Poster Presentation

Methodology

0163 COMPARISON OF RISK ESTIMATES FROM COX PROPORTIONAL HAZARDS AND POISSON MODELING FOR ASSOCIATION OF OCCUPATIONAL TITANIUM DIOXIDE EXPOSURE AND SELECTED CAUSES OF DEATH

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Cox proportional hazards and stratified Poisson regression are commonly used models for time-dependent data in epidemiologic studies. However, whether these methods consistently produce comparable results for the estimate of risk for both rare and prevalent outcomes is unclear.

Data from a previous study that utilized stratified Poisson regression to investigate relationships between selected causes of death and annual cumulative exposures to titanium dioxide (TiO2) were reanalysed using Cox proportional hazards modeling. The study cohort included 3,607 workers employed in three US manufacturing facilities, followed 1935–2006. Analyses were completed for cumulative doses in mg/m3-year with no lag and lagged 10 years, with all models specified similarly for covariates.

Overall, the Cox and Poisson models resulted in similar estimates in most dose categories for the selected causes of death, with no statistically significant indication of a positive association between TiO2 exposure and death from all cancers, lung cancers, non-malignant respiratory disease, or all heart disease. The Cox model routinely produced narrower 95% confidence intervals (CI), although overlapping with those from Poisson. Borderline disagreement results were associated with risk estimates for all cancers at dose <15: 1.51 (CI: 1.00, 2.25) from Poisson and 1.356 (CI: 0.922, 1.995) from Cox; and for all cancers at dose 15-35: 1.35 (CI: 0.89, 2.04) from Poisson and 1.485 (CI: 1.005, 2.193) from Cox.

Poster Presentation

Exposure Assessment

0165 A JOB EXPOSURE MATRIX FROM SELF-REPORTED PHYSICAL EXPOSURES: A METHOD TO CONTROL BIAS FROM SYMPTOMS

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Background Self-reported physical exposures are prone to bias from symptoms. Job Exposure Matrices (JEM) can give unbiased estimates but do not capture variation of exposures within the same job. This study created JEMs from self-reported exposures, both including and excluding responses from symptomatic workers, and compared these three exposure measures and their associations with hand/wrist pain.

Methods 35 000 employed French workers from the CONSTANCE cohort reported work-related physical exposures and current symptoms in the hand and other body areas. We grouped self-reported exposures at the level of the job title to create two JEMs - a full JEM including all workers, and an asymptomatic JEM excluding workers with pain symptoms.

We examined differences in exposure estimates between the full and asymptomatic JEMs and the change of within-group and between-group variance. Log-binomial models tested strength of association between individual, full and asymptomatic JEMs to hand pain.

Results Most job-level exposure estimates were lower in the asymptomatic JEM. There was smaller within-group variance and larger between group variance in the asymptomatic JEM, demonstrating more homogenous exposure groups. Preliminary regression models showed similar estimates of association.
between each exposure method (individual, full JEM and asymptomatic JEM) and hand pain (Prevalence ratios with asymptomatic JEM = 1.15–1.34; all p<0.05).

Conclusions A JEM using responses only from asymptomatic workers created more homogenous exposure groups, but initial analyses showed no other significant evidence of biased exposure estimates due to symptoms. JEMs are a useful method of exposure assignment for some epidemiological studies of musculoskeletal disorders.

Oral Presentation

Intervention Studies

MISMATCH BETWEEN SURVEILLANCE OF RISKS AND RECORDED INJURIES IN CONSTRUCTION: INTEGRATION OF ERGONOMICS INTO A COMPREHENSIVE SAFETY PROGRAM

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Background Musculoskeletal disorders (MSD) are the most common nonfatal injuries in construction, occurring more frequently in construction than in most other industries. Construction safety programs typically focus on traumatic injuries and rarely address ergonomic hazards. This project presents data from a gap analysis that is driving an ongoing intervention to incorporate MSD prevention into an existing safety program.

Methods Using data from three large construction projects, we examined differences in annual injury records for MSD compared to other common hazards (falls, struck by, electrocution), frequency of hazards noted on daily pre-task safety assessment forms (PTSA), and topics presented in weekly safety trainings.

Results 26% of recorded injuries were MSD, primarily from lifting, and similar to the proportions from falls (26%) and "struck bys" (32%). However, only 3 of 152 weekly safety trainings related to lifting. PTSA forms showed that workers commonly recognised and recorded potential hazards from falls (40%), struck bys (47%), and lifting (41%) but rarely recognised other MSD risks such as poor posture (9%). When recognised, adequate hazard controls were usually described for falls (96%) and struck bys (65%), but less often for lifting and other MSD risks (45%).

Conclusions Despite having many musculoskeletal injuries, the studied safety program paid little attention to ergonomic training, hazard recognition, and abatement compared to other types of hazards. Our ongoing intervention incorporates ergonomic surveillance, risk assessment, and consistent monitoring of controls into the overall safety management system. Initial results of worksite audits and delivery of the modified program will be presented.

Poster Presentation

Injuries

ASSOCIATION BETWEEN AMBIENT TEMPERATURE AND OCCUPATIONAL INJURY

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Background Exposure to high temperature has been linked to adverse effects including cardiovascular and renal functions. It was also proposed to diminish human performance capacity and increase accident risk. However, the effects of high temperature on occupational injury have not been extensively studied.

Objective The aim of this study was to determine the association between ambient temperature and occupational injury (OI) occurrence.

Material and Methods OI information was extracted from the National Health Insurance Research Database (NHIRD). Daily ambient temperature and relative humidity (RH) were obtained from the Taiwan EPA air monitoring station. The day of first time OI outpatient/emergency visits during 2006–2011 was used as the event day. The same weekdays of the month were used as the referent day. Time-stratified case-crossover design and conditional logistic regression was used to investigate the relationship between ambient temperature and OI outpatient visits, adjusting for RH.

Results There were 18,951 first time OI outpatient/emergency visits during 2006–2011. The odds ratio (OR) of OI outpatient visits associated with per interquartile range (7.7 degree centigrade) increase in ambient temperature of the same day (lag 0 day) was 1.15 (95% confidence interval, CI: 1.08–1.22). The ORs associated with lag1 (the day before visit day) to lag3 day was 1.13 (95% CI: 1.06–1.19), 1.11 (95% CI: 1.04–1.17), and 1.11 (95% CI: 1.02–1.14), respectively.

Conclusion Exposure to higher ambient temperature was associated with increased risk of OI outpatient visits.

Poster Presentation

Exposure Assessment

QUANTIFICATION OF VIABLE STAPHYLOCOCCUS AUREUS AND VIABLE BACTERIA IN WORKPLACES BY PROPIDIUM MONOAZIDE WITH QPCR

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Background Surveillance of viable Staphylococcus aureus and viable bacteria in workplaces is difficult due to the need for complex methods. Viable bacteria can be quantified by qPCR after labelling with propidium monoazide (PMA). This study used PMA-QPCR to assess the levels of viable bacteria in workplaces.

Methods Propidium monoazide (PMA) and qPCR were used to quantify viable Staphylococcus aureus (SA) and viable bacteria in multiple workplaces. Workplace samples were collected and cultured for colony counts. The viable bacteria were then quantified by qPCR after labelling with PMA.

Results The viable SA and total bacteria levels were significantly lower in workplaces with high air flow compared to low air flow workplaces. The viable bacteria levels were also lower in workplaces with high air flow compared to low air flow workplaces.

Conclusion PMA-QPCR is a useful method for quantifying viable bacteria in workplaces. High air flow workplaces had lower levels of viable bacteria, indicating that air flow may be an important factor in controlling the levels of viable bacteria in workplaces.