

The result of the above is that workers in GB are unjustly denied early detection of harm to their health, with prompt compensation and the opportunity to avoid further harmful exposures.

Unless action is taken to address these issues, by accurately ascertaining the distribution and addressing the determinants of ODs, their elimination will not be achieved in GB.

## Poster Presentation

### Psychosocial

0015

#### THE SIGNIFICANCE AND APPLICATION OF SALIVARY BIOMARKERS OF STRESS, CORTISOL AWAKENING RESPONSE, IN OCCUPATIONAL PSYCHOLOGY

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**Objectives** This study aims to investigate the correlation between cortisol awakening response (CAR) and sleep quality, mental stress, fatigue, workload and health status in a period of 28 days.

**Materials and Methods** A total of 28 subjects participated in this study. The saliva was collected by cotton-based Salivette at awakening, 30 min after awakening, and bedtime for a period of 4 weeks. The saliva cortisol was measured by LC-MS-MS. Four parameters were used to present CAR, 30 min post-awakening cortisol, CAR denoting rise from awakening to 30 min post-awakening (slope), AUC for CAR, and full AUC (= AUC for CAR + AUC for late decline). The outcomes variables included sleep quality measured by Pittsburgh sleep quality index (PSQI) questionnaire, and self-rated workload, mental stress, fatigue, and health score for each day.

**Results** CAR were correlated with fatigue score and stress score, but not with sleep quality (PSQI), workload and health score. Regarding parameters of CAR, AUC for CAR and full AUC are better than CAR slope and 30 min post-awakening to correlate with fatigue and stress. AUC for CAR and full AUC may represent the degree of mental stress and fatigue in the previous day.

**Discussion** We have found single day CAR and 4 week CAR were correlated with mental stress. But how to design a study to elaborate whether CAR can predict the occurrence of cardiovascular diseases (Karoshi) needs further to be solved. Solution for variation of CAR day-to-day and pick-up the day of most stressful are urgent.

## Poster Presentation

### Methodology

0016

#### ASSOCIATION BETWEEN PM 2.5 EXPOSURE AND LIPID PEROXIDATION WAS CONFIRM BY REPEATED MEASUREMENTS LONGITUDINAL STUDY WITH A PROPER INTERACTION TERM

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**Objective** to examine the relations between personal exposure to PM<sub>2.5</sub> and inflammatory and oxidation markers.

**Methods** We conducted a panel study with three sampling time points (baseline, two months follow-up, and four months follow-up) among 68 healthy non-smoking young adults from 3 different areas (Area A [residential and commercial area], Area B [industrial area] and Area C [scientific park]).

**Results** the average PM<sub>2.5</sub> concentrations was 37.3 µg/m<sup>3</sup> for personal sampling and 31.6 µg/m<sup>3</sup> for nearest air quality monitoring station. Among them, the personal PM<sub>2.5</sub> concentrations in B zone was significant highest than A and C zone. For the longitudinal study, we used linear Mixed-model was as follows:  $Y_{it} = \alpha_0 + \alpha_1 Time_{it} + \beta_0 Z_{km} + \beta_1 Z_{km} Time_{it} + \gamma X_{i0} + \epsilon_{km} + \epsilon_i + \epsilon_{it}$ , where  $Z_{km}$  used four PM<sub>2.5</sub> counting methods: (1) personal PM<sub>2.5</sub> concentrations; (2) average personal PM<sub>2.5</sub> concentrations at three sampling times; (3) average personal PM<sub>2.5</sub> concentrations with area under the curve during 120 days; (4) average personal PM<sub>2.5</sub> concentrations during 120 days (>35 µg/m<sup>3</sup> vs. ≤35 µg/m<sup>3</sup>). After adjustment for age, gender, smoking habits, sampling zones, height, weight, temperature, and relative humidity, we found that the Urinary N7-MeG/creatinine was significantly decreased with PM<sub>2.5</sub> exposure concentrations, and Urinary HEL/creatinine was significantly increased with PM<sub>2.5</sub> exposure concentrations by time, regardless of which PM<sub>2.5</sub> exposure models were used. While we only used average personal PM<sub>2.5</sub> concentrations at three sampling times, we found that SDNN and GPx were significantly increased with PM<sub>2.5</sub> exposure concentrations by time.

## Poster Presentation

### Working Conditions

0018

#### DO HIGHLY ACTIVE WORKERS DIE EARLY? ELUCIDATING THE PHYSICAL ACTIVITY HEALTH PARADOX IN A SYSTEMATIC REVIEW WITH META-ANALYSES

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**Introduction** New evidence suggests a physical activity (PA) health paradox, with positive health outcomes associated with high intensity leisure-time PA (LTPA), but negative health outcomes for those engaging in high intensity occupational PA (OPA). The aim of this study was to examine this paradox by systematically reviewing evidence on the association between high OPA and all-cause mortality.

**Methods** A systematic search of the literature was performed screening for eligible (peer-reviewed articles on prospective studies. Meta-analyses were performed assessing the association of high (compared to low) intensity OPA and all-cause mortality in males and females, estimating pooled hazard ratios (HR) with 95% confidence intervals (95% CI).

**Results** 2060 unique articles were screened of which 28 (from 24 studies with 2 88 264 participants) were included. We statistically pooled information from 19 studies, showing that males with high intensity OPA had a higher risk of early mortality than those with light intensity OPA (HR [95% CI]: 1.24 [1.03 1.49]). Such an association was not observed for females (0.88 [0.75 1.03]).

**Conclusion** These findings support the PA health paradox, with levels of high intensity OPA being associated with ill-health (for males). An explanation for this finding may be the nature of OPA, involving sustained demanding tasks, causing chronically elevated blood pressure and heart rate responses. Males may be more prone than females because of gender differences in OPA, with males more likely to work in higher intensity occupations. Future research (preferably using objectively measured OPA) should further explore these potential mechanisms.

## Poster Presentation

### Musculoskeletal

#### 0019 THE ASSOCIATION OF ADOLESCENT SPINAL PAIN WITH WORK ABSENTEEISM IN EARLY ADULTHOOD – SIX-YEAR FOLLOW-UP DATA FROM A POPULATION-BASED COHORT

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**Introduction** For many, spinal pain first develops during adolescence. However, the extent to which adolescent spinal pain impacts work absenteeism later in life is largely unknown. We assessed the association of spinal pain in adolescence with work absenteeism in early adulthood, using a population-based cohort.

**Methods** Data from a sample of working people in the Western Australian Pregnancy Cohort (Raine) Study (n=476) were analysed. At 17 years of age, spinal pain (low-back or neck) with impact on work and/or study behaviour was self-reported. Six years later (at 23 years), participants replied to four quarterly text messages asking them about their work absenteeism, from which annual total and sickness absence were estimated. Negative binomial mixed-models were used to estimate the association between spinal pain and work absenteeism (Incidence Rate Ratios (IRR) with 95% confidence intervals (95% CI)).

**Results** Participants with adolescent spinal pain with impact at year 17 reported significantly higher (mean [SD]) total work absenteeism at year 23 (148.7[243.4] hours/year), compared to those without pain (43.7 [95.2] hours/year); with IRR [95% CI]: 3.9 [1.5 10.3]. Comparable findings were found for sickness absence (IRR: 3.6 [1.3 10.2], with 94.1 [201.5] and 29.3 [75.0] hours/year absence, respectively).

**Conclusion** Results of our study show a more than three-fold higher risk of work absenteeism in early adulthood among those with adolescent spinal pain with impact compared to those without spinal pain. These findings indicate that pain

behaviour during adolescence can set a stage for work absenteeism later in life, underlining the importance of early pain prevention and management.

## Poster Presentation

### Injuries

#### 0020 ROAD TRAFFIC COLLISIONS RISK IN PROFESSIONAL DRIVERS WITH DIABETES MELLITUS AND RECEIVING TREATMENT- A PROSPECTIVE COHORT STUDY

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**Aim** A cohort study was used to follow up the outcomes of DM and treatments to assess for the 6 year risk of RTC event.

**Methods** Taiwan Bus Driver Cohort Study (TBDCS) recruited 1650 professional drivers in Taiwan since 2005. The subjects were interviewed in person, completed the basic and working patterns questionnaires. Moreover, this cohort of drivers was linked to the National Traffic Accident Database (NTAD), and researchers found 152 new RTC events from 2005 to 2010. History of DM and DM treatments were found from National Health Insurance Research Dataset (NHIRD). Cox proportional hazards model were performed to estimate the hazard ratio (HR) for RTC.

**Results** The RTC drivers had high frequency of DM (13.8% vs. 7.3%; p=0.007), type 2 DM (13.2% vs. 7.0%; p=0.009), and DM treatment (11.2% vs. 5.8%; p=0.014) in comparison to non-RTC drivers. DM and type 2 DM increased the 6 year RTC risks among professional drivers (HR: 2.31, 95% CI: 1.33 to 4.01; p=0.003, and HR: 2.31, 95% CI: 1.31 to 4.06; p=0.004), even after adjusting for education, caffeine drinks used, sleeping pills used, time since first employment, hypertension, and overnight oxygen desaturation index. Moreover, DM treatment with insulin secretagogue (Sulfonylurea and Meglitinide) and insulin sensitizer (Biguanide) had an increased risk for RTC (HR: 2.22, 95% CI: 1.01 to 4.93; p=0.049, and HR: 2.07, 95% CI: 1.06 to 4.05; p=0.033).

**Conclusion** This study have proposed recommendations to labour or health care professionals for managing professional drivers with diabetes.

## Poster Presentation

### Occupational Medicine (SCOM/Modernet)

#### 0022 ASSESSING SELF-REPORTED HEALTH EFFECTS BY FORKLIFT OPERATORS

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**Aim** Forklift is a special machine used in transporting, lifting, carrying and storing heavy objects in logistics and in all other