

# POSTERS

Abstracts



4<sup>th</sup> Edition of International Conference on  
**Occupational Health and Safety**

May 28-29, 2018 | London, UK

May 28-29, 2018  
London, UKP Michael Politano et al., J Nurs Health Stud 2018, Volume 3  
DOI: 10.21767/2574-2825-C2-006

## AGE AS A FACTOR IN DAMAGE OR INJURY AMONG GENERAL AVIATION PILOTS

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**T**his research utilized the U.S. National Transportation Safety Board (NTSB) aviation accident/incident database from 1982-2016 to examine differences in severity of accidents by age for general aviation. The NTSB data set uses strict coding for each accident (damage to plane/injury to individuals) and incident (all other events). Of particular interest in for this study were number of flight hours for pilots, degree of damage to the plane (none, minimal, substantial, destroyed), and degree of bodily injury (none, minor, serious, fatal). There were 74,686 entries in the database. For this study, commercial (14 CFR part 121 and 135) operations were excluded as were home-built aircraft, helicopters, and gliders, leaving 61,363 events. Males were 91.8% with females at 3.7% (4.5% missing). The average age for pilots was 45.29 (SD=14.63). The mean number of flight hours for pilots was 2822.55 (SD=4980.61, SK=3.58). An ANOVA by age across damage levels was significant,  $F(3,60302)=4.06, p=.007$ . Post-hoc test indicated there were significant differences between no damage and substantial ( $p=.001$ ) and destroyed ( $p=.005$ ) but no other levels. An ANOVA by age across highest injury levels was also significant,  $F(3, 61312)=110.94, p<.001$ . Again, post-hoc analysis indicated significant differences between all levels of injury. This study indicated that there are differences in the degree of damage and injury related to aviation accidents based on age. While the cause of this increase has not yet been identified, pending examination of NTSB codes related to physical and psychological factors, currently underway, this preliminary examination begins to identify age ranges that become problematic with air flight operation.

### Biography

Michael Politano completed a doctorate and post-doctorate in clinical child psychology. He also holds a master's degree in religion. He has held the post of Head of Psychology at the Citadel and is currently a Professor of Psychology. He has published and/or presented over one hundred referred papers. He is co-author of *Statistics and research methodology: A gentle conversation*, and *Introduction to the process of research: Methodology considerations*. He is also author and illustrator of *A pig in a tree* and author of the novel, *Tag and Chubs*.

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## EXAMINATION OF DANGEROUS GOODS INCIDENTS ON AIRCRAFT

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**H**azardous and dangerous goods are often shipped by air on both passenger and cargo aircraft. These dangerous goods pose a danger to flight safety, passengers, and airline personnel, and have been known to cause aircraft accidents. This research examined dangerous goods incidents reported to the U.S. Aviation Safety Reporting System (ASRS) from 2009 to 2017. Early identification of dangerous goods trends using the ASRS data could lead to changes in aviation safety monitoring and reduce the likelihood of a dangerous goods event causing an incident on an aircraft. This study identified batteries as the most prevalent categories of hazardous material found in reported incidents and represents 25% of the total dangerous goods incidents. Missing or incorrect documentation was identified in almost 40% of the cases and 27% of the incidents involved improper packaging or loading of dangerous goods on aircraft.

### Biography

Robert Walton holds master's degrees in aeronautical science, business administration, and logistic and supply chain management, and a PhD in business administration. He is currently the Executive Director for Embry-Riddle Aeronautical University Worldwide. He has published in numerous academic journals, presented at multiple professional conferences worldwide and authored or co-authored several books. Most recently, he has co-authored Statistics and research methodology: *A gentle conversation*, and *Introduction to the process of research: Methodology considerations*.

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# PREVALENCE AND WORK FACTORS OF WORK-RELATED MUSCULOSKELETAL SYMPTOMS IN THE CHINESE CATERING INDUSTRY: A CROSS-SECTIONAL STUDY

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**T**he purpose of this study was to investigate the prevalence of work-related musculoskeletal symptoms (WMS) and their relationship with workplace risk factors in the context of the catering industries. It was a territory-wide survey of workers in the catering industries in Hong Kong. The revised Nordic Musculoskeletal Questionnaire (NMQ) was adapted in a three-part questionnaire collecting information on demographic characteristics, WMS, and work factors. The prevalence of WMS was then assessed by both restaurant type and job title. A two-way analysis of variance was used to analyze differences between pain intensity, prevalence, and frequency of movement at work. A total of 902 participants completed the survey. Their average age was 38.03 (SD=11.51). In general, the prevalence of WMS ranged from 11.6% (forearm) to 63.3% (lower back), with an intensity of around 5.0 (Visual Analogue Scale 0-10). The results also show that the most prevalent form of WMS was shoulder pain amongst Chinese chefs (71.7%). Frequency of movement (such as wrist bending and exertion) was the main work-related risk factor contributing to the development of WMS. Based on the study results, it was to conclude that Chinese chefs have a high prevalence rate for WMS in the catering industry. Undesirable work behaviors, such as poor posture, may contribute to their development.

## Biography

Andy S K Cheng is an Associate Professor in Department of Rehabilitation Sciences, Hong Kong Polytechnic University. He is also a Registered Occupational Therapist, chartered safety and health practitioner, and certified work capacity evaluator. He was the first Asian recipient of Canadian Institutes of Health Research Scholarship for postgraduate training on the work disability prevention CIHR strategic training program at University of Toronto.

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## HCFC-123 INDUCED TOXIC HEPATITIS AND DEATH AT A KOREAN FIRE EXTINGUISHER MANUFACTURING FACILITY: A CASE SERIES

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**E**xposure to sustained high concentrations of 2,2-dichloro-1,1,1-trifluoroethane (HCFC-123) is known to be hepatotoxic. We report two simultaneous cases of toxic hepatitis related to exposure to HCFC-123, a common refrigerant, at a Korean fire extinguisher manufacturing facility. Patients A and B were men aged 22 and 21 years, respectively, with no notable medical histories. They had recently started working for the same manufacturer of fire extinguishers. In the third week of their employment, they visited the emergency center of a general hospital due to fever and general weakness. At the time of their visit, they were suspected of having hepatitis due to elevated levels of liver enzymes. However, as their condition did not improve, they were transferred to a tertiary hospital. After conservative treatment, one patient improved, but the other died from acute hepatic failure. Assessment of the work environment showed that the short-term exposure levels of HCFC-123 for the valve assembly process were as high as 193.4 ppm. A transjugular liver biopsy was performed in patient B; the results indicated drug/toxin-induced liver injury (DILI). Given the insignificant medical history and occupational exposure to high levels of HCFC-123, the toxic hepatitis of the two workers was likely related to HCFC-123 exposure. HCFC-123 was not included in the work environment assessment material prescribed in Korea. We are the first to report a case of death related to HCFC-123-induced liver damage. Our findings suggest that exposure standards and limits for HCFC-123 must be developed in Korea; work environments must be improved based on such standards.

### Biography

Jihye Lee completed her Graduation from Catholic University of Korea. She has specialisation in Preventive Medicine and Public Health from Chung-Ang University. Later on, she started working at Occupational Safety and Health Research Institute (OSHRI) where she has continued her research.

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May 28-29, 2018  
London, UKSílvia Jesus Sousa Oliveira et al., J Nurs Health Stud 2018, Volume 3  
DOI: 10.21767/2574-2825-C2-006

## CPPD— OCCUPATIONAL CONTRIBUTION

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**C**alcium pyrophosphate dehydrate crystal deposition disease (CPPD) is an inflammatory arthritis produced by the deposition of calcium pyrophosphate crystals. The pathogenesis is not fully understood, but some risk factors were associated such as aging, previous trauma or some metabolic conditions. The involvement of joints like the metacarpophalangeal, which are not typically affected by osteoarthritis, should raise the suspicion of CPPD. Diagnosis is based on the clinical manifestations, radiographic and laboratory findings. The author presents a case report in which occupational exposure, through the contribution of chronic microtrauma, appears to be the main etiological factor for CPPD, an association never reported before. This case refers to a 63-year-old man, who worked as a medical pathologist for 30 years, specialized in cellular microscopy. His daily tasks consisted of using the microscope about eight hours per day and involved highly repetitive precision movements of fingers and hands at high rate with insufficient recovery time. After 25 years in this job, he gradually developed complaints of bony enlargement, tenderness, warmth, erythema and swelling referred to the metacarpophalangeal and 1st interphalangeal joints of the 2nd and 3rd right fingers. Secondary causes of CPPD were excluded and the immunological study was normal, but the radiographic images showed intra-articular calcifications and arthritis in the metacarpophalangeal joint of the 3rd finger of the right hand and marginal osteophytosis in this topography, with the deposition of calcium pyrophosphate crystals. This case opens the possibility of a new etiology for CPPD as well as this classification as a work-related disease.

### Biography

Sílvia Oliveira has graduated from Faculty of Medicine, University of Porto as Medical Doctor, with the specialty of Occupational and Health Medicine, from Centro Hospitalar do Porto. She obtained her post-graduation in Occupational Health from Faculty of Medicine, University of Coimbra. Presently, she is working in the Occupational and Health division, in Centro Hospitalar do Porto, Portugal.

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## **SOLID PHASE EXTRACTION OF CD (II) USING XAD-7 SORBENT PRIOR TO ATOMIC ABSORPTION SPECTROSCOPY**

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**C**admium is an important constituent widely used in different industrial processes for production of various synthetic materials. For evaluation of workers' exposure to trace toxic metal of Cd (II), environmental and biological monitoring are essential processes, in which, preparation of samples is one of the most time-consuming and error-prone aspects prior to analysis. To evaluate factors influencing quantitative analysis scheme of cadmium, solid phase extraction using mini columns filled with XAD-7 resin was optimized regarding sample pH, ligand concentration, loading flow rate, elution solvent, sample volume (up to 500 ml), elution volume, amount of resins, and sample matrix interferences. Cadmium ion was retained on solid sorbent and was eluted with 2M HNO<sub>3</sub> followed by simple determination of analytes by using flame atomic absorption spectrometry. Obtained recoveries of metal ion were more than 95%. The amount of the analyte detected after simultaneous pre-concentration was basically in agreement with the added amounts. The optimized procedure was also validated with three different pools of spiked urine samples

and showed a good reproducibility over six consecutive days as well as six within-day experiments. The developed method promised to be applicable for evaluation of other metal ions present in different environmental and occupational samples as suitable results were obtained for relative standard deviation (less than 10%), therefore, it is concluded that, this optimized method can be considered to be successful in simplifying sample preparation for trace residue analysis of Cd in different matrices for evaluation of occupational and environmental exposures.

### **Biography**

Seyed Jamaledin Shahtaheri completed his PhD from Surrey University, Guildford, England in 1996, with the specialties including sample preparation techniques for environmental and biological samples with subjects "trace residue analysis of pesticides" and then started working at Tehran University of Medical Sciences, Iran where he continued his research.

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May 28-29, 2018  
London, UKR Alami et al., J Nurs Health Stud 2018, Volume 3  
DOI: 10.21767/2574-2825-C2-006

## EVALUATION OF IMPREGNATION OF PESTICIDES IN PATIENTS ADMITTED TO THE DEPARTMENT OF ENDOCRINOLOGY IBN SINA CHU RABAT

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**R**epeated exposure or consumption of food contaminated with pesticide residues can cause various disorders to the human body, especially the immune and hormonal disturbances and the onset of certain cancers. Blood samples of 45 patients of endocrinology of the Rabat University Hospital were extracted by SPE C18 under the same conditions as the range calibration of 67 pesticides and controls, and then injected in the GC - MS. The pyrethroid (bifenthrin, deltamethrin and cypermethrin) were identified and assayed at 11.62% volunteer patients, 6.97% were contaminated with dimethoate, Malathion, azinphos-methyl, carbamates which were detected only in 3.65% of patients. Other assay was carried by LC - MSMS to cover polar pesticides or heat labile. After this study we found that, around 20% of patients suffering from thyroid dysfunction admitted to the department of endocrinology of the Rabat University Hospital were contaminated with pesticide residues with peaks exceeding 50 ppb especially for dimethoate and bifenthrin, while the reporting thresholds for the affectation of human health by pesticides never exceed 10 ppb for residues. Rest of complete a sufficient number of patients for biostatistical analysis and pesticide assay results by LC - MSMS; we can discuss a possible relationship between the presence of pesticide residues in human blood and development of certain endocrine diseases.

### Biography

He has done his PhD in Analytical Chemistry and Pharmacokinetics at the Faculty of Pharmacy University Clermont, FRANCE. He has DEA of basic pharmacokinetics and clinical faculty of pharmacy University Clermont in FRANCE. He is Master of Science and Biology Faculty of Science University Mohamed V Rabat. As per Professional experience, he is the Professor of Pharmacology and Toxicology, Head of Department of Toxicology Pharmacology at LRAM Royal Gendarmerie Morocco. He also founding member of the Moroccan Society of Toxicology.

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## EFFECT OF NUTRITION ON HEALTH AND SAFETY

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**F**or the realization of global positive impact a more safe and secure work, there is a need for deeper understanding of how nutrition affects productivity at the work place. Due to many demands at the workplace, maintaining a healthy diet at work might fall as a low priority. Getting time for eating and ample access to vending machines, snacks, doughnuts, and other junk foods, the workplace can derail the best-intentioned diet. Good nutrition habits have a positive impact on occupational safety and health and subsequently workplace productivity. It is well documented that unhealthy foods lead to obesity and chronic diseases, while lack of it can cause malnutrition among other disorders and ailments. In both these instances, the effects are detrimental to a strong, well-equipped workforce. What workers eat influence their health and their productivity, so it is in the interest of all the social partners unions, workers, employers and governments around the world to contribute in their different ways to good nutrition and a healthy diet at work.

### **Biography**

Hezron Ngugi has graduated from Mt Kenya University with a BSc in Business Administration and later a BSc in Public Health, with specialty in occupational health and safety. He works at Unisafe safety and presently also works as consultant with Kaileys Consortium Limited.

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Abstracts



4<sup>th</sup> Edition of International Conference on

# Occupational Health and Safety

May 28-29, 2018 | London, UK

## PECULIARITIES OF THE MINERAL PROFILE OF CHILDREN LIVING IN THE EAST OF UKRAINE

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**A** comparative analysis of the mineral profile (MP) in hair in practically healthy children of school age (6-18 years old), who are residents of different regions of East Ukraine was monitored. 375 children who live in ecologically unfavorable areas (group I) and 325 children living in relatively ecologically favorable regions (group II) of East Ukraine were examined. MP of children of the 1st group was characterized by significant reduction of essential microelements (ME): Ca, Zn, I and Mn, against a background of higher levels of potentially toxic ME: Ni, Cr, Cd and Rb and toxic ME - Pb, Sr and As. The analysis of second group showed an imbalance of the essential elements with decreasing of Ca, Zn, Mg, P and significant decreasing of essential ME - Fe. It has

been also evidenced the deterioration of the mineral profile in children aged 6-11 owing to a higher level of potentially toxic ME in contrast to children of the older age group. During a past decade, children of the East Ukraine developed reduction of Zn, Mn, and Ca and elevations in the levels of Pb, Al, Sr, Ni, Cd and this is explained by the state of the ecological environment of a large industrial region. There is no doubt that an unfavorable state of the environment creates a specific mineral profile and causes the mineral imbalance even in conditionally healthy children, which in turn may become the basis for the formation and development of chronic pathology in children.

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## **PERCEPTIONS AND EXPERIENCES OF STRESS, RESILIENCE AND WELL-BEING AMONGST MERCHANT SEAFARERS**

**Joanne McVeigh**

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**R**ecent changes in the maritime industry have escalated occupational stressors at sea, often challenging the well-being of seafarers. Faster turnaround schedules in ports, increased technology, decreased personnel, labour intensification, and social isolation have all affected the seafaring landscape. Seafarers are an occupational group amongst those at the highest risk for stress, which may in turn influence their mental and physical health. The overall aim of this study was to contribute to the current body of knowledge on facilitators and barriers of the psychosocial well-being of maritime workers, with a view to identifying how organisational policies could support optimal working conditions at sea. Qualitative analysis was conducted comprising 11 semi-structured interviews and 5 focus groups with superintendents, officers and ratings/crew of a large shipping company to explore their perceptions and experiences of stress, resilience and well-

being. Qualitative data was analysed using the descriptive and interpretive qualitative methods. Findings indicated psychosocial factors that impacted on stress, resilience and well-being on board. Psychosocial factors were varied including the importance of shore leave, the significance of high-quality food on board, the importance of socialisation on board, and the effects of diverse cultures and nationalities on well-being. Supporting the psychosocial well-being of seafarers may benefit both the individual seafarer and their employer, through improved well-being and increased work performance, comprising a virtuous reinforcing cycle. Importantly, however, a work environment seen as supportive and just is necessary to provide a good platform upon which individually focused psychological interventions can be optimally applied?

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## THE INITIATION OF JAWA-BALI CONTROL CENTER'S HEALTH PROGRAMME FOR DISPATCHER TO PREVENT OCCUPATIONAL DISEASES

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**O**ccupational Safety and Health (OSH) is paramount importance for PT PLN P2B Jawa-Bali Transmission Grid Control Center. HSE department under Occupational Safety and Health Management System (OHSMS) continuously ensuring and improving the safety and health of the employees since PT PLN P2B is responsible for feeding electricity to the mainland Jawa and Bali without disturbances. Occupational health is considered as integral factor to achieve company's missions, which are zero interruption and mistake due to human error and operational excellence of Jawa-Bali main transmission network. Dispatching functions of the centralized control centre has the main tasks to manage, monitor and maintain the trunk network

as well as maneuver's in case of power outages all the time. The demand of the job requires dispatchers to standby in front of screens under pressure and nonstop that exposed them to many health hazards such as vision problems, back pain, heart diseases, colon cancers and other musculoskeletal. Therefore, a complete and integrated dispatcher's health programme has been designed to prevent occupational health issues such as specially designed sports venue for dispatchers, additional health kit and frequent counseling by physicians to ensure the health condition of dispatchers.

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## **DIRECT AND INDIRECT COSTS OF ACCIDENTS IN THE CONSTRUCTION SECTOR PROJECTS**

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**T**he companies involved in construction have not completely indicated the data to calculate the real costs associated with accidents at work. Typically, these companies do not believe or do not bother to track or calculate associated costs to accidents.

**Objective:** To determine the relationship between direct and indirect costs of occupational accidents in construction sector projects.

**Results:** In Project 1 the direct costs exceeded almost half of indirect costs, whereas project 2 the direct costs are a little more than half of indirect costs. We obtained a ratio 1:0,41 to 1:1,71 for project 1 and project 2.

**Conclusion:** Any company not considering important indirect costs, because they are not covered by the Administrator of Professional Risks (ARL) may involve unnecessary expense.

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## **IMPACT OF OCCUPATIONAL HEALTH AND SAFETY HAZARDS ON WORKER PERFORMANCE IN TEXTILE INDUSTRY**

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**T**extile industries are facing tremendous issues relating with occupational health and safety hazards at workplace. These hazards have a negative impact on the performance of workers. It becomes difficult for workers to prevent from hazards at working place. The questionnaire was designed through survey in industry. The SPSS software was used to analyze the data. The reliability of data was checked by Cronbach's Alpha the descriptive techniques include mean, frequency and percentage, Correlation And Regression were used to compute the data. This study will

help to protect the workers from incident and workplace hazards. The result reveals that workers were facing many hazards like; stress, fumes, fluff, unmaintained machine, dust, noise, working in irregular time and without PPE at workplace. It is recommended that workers were not satisfied which creates the negative impact on the workers performance. This study will help to all industry to make the positive environment for workers at workplace.

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## THE SAFETY AND ENVIRONMENTAL PERFORMANCE OF THE WORLD'S LONGEST SOUR GAS PIPELINE

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Located in the southwest of IRAN, the Iran Gas Trunkline-5 (IGAT-5) with 504 kilometers in length and 56 inches in diameter is the longest sour gas pipeline among those developed in world so-far. Sour gas is more dangerous than sweet gas because of its hydrogen sulfide contents, so it require more safety considerations. The safety aspects of long pipelines for transportation of sour gas have been always of concern because of the potential populated area, high pressure and presence of toxic compounds of pipelines. Environmental harm, neighborhood destruction, serious injury and death. As a result, pipeline safety regulations have been established that govern how the pipeline industry designs, builds, operates, and maintains pipelines. Sour gas pipelines pigging operation is a highly risk work. The pipeline pigs may be stuck, lead to leakage accident, and even lead to

fire and explosive hazard. This pipeline with the containment of approximately 6000 ppm hydrogen sulfid in the most unique sour gas pipeline in the world. In order of operation improvement and precision maintenance it must consistently follow the safety rules and regulations. This study examines a set of safety rules and environmental measures that have brought about the optimal performance of the pipelines, and we express what measures we have functionally taken and put into place since the start of the operation of this pipeline(2008). We are pleased to announce that so far there has not been any harmful or any disastrous occurrence in terms of safety and environmental performance.

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## PREVALENCE OF HEARING LOSS AMONG FORMER MINeworkERS OF THE FORMER BLACK HOMELAND OF THE TRANSKEI, SOUTH AFRICA

**BL Meel**

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**Background:** Most miners who worked in apartheid South Africa came from the Transkei, which is one of the four former nominally independent black homelands of South Africa. Thousands of mineworkers returned home when they became disabled. Little research has yet been conducted into the needs of those mineworkers who developed hearing loss, which is recognised as a major problem in the mining industry.

**Objective:** To study the prevalence of loss of hearing among the retired mineworkers of the Transkei.

**Method:** Between May 1997 and May 2000, 2027 ex-mineworkers were examined at the Benefit Examination Clinic, which is located in the Chest Section of Umtata General Hospital (UGH), the teaching hospital of the University of Transkei Medical School in the Eastern Cape province of South Africa. A structured questionnaire was posted to 677 randomly selected ex-mineworkers. Data from the 406 (63%) completed questionnaires

received back were compiled and analysed by means of the Epi 6 Info computer program.

**Results:** Hearing loss was indicated by 219 (54%) of the respondents, of whom 72 (33%) were between 40 and 59 years of age. Of the 182 (45%) workers who had worked between 10 to 19 years in the mines, 40 (22%) indicated experiencing a loss of hearing. A strong association between hearing loss and years spent mining was detected ( $p < 0.05$  and  $X^2$  is 12.4).

**Conclusion:** Many (54%) of the ex-mineworkers from the Transkei were found to be afflicted with hearing loss. Such a health problem demands much attention from occupational hygienists and the compensation authorities.

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May 28-29, 2018  
London, UKJ Nurs Health Stud 2018, Volume 3  
DOI: 10.21767/2574-2825-C2-006

## RESILIENCE IN POLICE

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**Background:** The study examined the feasibility of implementing an innovative stress-resilience intervention using self-regulation, to modify psychological stress, autonomic response to stress and cardiovascular disease risk factors in police officers.

**Methods:** Subjects included police officers age 21 to 65 years (n=40). To self-regulate responses to stress, officers were educated on techniques to manage emotional and physical responses to stress, 2) practiced self-regulation and 3) used iPad to practice techniques to build coherence associated with heart rate variability. Pre to post-difference in coherence was tested using a one-sample two-sided t-test. To evaluate relationships between differences in coherence and differences in outcomes, Pearson correlation coefficients (r) were calculated. Correlations among variables were examined.

**Results:** Post intervention officers showed reduction in diastolic blood pressure (M = -6.8, SD= 9.3, p = .02, d = 0.73), correlation coefficient values for the relationship between differences in coherence and differences in outcomes were large for Impact of Event Scale Avoidance subscale (r = -.58, p = .10), Impact of Event Scale total score (r = -.55, p = .13), and clinically significant changes were found for both the sympathetic and parasympathetic contributors of heart rate variability.

**Conclusion:** Results support post intervention change and these methods may well be applicable to other high stress occupations including nursing. This data is also necessary to support policy change

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## **EFFECT OF MACHINING AND LUBRICATING CONDITIONS ON DUST EMISSION DURING GRANITE POLISHING**

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Machining is necessary to shape parts but it is also an important source of pollution (such as dust and aerosols) and this constitutes hazards for machine-tools operators. The emission of dust and the overall shop floor air quality are of great concern when shaping dusty materials such as granite as this process generates harmful dusts containing silica. In recent times, the occupational health and safety regulations have become more severe. To quickly comply with new regulations, engineers and

researchers must help industries in developing strategies to limit ultrafine particle emission when polishing granite as a function of machining conditions and parameters. The machining conditions studied include the tool paths, the lubrication and its applications modes. The main goal is to determine machining conditions leading to less dust emission while maintaining acceptable part quality and productivity.

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# CHRONIC EXPOSURE TO HEAVY METALS DECLINES SPERM QUALITY, DAMAGES TISSUE ARCHITECTURE AND ALTERS EXPRESSION OF STRESS PROTEINS

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Exposure to Cadmium or Lead is generally considered as an occupational health hazard while; contaminated ground water is the major route for human exposure to arsenic. An early and chronic exposure of these heavy metals may result in reduced or impaired fertility at later stages of life. This study aims to assess and compare the toxic effects of Sodium Arsenite, Cadmium Chloride and Lead Acetate in both reproductive (testes) and non-reproductive tissues (liver) of juvenile and adult rats. Triplicate sets of male juvenile and adult Wistar rats were supplied drinking water having heavy metal salts of dose 100 times higher than Maximum Contamination Limit, for three months and simultaneously, age-matched controls were taken. Effects of heavy metals were assessed by studying total sperm count and defective sperm and by histological examinations. Semi-quantitative RT-PCR was done

in order to assess the expression level of stress proteins mRNAs i.e. Heat Shock Protein 70 (HSP70) and Metallothioneins (MT1 and MT2) in testes and liver of all treated and control rats. Results showed that heavy metal exposure (except arsenic) caused a significant decrease in healthy sperm count ( $p < 0.05$ ) and tissue integrity. The expression of HSP70 and MT1 were found higher in treated tissues (significantly in juveniles) compared to controls ( $p < 0.05$ ). Furthermore, higher expression of MT1 mRNA can make this gene a good biomarker to assess heavy metal toxicity. This study showed that juveniles are showing more severe effects compared to adults justifying the vulnerability of early chronic exposure to heavy metals.

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## **LOW BACK PAIN AND ERGONOMIC RISKS OF TRADITIONAL WEAVING FOR YOUNG WORKERS IN THE INFORMAL SECTORS, CENTRAL AND SOUTHERN ETHIOPIA**

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Low back pain among adolescents has become a growing public health concern but little known about the burden, particularly in young workers engaged in the informal economy. The aim of this study is to determine the prevalence, estimate the ergonomic risk level of main traditional weaving tasks and other factors associated with low back pain. Data was collected from 814 sampled young workers of age between 14-17 years employed in traditional weaving from the central and Southern region of Ethiopia. Workers having musculoskeletal symptoms and the ergonomic risk level were assessed using Nordic and Quick Exposure Check tools respectively. In addition, the work-related stress was assessed by the Health and Safety Executives (HSE) Management standard questions. The prevalence of low back

pain symptoms was 48.9% and 14.0% having a severe form of Low Back Pain. From the five main tasks in the traditional weaving process, four of the tasks have very high and one task has medium ergonomic risk level. Working on a seat without back rest, long day work, thermal comfort of the workplace, working at night, workplace safety, health awareness and emotional abuse were statistically significant to low back pain symptoms at  $P < 0.05$ . The working practices in the traditional weaving process had high ergonomic risk for low back pain development to young workers. Strengthening the labor inspection services, work environment and tools improvement could be very important to reduce the incidence of low back pain.

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