to 246 employees in a cement factory located in Adana province between May and October 2015. The subject matters of the training were as follows: ergonomic risks at workplaces, occupational diseases, work-related diseases, occupational accidents and protection, reasons for pains on neck, arm and waist and measures for protection against these pains, office ergonomics and ergonomic use of computers and exercises for protection. A test was applied before and after the training of each group.

408 employees, including 311 blue collars and 97 white collars, work in the factory. It was determined that the least known question (15.9%) prior to the training was that smoking causes chronic waist pain. It was found that the subject matter on which employee's knowledge was least improved by the training was the knowledge that the most frequently encountered occupation accident in the cement sector is not explosion 40.7%. Trainings were repeated on five subject matters in particular which were known less than 80% by the trained employees. Following these repeated trainings, the total knowledge level on all questions was increased up to at least 89.4%.

Minimization of exposure to the work-related musculoskeletal disorders is possible with provision of the required information and application, and conduct of periodical delivery of applied trainings, as in our study.

## Poster Presentation

### Working Conditions

#### 0054 THE RELATIONSHIP BETWEEN ON-CALL WORK AND HEALTH PROBLEM AND INJURY AMONG KOREAN WORKERS

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**Objective** In case of on-call work, it is mixed with day-duty and night-duty, so that workers may have to work anytime of the day. This study aimed to understand the relations between Korean workers' on-call work, health problem, and injury.

**Methods** Using the 3rd Korean Working Conditions Survey in 2011, this study targeted 29 246 paid workers working for more than a year. Conducting the logistic regression analysis of on-call work and health problem based on the surveyed data, the personal/occupational characteristics, working environment, and job stress were controlled.

**Results** In case of on-call work, it showed higher odds ratio like physical health problems (OR, 1.33; 95% CI 1.22–1.44), psychological health problems (OR, 1.31; 95% CI 1.08–1.60), and injury (OR, 2.76; 95% CI 2.26–3.37). In the results of analysing the detailed health problems, workers on-call work showed higher odds ratio of hearing problems (OR, 2.06; 95% CI 1.63–2.62), skin problems (OR, 1.71; 95% CI 1.38–2.12), back pain (OR, 1.22; 95% CI 1.08–1.38), muscular pain in shoulders, neck, and upper limbs (OR, 1.23; 95% CI 1.12–1.34), muscular pain in lower limbs (OR, 1.27; 95% CI 1.15–1.40), headache and eyestrain (OR, 1.46; 95% CI 1.32–1.60), abdominal pain (OR, 1.37; 95% CI 1.02–1.85), depression or anxiety (OR, 1.43; 95% CI 1.07–1.93), overall fatigue (OR, 1.36; 95% CI 1.24–1.49), insomnia or sleep difficulties (OR, 1.41; 95% CI 1.13–1.76).

**Discussion** In the results of this study, on-call work was related to health problems and injury. Additional study should be conducted to understand the correlations in the future.

## Poster Presentation

### Intervention Studies

#### 0055 THE HEALTH RISKS OF OCCUPATIONAL EXPOSURE TO N-HEXANE IN PRINTING INDUSTRY

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**Objective** To evaluate the risks of occupational exposure to n-hexane in printing industry.

**Methods** 76 printing factories using n-hexane were investigated. The concentrations of n-hexane in workplaces were tested. The medical examination was carried out for 179 exposed workers and 208 controls. The concentrations of 2,5-hexanedione in urine were tested among 162 exposed workers and 54 controls. The neural electromyography (EMG) examination was performed on 28 cases exposed to n-hexane for more than 4 years.

**Results** The solvents containing n-hexane are used to clean the printing machines. The concentration of n-hexane in the air of the workplaces was 1.5–1553.5 (median=178.2) mg/m<sup>3</sup> and 17.59% of them exceeded the occupational exposure limit (OEL). The concentration of n-hexane for exposed individuals was 39–215 mg/m<sup>3</sup> and 66.67% of them exceeded the OEL.

The results of medical examination showed that the occurrence of conjunctiva congestion (10.65%)\*, tremor of fingers (10.06%)\* and tendon hyporeflexia (13.41%)\* among the exposed workers were significantly higher than that of the controls (4.81%, 6.25% and 4.33%, respectively) (\*p<0.05, \*\*p<0.01). The concentrations of 2,5-hexanedione in urine were 0.25–15.6 (1.78±2.98)mg/L among the exposed workers and 11.73% of them exceeded 5 mg/L. The EMG showed that 2 cases suffer from a slight peripheral nerve injury.

**Conclusion** The concentration of n-hexane in workplaces exceeds the OEL and the abnormal results of medical examinations performed on the exposed workers indicate health risks in the printing industry. These risks are caused by manual labour, overtime work, lack of harmful chemical removal devices and PPE.

## Poster Presentation

### Intervention Studies

#### 0056 INVESTIGATION ON OCCUPATIONAL EXPOSURE TO NON-IONISING RADIATION IN PHYSIOTHERAPY WORKPLACES

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**Objective** To understand the occupational exposure to non-ionising radiation in physiotherapy workplaces.

**Methods** An investigation was conducted in 16 physiotherapy agencies used non-ionising radiation physiotherapy instruments. The ultra-high-frequency radiation, high-frequency radiation and microwave were measured in the points of the head, chest and abdomen. The laser was measured on skin.

**Results** The intensity of ultra-high-frequency radiation produced by 17 ultra-short wave therapeutic apparatus were 0.001–0.306 (median=0.085)mW/cm<sup>2</sup>, 0.008–4.225 (median=0.102)mW/cm<sup>2</sup> and 0.011–2.701 (median=0.292) mW/cm<sup>2</sup> in the point of the head, chest and abdomen, and 70.6%, 47.1% and 17.64% meet the occupational exposure limits (OELs) respectively. The high-frequency radiation in the point of chest (26.7 V/m) and abdomen (40.8 V/m) produced by 1 of the 4 high frequency thermotherapy instruments respectively exceed the OELs. The microwave (0.001–4.668 mW/cm<sup>2</sup>) of 18 microwave therapeutic apparatus meets the OELs in all points mentioned above. The laser of 12 laser therapeutic apparatus were <0.01×10<sup>-4</sup>–0.13×10<sup>-4</sup> W/cm<sup>2</sup> in wavelength range 400–1400 nm on the skin, all of them meeting the OELs.

**Conclusion** The physical therapists are exposed to occupational hazard factors such as ultra-high-frequency radiation, high-frequency radiation, microwave and laser in the workplace. The ultra-high-frequency radiation and high-frequency radiation that exceed the OELs in some measurement points indicate the risks currently in physiotherapy workplaces. It is necessary