

not statistically significant. No association was significant in Bayesian analyses.

**Conclusions** We suggest that future studies use similar biologically-based exposure assessments in order for us to be sure what advice we should give to the millions of women around the world who work at night.

#### 206 MELATONIN AND SEX HORMONE BIOMARKERS AND LIGHT INTENSITY EXPOSURE IN FEMALE AND MALE PERMANENT NIGHT SHIFT WORKERS

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**Objectives** Night shift work has been associated with higher breast cancer risk. It has been proposed that night shift workers experience light-induced reduction in melatonin production. Melatonin has direct oncostatic properties and a potential interplay with reproductive hormones. In this cross-sectional study the hypothesis was that night shift workers produce less melatonin and more estrogens and androgens compared to day workers. Changes in the rhythm of hormone production under different individual light exposures were evaluated.

**Methods** 75 permanent night workers and 42 day workers of both sexes, aged 22–64 years, were recruited from 4 companies in Barcelona, Spain. Levels of 6-sulfatoxymelatonin (melatonin metabolite) and 27 steroid metabolites were measured in urine samples collected from all voids over 24-hours on a working day by all participants. Simultaneously participants wore a data logger that continuously recorded their light exposure. Socio-demographic, occupation and lifestyle information was collected for each participant by interview. Cosinor analysis was performed for 6-sulfatoxymelatonin in every individual to evaluate their circadian rhythm estimating the mesor (midpoint in the full-range), amplitude (difference of the peak value to the mesor) and peak time of production. Geometric means were calculated for each parameter in night and day workers.

**Results** Sociodemographic and lifestyle characteristics of day and night shift groups were not significantly different. 6-sulfatoxymelatonin production was significantly lower in night compared to day workers (mesor 10.9 vs 14.2 ng/mg creatinine respectively; amplitude 11.5 vs 18.3 ng/ml creatinine) and peak time was later in night shift workers (6:00 am vs 3:48 am). Mean oestrogen and androgen levels tended to be higher among night workers but differences were not significant.

**Conclusions** This study indicates potential differences in melatonin and steroid profiles between night and day workers. Results from hormone levels in relation to personal light exposure using nonlinear mixed models will be presented.

#### 207 NIGHTSHIFT WORK AND LEVELS OF 6-SULFATOXYMELATONIN, CORTISOL AND SEX HORMONES IN MEN

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**Objectives** Nightshift work has been associated with cancer among men, but the mechanism underlying this association is

not clear. We investigated whether male nightshift workers demonstrated changes in the normal circadian levels and secretion patterns of melatonin, cortisol and sex hormones that may be directly related to cancer risk.

**Methods** Participants were 185 male nightshift workers (NSW) and 158 male dayshift workers (DSW) employed as healthcare providers, aged 22–55. Urine samples were collected throughout work and sleep periods and assayed for various hormone metabolites.

**Results** Compared to DSW during their nighttime sleep, NSW had significantly lower levels of 6-sulfatoxymelatonin during daytime sleep, nighttime work, and nighttime sleep on their off-nights (57%, 62% and 40% lower, respectively). Urinary cortisol levels in the NSW were 16% higher during daytime sleep and 13% lower during nighttime sleep on off-nights, compared to DSW during nighttime sleep. While cortisol levels between NSW during night work and DSW during night sleep were not significantly different, metabolites of cortisol (e.g. cortisone, tetrahydrocortisol) were significantly increased among NSW. No significant differences were observed in testosterone or dihydrotestosterone levels between nightshift workers during their day sleep or night sleep compared to dayshift workers during nighttime sleep.

**Conclusions** Male sex hormones have been implicated in prostate carcinogenesis, however, results of this study indicate that the impact of nightshift work on cancer risk may occur through other mechanisms. Substantially reduced 6-sulfatoxymelatonin levels during night work, daytime sleep and even night sleep on off-nights among night shift workers were observed, and given the oncostatic properties of melatonin, this chronic reduction in melatonin among nightshift workers may represent an important carcinogenic mechanism. Corticosteroid secretion and metabolism was also found to be impacted by night shift work, which could have implications for cancer risk through its effects on immune function.

### Session: Plenary session

#### 208 CHANGES IN EMPLOYMENT CONDITIONS AND MENTAL HEALTH DURING THE ECONOMIC CRISIS IN MIGRANT WORKERS IN SPAIN

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**Objective** Evaluate the influence of changes in employment conditions on mental health of migrant workers in Spain, in the context of economic crisis.

**Methods** Follow-up survey at two time points: 2008 and 2011, whose reference population consists of 318 workers from Colombia, Ecuador, Morocco and Romania living in Spain. Those who reported good mental health (n = 214) at 2008 were selected to evaluate, after three years, the incidence of poor mental health according to several sociodemographic and occupational factors (sex, age, nationality, education level, occupation and employment status), and the association between this health indicator and different employment trajectories during this period, by means of adjusted odds ratio (aOR).

**Results** There is an increased risk of poor mental health in those workers who lost their employment (aOR = 3.62; IC 95%: 1.64–7.96), who increased the number of work hours