

significant correlation between overall job satisfaction and managerial roles leader ( $r = 0.272$ ,  $p = 0.002$ ), decision maker ( $r = 0.196$ ,  $p = 0.022$ ), innovator ( $r = 0.206$ ,  $p = 0.014$ ) and negotiator ( $r = 0.237$ ,  $p = 0.005$ ). There was no correlation between total job satisfaction and motivation of health care professionals ( $r = -0.033$ ;  $p = 0.713$ ).

**Conclusion** The finding suggests that the nature of work, supervision and coworkers had a modest effect on job satisfaction of healthcare workers at surgery departments. Strengthening of managerial skills would lead to increased job satisfaction of health workers.

**P-193 ASSOCIATION BETWEEN SLEEP-WAKE ACTIVITY CIRCADIAN RHYTHM AND MILD COGNITIVE IMPAIRMENT AMONG WORKERS WITH PNEUMOCONIOSIS IN HONG KONG**

<sup>1</sup>Shelly Lap-ah TSE, Chun Yuk Jason Tsang, Bixia Huang, Chi Chiu Leung. <sup>1</sup>The Chinese University of Hong Kong, Hong Kong

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**Introduction** Weakened circadian activity rhythm was found to increase dementia and mild cognitive impairment (MCI) among female aged general population, but little is known among pneumoconiosis workers with male predominating.

**Objectives** This study aims to investigate sleep-wake activity circadian rhythm of patients with pneumoconiosis and test the hypothesis that weakened circadian rhythm is associated with MCI.

**Methods** We randomly enrolled patients with pneumoconiosis who participated in the annual interview activity. Community controls frequency-matched by age and sex were recruited as the reference. Participants wore wrist actigraphs continuously for 7 days (168 h) after completion of a standardized epidemiological questionnaire. Mesor, doubled amplitude acrophase and percent rhythm are the main circadian parameters and a higher value indicates a more robustness of circadian rhythm. MCI status was assessed using validated Chinese version of Montreal Cognitive Assessment (HK-MoCA) and Mini-mental state examination (MMSE) with a cutoff of 21/22 and 26/27, respectively. Co-variance analysis and multivariate logistic regression were performed to obtain adjusted mean of cognitive score and adjusted odds ratio (AOR).

**Results** Workers with pneumoconiosis had significantly lower MoCA score than the community controls ( $20.5 \pm 0.4$  vs.  $22.0 \pm 0.5$ ,  $p = 0.03$ ) after age and education were adjusted, while the difference in MMSE score was borderline ( $25.6 \pm 0.3$  vs.  $26.4 \pm 0.4$ ,  $p = 0.08$ ). Mesor and Double amplitude were the circadian parameters that were notably lower among pneumoconiosis workers than the community controls. Compared with community controls with higher Mesor values, pneumoconiosis workers with lower Mesor levels had an AOR of 2.89 (95%CI: 1.20–6.95) for MCI measured by MoCA, which was relatively higher than that of the community controls (AOR=2.73, 95%CI: 0.94–7.93). Similar but attenuated results were observed for double amplitude.

**Conclusion** This study provides the first epidemiological evidence that increased risks of mild cognitive impairment is associated with weakened circadian rhythm among pneumoconiosis workers.

**P-194 SEX DIFFERENCE OF NEGATIVE EMOTION AND CONTRIBUTING FACTORS AMONG CHINESE NIGHTSHIFT WORKERS**

<sup>1</sup>Shelly Lap-ah TSE, Feng Wang, Zhimin Li. <sup>1</sup>The Chinese University of Hong Kong, Hong Kong

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**Introduction** Nightshift work is prevalent in developed and developing countries in which female nightshift workers are more vulnerable, particularly for mental health.

**Objective** This study aims to investigate if the prevalence of negative emotion differ among male and female nightshift workers and explore the contributing factors using the baseline information of a prospective nightshift worker cohort in Shenzhen, China.

**Methods** We recruited 5329 workers and collected their blood/urine samples from 5 industries at the baseline, but only included 834 workers from 2 companies into this report because other 3 companies mainly composed of male workers. We adopted a standardized questionnaire to collect information on lifetime nightshift work, lifestyle factors, housework demands and socio-demographic data.

**Results** Overall, 510 workers were males (61.2%) and 324 were females (38.8%). More female than male workers were nightshift workers (90.1% vs. 82.7%), aged  $\geq 40$  years (20.4% vs. 12.9%) and married (74.4% vs. 58.2%) but less females attained college or above (8.6% vs. 23.5%) and leisure-time exercises (32.7% vs. 50.0%). Significantly more female workers did different housework including cooking (12.7% vs. 9.6%), washing (50.6% vs. 31.4%) and taking care of children/elderly (20.4% vs. 12.2%), and the sex difference in housework demands was particularly prominent among nightshift workers. Female nightshift workers were more prone to negative emotion because of 'feel exhaust or insufficient energy (40.1% vs. 32.2%)', 'worry of significant change of body weight (18.5% vs. 12.6%)', 'insomnia/poor sleep (31.5% vs. 21.3%)', and 'hard to concentration or forgetful (30.1% vs. 20.4%)'; however, there was no significant sex difference of negative emotion among daytime workers.

**Conclusion** This study reveals that female nightshift workers were more vulnerable to negative emotion, and nightshift work schedule and high housework burden are the contributing factors.

**P-195 EFFECTIVENESS OF COVID-19 VACCINE IN HEALTH CARE WORKERS, MILAN, ITALY**

<sup>1</sup>Dario Consonni, Patrizia Bono, Massimo Oggioni, Sara Uceda Renteria, Alessandra Piatti, Silvana Castaldi, Antonio Muscatello, Michele Carugno, Luciano Riboldi, Ferruccio Ceriotti, Alessandra Bandera, Andrea Gori, Angela Cecilia Pesatori, Andrea Lombardi. <sup>1</sup>Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Italy

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**Introduction** Randomized controlled trials showed efficacy of vaccines against coronavirus disease 19 (COVID-19). There is the need to quantify vaccine effectiveness in real-world contexts, including people at high risk of infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), such as health care workers (HCWs).

**Objectives** To evaluate vaccine effectiveness among hospital HCWs.

**Methods** We performed a cohort study among HCWs of a large University hospital in Milan, Lombardy, Italy by merging routinely collected data on demographics, COVID-19 vaccination, and polymerase chain-reaction (PCR) tests performed on nasopharyngeal swabs. Follow-up started on December 27, 2020 (start of vaccination campaign). We included HCWs never PCR-positive before the start date and with at least a PCR test afterwards. Vaccination was treated as a time-dependent variable by calculating person-years (PY) at risk before and after vaccine doses. Subjects contributed PY until first positive PCR test (cases) or last test for never positive HCWs (to avoid immortal time bias). We calculated infection rates (cases per 1000 PY), rate ratios (RR, with a Poisson regression model adjusted for gender, age, occupation and 30-day periods), vaccine effectiveness (VE =  $(1 - RR) \times 100$ ) and 95% confidence intervals (CI) taking never vaccinated HCWs as reference.

**Results** As of May 10, there were 3,152 vaccinated (97% with BNT162b2, 140 with one dose, 2,679 with two doses) and 333 non-vaccinated. We counted 29 infected cases (rate 385) among non-vaccinated, 6 (rate 65) from day 14 after the first dose (VE 79%, CI 49–92%), and 24 (rate 65) from day 7 after the second dose (VE 89%, CI 80–94%). Most cases after vaccination were asymptomatic or mildly symptomatic.

**Conclusion** In these preliminary analysis we found high effectiveness of COVID-19 vaccine in HCWs in our hospital. Further work is needed to assess long-term effectiveness and to better plan future preventive strategies among this high-risk occupational group.

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#### PREVALENCE OF NIGHT/SHIFT WORK AND ITS ASSOCIATION WITH EXITING THE WORKFORCE AMONGST OLDER UK WORKERS FROM THE HEAF STUDY

<sup>1</sup>Gregorio Bevilacqua, Stefania D'Angelo, Georgia Ntani, Martin Stevens, Cathy Linaker, Karen Walker-Bone. <sup>1</sup>University of Southampton, United Kingdom

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**Introduction** Night/shift work is increasing but there are few data about the prevalence amongst older workers. Night/shift work has been associated with a number of adverse physical and mental health outcomes, including cardiovascular disease, cancer, anxiety, and depression. With governments encouraging people to work to older ages, it is important to know how feasible night/shift work is for older workers and whether it is associated with prematurely exiting the workforce.

**Objectives** Amongst current older workers (aged 50–64 years), to explore the prevalence of night/shift working and evaluate its associations with early exit from the workforce over 4 years of follow-up.

**Methods** Data from the Health and Employment After Fifty (HEAF) cohort were used to describe the demographic, job and health characteristics of men and women undertaking night/shift work. Longitudinal data from annual follow-ups were used to examine the number and nature of exits annually thereafter.

**Results** Amongst the 5409 working at baseline, 32% reported night/shift work but the sectors differed by sex. Night/shift workers were more likely to be: current smokers; doing physically-demanding work; struggling to cope at work

physically and mentally; dissatisfied with their hours; depressed; sleeping poorly; and/or rating their health poorly. Men (OR 1.4, 95%CI 1.1–1.8) and women (OR 1.3, 95%CI 1.0–1.6) working nights/shifts were slightly more likely to exit the workforce over 4 years. A greater proportion of those exiting the workforce who were night/shift workers attributed their exit to ill-health compared with those working conventional hours.

**Conclusion** In our study, almost one in three workers reported night/shift work. We found some evidence of adverse impact on health, sleep and wellbeing and higher rates of job exit in shift/night workers. More research is needed, but night/shift work may be challenging to sustain for older workers and could be detrimental to health.

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#### LONG TERM EXPOSURE TO AIR POLLUTION AND COVID-19 INCIDENCE IN THE CITY OF VARESE, NORTHERN ITALY: A COMPLETE-YEAR, INDIVIDUAL-LEVEL ANALYSIS

<sup>1</sup>Giovanni Veronesi, Sara De Matteis, Giuseppe Calori, Nicola Pepe, Marco Ferrario. <sup>1</sup>University of Insubria, Italy

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**Introduction** Studies on air pollution and COVID-19 are limited to the first pandemic wave (April/June 2020) and by their ecological design.

**Objectives** To investigate the association between airborne pollutants and SARS-CoV-2 incidence up to March 2021 in the Varese city (Lombardy region), with individual-level data on exposures, disease and confounders.

**Methods** Varese citizens aged 18+ years as of Dec31st,2019 were linked by residential address to 2018 average annual exposure to outdoor concentrations of PM2.5, PM10, NO2, NO and O3 modelled using FARM chemical-transport model (linkage coverage: 97.4%). Citizens were linked to Regional datasets for COVID-19 case ascertainment (positive nasopharyngeal swab specimens) and to define age, sex, residential care home living, population density and comorbidities. We estimated rate ratios and additional number of COVID-19 cases for 1 µg/m3 increase in air pollutants, from single- and bi-pollutant Poisson regression models.

**Results** Among the 62,848 residents, we observed 4408 COVID-19 cases. Yearly average PM2.5 exposure was 12.5 µg/m3. Cumulative incidence curves suggest an increased risk for PM2.5 > 13.5 µg/m3 in correspondence of downtrend periods in the pandemic curve. Age, residential care home living, history of stroke, medications for diabetes, hypertension and obstructive airway disease were independently associated with COVID-19 rate. In single-pollutant multivariate model, 1 µg/m3 increase in PM2.5 was associated with 5.1% increase in COVID-19 rate (95%CI: 2.7%–7.5%), corresponding to 294 additional cases per 100,000 person-years. These figures were confirmed in bi-pollutant models and after excluding subjects in residential care homes. Similar findings were observed for PM10, NO2 and NO. O3 was associated with a 2% decrease in disease rate, the association being reversed in bi-pollutant models.

**Conclusions** In our study, long term exposure to low-levels of air pollutants, especially PM2.5, positively affected COVID-19 incidence. Causality warrants confirmation in future studies;