

knowledge levels of sunscreen creams, sun protection factor (SPF), ultraviolet A (UVA) and ultraviolet B (UVB), it was determined that 11.2% of the participants knew the definition of SPF 30. In the question about UVA and UVB, 27.9% answered correctly.

Discussion The use of sun protective cream among the sun protection methods among the academic staff was found to be the first place. However, it has been determined that this method of protection is not conscious and orderly. Academic staff's knowledge of sunscreen creams, SPF, UVB and UVA was found to be inadequate. Therefore, we believe that future sun protection programmes could target in order to improve academic staff's knowledge and attitudes towards sun protection, effects of the sun on skin and skin cancer.

409 OCCUPATIONAL RADIATION EXPOSURE TO PREGNANT HEALTHCARE WORKERS

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Introduction Radiation exposure to healthcare workers is a known occupational hazard. With a significant number of female healthcare employees of childbearing age in the workforce, it is essential to ensure that occupational exposure is at the lowest possible limits. The fetus is sensitive to high doses of ionising radiation. The probability that a particular effect will occur depends on several factors, including dose, stage of gestation, and dose rate. A number of strategies and administrative controls are used to protect healthcare workers.

Method JHAH has an active radiation protection program for pregnant radiation workers. The program includes training, exposure monitoring and record review, modifications to working conditions, protective devices and administrative procedures to control exposure. The JHAH Radiation Protection Team provides individual case-based risk assessments and, if required, work condition modifications and necessary administrative procedures are discussed. In addition, occupational medicine provides advice and counselling as required. Two case studies will be discussed showing how the JHAH Radiation Protection program works.

Results Assessments have shown effective use of time, distance and shielding resulted in exposures well below advised guidelines. Additional radiation monitors worn at the abdomen level of pregnant healthcare workers resulted in enhanced fetus monitoring. In cases assessed, readings have been found below the level of public exposure.

Discussion/conclusion The JHAH Radiation Protection program demonstrates that proactive measures and regular monitoring provides healthcare workers with reassurance that exposure is well below exposure limits. Risk assessment for pregnant healthcare workers at work provides further reassurance that employees and their fetuses are safe. This psychological assurance has made a positive contribution to increased morale and satisfaction of the healthcare workers.

It is important to establish radiation guidelines and training programs for pregnant radiation healthcare workers.

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GENE EXPRESSION ANALYSIS OF BLOOD CELLS IN RADIATION HEALTH CARE WORKERS OCCUPATIONALLY EXPOSED TO IONISING RADIATION

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Introduction Ionising radiation (IR) is a ubiquitous environmental agent whose effects on organism are well established. A direct interaction of IR with human cells causes a variety of biological effects including neoplastic transformation. In this context, physical and biological dosimetry could be a key tool for individual monitoring of the absorbed IR. However, since the current dosimetry approaches are not tailored to distinguish the early response and long-term pro-oncogenic effects of low-dose (LD)IR the discovery of inherent biomarkers represents a priority area. We hypothesised that changes of gene expression profiles in blood cells may occur during occupational exposure to LDIR and that the identification of these changes could be potentially useful in the early recognition of pro-oncogenic phenotypes.

Methods We included 9 workers exposed to IR and 3 non-exposed workers, all equipped with dosimeter. Exclusion criteria were smoking, history of cancer diagnosis before occupational exposure, high blood pressure medication and intake of paracetamol. Blood cells were collected from each worker and used to evaluate transcriptional expression of a panel of 624 cancer-related genes by using the Real-Time PCR OpenArray technology.

Results The analysis in radiation workers exposed showed the over-expression of some genes involved in the progression of certain types of tumours and an evident alteration in the expression of the gene involved in a way of regulation, known to predispose to genomic instability and tumorigenesis induced by IR. Intriguingly, we also found that among radiation workers 3 subjects, with occupationally recognised thyroid cancer displayed an up-regulation of the rearranged during transfection (RET) gene, which has been found previously overexpressed in subjects with radiation-induced thyroid cancers.

Discussion Our preliminary data would indicate that exposure to LDIR is able to alter the expression of pro-tumour genes in blood cells, posing questions and opening new scenarios towards a 'personalised radioprotection' model.

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GENOTOXIC DAMAGE AND DNA REPAIR GENE POLYMORPHISMS IN WORKERS EXPOSED TO LOW DOSES OF IONISING RADIATION

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Introduction DNA repair enzymes could modulate the individual susceptibility to the genotoxic effect of exposure to ionising radiation (IR).

Methods The influence of polymorphisms of XRCC1, XRCC3 and XPD genes on the onset of chromosomal and DNA damage has been investigated in 43 workers exposed to low levels of IR, including 36 healthcare professionals and 7 industrial radiologists (exposed workers), and 43 subjects not occupationally exposed to IR (controls), matched for age. Chromosomal aberrations (CA) and micronuclei (MN) frequencies in peripheral blood lymphocytes were measured according to standard procedures and used as cytogenetic biomarkers, while Tail Intensity (TI) was the parameter of the Comet test used to evaluate oxidative DNA damage. Genotypic variants Arg194Trp, Arg280His and Arg399Gln for XRCC1, Thr241Met for XRCC3 and Lys751Gln for the XPD genes were analysed using the restriction fragment length polymorphism technique.

Results Both total CA and chromosome breaks frequencies were significantly higher in the exposed workers than controls ($p < 0.05$ and $p < 0.01$ respectively), while no significant differences between the two groups were observed in terms of chromatid breaks and MN frequencies as well as the TI. In the controls only, TI was significantly higher in females than males, whereas a smoking habit did not affect the biomarkers investigated. The genetic polymorphisms of XRCC1, XRCC3 and XPD, individually analysed, did not influence any of the genotoxicity and oxidative damage biomarkers studied, either in the exposed workers or the controls.

Discussion Chromosome breaks frequency resulted a valid cytogenetic biomarker for the monitoring of workers exposed to low doses of IR. The presence of single genetic variants reducing the activity of DNA repair enzymes does not seem to determine an increased risk of genotoxic effects of low doses of IR.

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EXPOSURE OF EMPLOYEES IN THE GERMAN TRANSPORT INDUSTRY TO SOLAR UV RADIATION

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Introduction In Germany, the number of skin cancer diseases, which is caused by ultraviolet radiation (UV radiation) of sunlight, increases considerably. The exposure to solar UV radiation can be effected outdoors during a professional activity. But reliable data about the level of UV radiation exposure are missing.

In the research project 'skin cancer induced by UV radiation', initialized and realised by the German social accident insurance, the actual exposure should be identified under realistic working conditions. The objective is to create a task-related exposure matrix.

Methods From april till october 2015, UV radiation was determined in different groups of occupational activities. 18 people were involved, who were exclusively working at the airport ramp including handling agents (passenger handling), handling agents (cargo handling), turn round coordinators (TRC), turn round supervisors and gardeners. During their daily working hours they wore an electronic dosimeter, which is fixed at an

arm mount and determines the erythral exposure radiation. The data were recorded and anonymously transferred to a server.

Result During summer, the UV exposure of occupational groups is as different as their work. Compared to other occupational groups, apron workers are exposed to a medium level of solar UV radiation. Values between 129 and 322 SED were determined. Among the apron workers, the handling agents (passenger handling) get the highest erythral exposure.

Discussion Sun protection has to be adapted to the expected UV exposure of the different occupational groups. The data can be used for the development of tailor-made prevention measures.

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SHORT-TERM RADON 222 MEASUREMENT MODELLING

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Introduction Radon concentration undergoes seasonal and daily changes. Those changes are kept into account by long-term measurement: in Italian law this period is one year. Following the excess of limits, it is mandatory to start mitigation activities. The assessment of the new concentration cannot exceed few weeks, otherwise it will infringe the want for workers' safety.

Methods The aim of present work is to assess feasibility of short-term measurement that can substitute longer ones. In order to do so we measured radon in the same room by two different methods one long-term integration (reliable) and another one that gives short-term time history. Radon concentration was assessed by half-yearly CR39 and active alpha spectrometer Tracerlab in the same room. The spectrometer daily curves were modelled by mathematical functions to fit changes while giving the CR39 integrated value.

Result After comparison of modelled values with integrated ones, it comes out that the very important step is to keep into account, in the modellization, the occupation and the use of rooms, along with their duration. If this step is accurate, the numbers are comparable with those of passive methods.

Discussion Essentially two occupational phases gives two functions to reproduce integrated values: a sinusoidal and an exponential function. The correct duration with the window opening/closing time profile, provide the estimation of values of parameters to be used with those functions.

This gives the coincidence of actual and foreseen data of daily radon changes, saving a whole lot of measuring time and, hence, money.

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RADIATION PROTECTION IN PUBLIC HOSPITALS IN ABIDJAN

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Introduction Advances in medical imaging have helped to better orient the therapeutic strategy and evaluate the