Shiftwork

1193 NIGHT-SHIFTS, DNA METHYLATION AND TELOMERE LENGTH: PRELIMINARY RESULTS FROM A SURVEY ON A SAMPLE OF ITALIAN NURSES

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Introduction IARC defined shift work as probably carcinogenic to humans (Group 2A), after investigations highlighted an increased breast cancer risk in night-shift female workers. The biological mechanisms underlying this association are still unclear. Hence, we evaluated the relationship between night-shift work and molecular alterations potentially related to increased cancer risk, in detail: DNA methylation of the oestrogen receptor gene (ER-Beta) and tumour suppressor genes (BRCA1, p53, p16), global DNA methylation estimated in repeated elements (LINE-1, Alu) and telomere length (TL).
Methods 46 female nurses (age: 35–45 years) who had been working in night-shifts for at least two years (length of service ≥five years) were recruited at the Policlinico Hospital (Milan, Italy) and matched for age, sex and length of service to 51 colleagues not working in night-shifts. Each subject was administered a structured questionnaire and withdrawn a 12 mL blood sample. Linear regression models adjusted for age, BMI, parity, smoking habit and oral contraceptive use were then applied.
Results Working in night-shifts (yes/no) was associated with BRCA1 hypomethylation (β: −0.512, 95% CI: −1.039 to 0.015). When considering also former night-shift workers, the number of years in night-shifts (NYNS) was associated with hypomethylation of BRCA1 (β: −0.084, 95% CI: −0.127 to −0.042), p53 (β: −0.072, 95% CI: −0.133 to −0.011) and LINE-1 (β: −0.043, 95% CI: −0.083 to −0.002). After graphically inspecting the NYNS-TL relationship, we stratified our study population by NYNS <15 vs ≥15 years. Among nurses with NYNS ≥15 years, NYNS was associated with telomere shortening (β: −0.065, 95% CI: −0.122 to −0.008) and hypermethylation of BRCA1, p53 and LINE-1.
Conclusion Our results show epigenetic alterations that might play a role in cellular ageing, genomic instability and carcinogenesis. We are currently extending our study to other molecular targets involved in the cascade of events that might bring from night-shift exposure to cancer.

1252 LONG WEEKLY WORKING HOURS AND RISK OF ISCHAEMIC HEART DISEASE AND STROKE

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Introduction Studies have indicated that long working hours is associated with circulatory diseases. The aim of the present studies was to test if long working hours were prospectively associated with ischaemic heart disease (IHD), usage of antihypertensive drugs (AD) and stroke, in a large randomly selected sample from the general workforce of Denmark.
Methods Self-reported data on weekly working hours from the Danish Labour Force Survey (1999–2013) was linked to national registers. Participants were followed until becoming a case, emigration/dead due other causes or end of study period (2014).

Poisson regression was used to analyse incidence rates as a function of weekly working hours. The analyses were controlled for calendar time, time since start of follow-up, age, sex, SES, night and health care work (the latter two for IHD only).
Result Around 1 45 000 persons were included with 3635 cases of IHD, 20 648 cases of AD and 1737 cases of stroke. With 32–40 hours/week serving as reference, the estimated rate ratios for IHD were 0.95 (95% CI: 0.85–1.06) for 41–48 and 1.07 (0.94–1.21) for >48 hours/week. The corresponding rate ratios for AD were 0.99 (0.95–1.04) and 1.02 (0.97–1.08).

In the study of stroke 35–40 working hours/week served as reference. The estimated rate ratios for overall stroke were 0.97 (95% CI: 0.83–1.13) for 41–48, 1.10 (0.86–1.39) for 49–54, and 0.89 (0.69–1.16) for ≥55 hours/week. The estimated rate ratios per one category increase in working hours were 0.99 (0.93–1.06) for overall stroke, 0.96 (0.88–1.05) for ischaemic stroke and 1.15 (1.02–1.31) for haemorrhagic stroke.
Discussion The analyses cannot confirm long working hours to be associated with IHD, AD or overall stroke. Data suggest however, that long working hours might be associated with increased rates of haemorrhagic stroke.

1426 CLOCKWISE AND COUNTER-CLOCKWISE JOB SHIFT ROTATION DIFFERENTLY IMPACTS ON WORK-LIFE BALANCE

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Introduction Rapidly rotating shiftwork schedule, is common in hospital nurses as it provides continuity to the patients' care. It has been suggested that shift rotation in clockwise (CW) direction produces less disruption of circadian rhythms than counterclockwise (CCW) rotation. Little is known about the effects of different direction of shift rotation on work-life balance, particularly in women characterised by additional commitments and responsibilities in the home and outside of work.
Aim To evaluate if CW and CCW shift rotation differently impacts on family and social relationships in female nurses.
Methods One hundred healthy hospital nurses (F, 20–50 years) were enrolled. Fifty of them worked in CW (Morning, M; Afternoon, A; Night, N; two rest days) and 50 in CCW (A, M, M, N, three rest days) shift rotation direction. A daily

diary filled out by the nurses at the end of each work-shift provided information concerning family and social relationships during a typical working week. Habits on coffee, smoke, time of meal assumption and home management during working days were also collected.

Result Nurses working on CCW shift rotation reported more frequently difficulties in keeping adequate family and social relationships compared to nurses working on CW one (96% vs 73%, p=0.002).

No differences were reported in coffee (3–4 cups/day), smoking (61%) habits and time of meals assumption (irregular in about 33% of nurses) during working days in the two groups. No differences were reported in the time spent in home management by the two groups.

Discussion CCW shift rotation seemed to disrupt quality of family and social relationships of nurses more than CW one. The fact that CCW shift rotation is associated to higher sleep disturbances and more fatigue in the free-time might partially explain these results. These aspects should be taken into account in shift-work schedule organisation, particularly in women.

1600 SHIFTING TIMES: RECENT ROTATIONAL SHIFTWORK AND INCIDENT HYPERTENSION RISK

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Introduction Rotational shiftwork, such as alternating day, afternoon, and night shifts, causes chronobiologic phase disruptions which may cause an increase in hypertension risk. Prior research has classified rotational shiftwork using assigned schedules in lieu of actual recorded work which may result in exposure misclassification. Therefore, we assessed the association between a novel quantitative definition of rotational shiftwork and incident hypertension.

Methods A cohort of 2156 new hires at 9 aluminium smelter and fabrication facilities were followed from 2003 through 2013 for incident hypertension defined by ICD-9 codes from insurance claims. Detailed time-registry data was used to classify each worker's history of rotational shiftwork. Rotational shiftwork was defined as shift with a larger than 4 hour absolute value change in start time from the preceding shift that started on an earlier day. The association between incident hypertension and rotational shiftwork in the previous 12 months was estimated in a Cox proportional hazards model, adjusting for age, sex, facility, smoking history, annual BMI, annual health claims based risk score, night shift exposure (percentage of shifts that were night shifts cumulatively and in the previous year), and history of rotational work.

Results The majority of workers (99.8%) experienced at least one rotation in their work history. The average worker had at 2.91 rotations (SD=1.87) per month with a mean of 130 rotations over their work history. Compared with workers with less than 5% rotational shiftwork in the previous year, the hazard ratio among workers with ≥5-<15%, ≥15-<30%, and ≥30% rotational shiftwork in the previous year were 1.02 (0.64–1.64), 1.13 (0.73–1.76), and 1.53 (0.95–2.45) respectively. Estimates were robust to the adjustment for night shifts

Conclusion Our results suggest recent rotational shiftwork exposure may be associated with higher rates of hypertension. Furthermore, rotational shiftwork may have an independent effect on hypertension risk not explained by night work.

223 INFLUENCE OF CHRONOTYPE AND SHIFTWORK ON SLEEP DURATION AND OCCUPATIONAL ACCIDENTS: FINDINGS FROM A CROSS-SECTIONAL STUDY IN METAL WORKING INDUSTRY

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Introduction Atypical work-times such as night shifts and very early shifts can affect the quality and quantity of sleep. Short sleep duration and disturbed sleep are associated with a hightened accident risk. Humans and animals are influenced by a biological clock which is genetically determined and synchronised by daylight. The study investigates the impact of the start of working time and chronotype on sleep duration and occupational accidents.

Methods In this cross-sectional study data were collected from about 550 employees in the woodworking and metalworking industry. Analyses were conducted for relationships between chronotype, start of working time, sleep duration and accidents.

Result The average chronotype moves by two hours towards an earlier type from the youngest to the oldest group of employees. Among the subjects without accidents 23% regard themselves as morning types, 69% as intermediate types and 9% as evening types. Among the subjects who had an accident 32% were morning types and 5% evening types. The late chronotypes get the least sleep on workdays and the early chronotypes get the least sleep on work-free days. Significant differences in the sleep duration were found for morning shift workers compared to day workers. A relevant proportion of the sleep deficit is due to the early start of working time.

Discussion The study shows significant chronotype-dependant differences in the sleep duration on work-days and free days. Early chronotypes seem to be unable to compensate their sleep deficit on free days, late types are unable to sleep early in the evening. Results will be useful to identify groups of workers at hightened risk for sleep deficit and sleepiness at work. In this way occupational accidents in shift workers and workers with an early starting time of work could be reduced.

480 HEALTHY DIET AND REDUCTION OF CHRONIC DISEASE RISKS OF NIGHT SHIFT WORKERS – A REVIEW

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Introduction The large increase of epidemiological studies on night shift work is due to the important effects on workers' health and psychophysical wellbeing. The short-term effects are easily studied and they are: insomnia, difficulties in managing work and private life, lower work performance, more