

Abstracts

subsequently every six months. All new pregnancies are followed for exposure and outcome.

Results To date 496 women have signed up, with 63 new pregnancies notified by study members: recruitment is now underway across Canada. The results here are from 385 early recruits (mean age 31.6 years) and we consider only first pregnancies from the baseline questionnaire. We know of 174 first pregnancies (90 welders; 84 electricians): 3 welders chose not to give this information. Elective abortion was frequent, particularly in welders: 64 welders and 66 electricians continued the pregnancy. Spontaneous abortion rates were similar (welders 12/64; electricians 16/66). Only 25 welders and 11 electricians were working in their trade at the start of their first pregnancy and elected not to terminate it. Among these, spontaneous abortion rates were 40% (10/25) for welders and 18% (2/11) for electricians. In a logistic regression allowing for age and cumulative months in the trade at conception, the risk of miscarriage for welders in their trade was raised (OR = 3.51 95% CI 1.19–10.37). No marked effect was seen on live birth weight (welders 7.25 lbs; electricians 7.43 lbs) but infertility >12 months was more likely to be reported by welders: 11/201 welders and 3/184 electricians were working in their trade at the start of a period of infertility ($X^2 = 4.05$ $p = 0.04$)

Conclusions Early data from WHAT-ME are consistent with some reproductive hazard to welders. The cohort's increasing size and prospective data collection will serve to confirm or refute these results.

218 THE CHANGING SHIFT PATTERN AND OVERTIME AFFECT NURSES' MENSTRUAL CHARACTERISTICS

W S Chin, Shiao, Guo. *National Taiwan University, Taipei, Taiwan*

10.1136/oemed-2013-101717.218

Objective The aim of this study was to determine whether the frequency of changing work shift and overtime are associated with registered nurses' menstrual characteristics.

Method Female nursing staff aged 20–45 years and working at hospitals were invited to participate in the study. Menstrual characteristics and work shifts were recorded daily for 180 days. A multivariate logistic model was performed. Important confounders such as age, educational level, occupational category, regular exercise habit, and major earner of family were adjusted.

Result A total of 330 nurses and 1,437 menstrual cycles were collected and eligible for the final analysis. The adjusted odds ratio for shorter bleeding time (≤ 3 days) was associated with changing work shift (involved one night shift) more than 3 times between menstrual cycles were 2.2 (95% CI = 1.1–4.3). The adjusted odds ratios for longer menstrual cycle lengths (>40 days) due to changing work shift (involved one night shift) more than 3 times between menstrual cycles were 4.7 (95% CI = 3.1–7.1). The adjusted odds ratios for dysmenorrhea due to overtime more than 40 hours during 28 days before menstrual were 2.9 (95% CI = 1.6–5.2).

Conclusion The high frequency of changing work shift (esp. from day shift change to night shift or from evening shift to night shift) and overtime (>40 hours/ 28 days) may affect child-bearing aged female nurses' reproductive function.

219 WORK RELATED STRESS AND INCREASED RISK OF LOW BIRTH WEIGHT, PREGNANCY-INDUCED HYPERTENSION AND PREECLAMPSIA

¹T Brand, ²Milder. ¹AMC/Coronel Institute, Amsterdam, Nederland; ²National Institute for Public Health and the Environment, Bilthoven, Nederland

10.1136/oemed-2013-101717.219

Purpose On request of the National Institute for Public Health and the Environment, the present study was set up to find studies regarding an association between work related stress and pregnancy complications, pregnancy-induced hypertension and preeclampsia and to evaluate the present level of evidence.

Methods PubMed was used to find studies published between 1990 and April 2012, using a search strategy taking into account pregnancy complications, pregnancy-induced hypertension, preeclampsia and work related stress or burnout. For assessment of the quality of the studies, a score was calculated adapted from Nieuwenhuijsen *et al.*[1].

Results 17 studies were found on preterm birth, low birth weight, spontaneous abortion, pregnancy-induced hypertension and preeclampsia. Using the studies of the highest quality, work related stress was significantly associated with a higher risk of pregnancy-induced hypertension and preeclampsia and also a significant higher risk albeit to a slightly lesser extent, on a lowering of the birth weight of about 150 gram. The association of work related stress and preterm birth or spontaneous abortion was unequivocal.

Conclusions Clear evidence was found that work related stress during pregnancy is strongly associated with pregnancy-induced hypertension and preeclampsia and to a slightly lesser extent with a lowering of the birth weight of about 150 gram. These findings underscore the need for attention and reduction of work related stress during pregnancy in order to prevent the work related effects. Therefore, it was decided to develop an information brochure on work related stress and pregnancy that will be added to the communication toolkit 'Kinderwens, zwangerschap en werk' which can be found on the website <http://toolkits.loketgezondleven.nl/>

220 SHIFT WORK AND SPONTANEOUS ABORTIONS

¹B E M Moen, ¹Waage, ²Ronda, ³Magerøy, ¹Pallesen, ¹Bjorvatn. ¹University of Bergen, Bergen, Norway; ²University of Alicante, Alicante, Spain; ³Haukeland University Hospital, Bergen, Norway

10.1136/oemed-2013-101717.220

Objectives Our aim was to study the relationship between spontaneous abortions among nurses working three different types of shift schedules; permanent day shift, three shift rotation, and permanent night shift.

Methods From a cohort of nurses in Norway established in 2008, we identified 1083 female workers who worked the same type of shift schedule in 2008 and one year later. Information on age, years worked as a nurse, weekly work hours, job demands, job control, smoking, consumption of alcohol, caffeine, spontaneous abortions the past year and throughout life was obtained by questionnaires. The relationship between spontaneous abortion and type of shift schedule was analysed by logistic regression analyses, adjusting for job strain and life-style factors. The analyses were performed in two strata, above and below 30 years of age.

Results An increased risk for experiencing spontaneous abortions the past year was found among nurses who worked only night shifts compared to those who worked only day shifts,

restricted to nurses below 30 years of age, odds ratio (OR) 3.4 (95% confidence interval [CI] 1.0–12.4). A similar increase in risk for experiencing spontaneous abortions throughout life was found among permanent night-shift workers, OR 4.4 (95% CI 1.2–16.3), also in this case for nurses below 30 years of age. No increased risk of spontaneous abortions was found among nurses above 30 years of age.

Conclusions The findings suggest that night work may cause spontaneous abortion by disrupting the circadian rhythms, but other unknown mechanisms may also play a role. More studies of night-shift workers considering different age groups are needed to supplement the findings.

221 PSYCHOSOCIAL JOB STRAIN AND RISK CONGENITAL MALFORMATIONS IN OFFSPRING

¹A D L Larsen, ¹Hougaard, ¹Hannerz, ²Thulstrup, ³Obel, ⁴Bonde. ¹National Research Centre for the Working Environment, Copenhagen, Denmark; ²Department of Occupational Medicine, Aarhus University Hospital, Aarhus, Denmark; ³Department of General Medicine, Institute of Public Health, University of Aarhus, Aarhus, Denmark; ⁴Department of Occupational and Environmental Medicine, Copenhagen University Hospital, Copenhagen, Denmark

10.1136/oemed-2013-101717.221

Background Previous studies have shown a relationship between maternal stress during pregnancy and increased risk of malformations in children, eg: cleft lip, palate, neural tube and heart defects. To our knowledge no previous studies has had a job-related angle to maternal stress during pregnancy. The present project therefore examines if maternal exposure to psychosocial job strain (high demands and low control) measured by questionnaire early in pregnancy is associated with congenital malformations (all), cardiovascular malformations and malformations in the musculoskeletal system.

Methods We use the Danish National Birth Cohort with more than 100.000 children at baseline. In the present study 60,120 pregnancies are included due to inclusion criteria as: working, pregnant when interviewed, singleton pregnancy and information on exposure, covariates and outcome. Congenital malformations are available from the Danish Medical Birth Register with ICD-10 codes. Analyses are controlled for maternal age, BMI, parity, smoking, alcohol use, type of work, maternal serious disease and gestational age at interview.

Results In total 3,069 cases of malformations were registered in the study population, 582 of these were cases of circulatory malformations and 1,555 of musculoskeletal malformations. Logistic regression analyses showed that high strain was not associated with increased risk of any type of malformations (OR = 0.99, CI: 0.85–1.15), circulatory (OR = 1.04, CI: (0.75–1.44) or musculoskeletal malformations (OR = 0.88, CI: 0.70–1.10). The analyses were adjusted for maternal age, parity, smoking, alcohol, maternal BMI, type of work, maternal serious disease, gestational age at interview. Crude analyses did not change the results significantly.

Conclusion The results support the null-hypothesis; that the risk of having a child with congenital malformations is independent of psychosocial job strain in this sample from the Danish National Birth Cohort. As this contradicts previous findings (e.g. bereavement studies, with loss of a child or husband), a discussion regarding exposure and sample size could be beneficial.

Session: Parallel session 2 RICOH: Child behavior and semen quality

222 MALE REPRODUCTIVE TOXICITY OF PHTHALATES: A CROSS-SECTIONAL STUDY OF TESTOSTERONE AND TOTAL SPERM COUNT IN EUROPEAN AND INUIT POPULATIONS

¹O S Olmer Specht, ²Toft, ³Jönsson, ⁴Jens Peter. ¹Copenhagen N, Denmark; ²Department of Occupational Medicine, Aarhus, Denmark; ³Division of Occupational and Environmental Medicine, Lund, Sweden; ⁴Department of Occupational and Environmental Medicine, Copenhagen N, Denmark

10.1136/oemed-2013-101717.222

Objectives Phthalates are widely used man-made chemicals that in spite of a short half-life in the organism are detectable in urine among more than 95% of investigated men and women. Phthalates are with varying potency anti-androgens through interaction with several metabolic steps involved in endogenous sex-steroid metabolism. Some cross-sectional studies have shown inverse associations between phthalates and plasma levels of testosterone and some semen characteristics, but the evidence base is limited and results are conflicting. The aim of this study was to examine the hypothesis that phthalates are associated with reduced levels of plasma testosterone and total sperm counts.

Methods Spouses of pregnant women from Greenland (n = 196), Poland (n = 190) and Ukraine (n = 203) were enrolled into the study. We measured six metabolites of di-2-ethylhexyl phthalate (DEHP) and diisononyl phthalate (DINP) in serum and concurrent testosterone, sperm concentration, sperm volume and total sperm count. Analyses were stratified by country as well as analysed across countries.

Results The most abundant metabolite from DEHP namely 5-cx-MEPP (mean concentration in serum 2.22 ng/ml) was negatively associated with testosterone, sperm volume and total sperm count in the overall analysis after adjustment for country, age, sexual abstinence time and current smoking. Testosterone decreased with 1.08% per ng/ml 5-cx-MEPP (p = 0.032), volume with 1.59% (p = 0.043) and total sperm count with 3.47% (p = 0.030). When analysed by country the association was strongest in Ukraine and Poland, but the inverse relationship between 5-cx-MEPP and outcomes was observed in all three countries. No significant association between phthalate metabolites and sperm concentration was observed.

Conclusions These results are compatible with a weak anti-androgenic action of the DEHP metabolite 5-cx-MEPP on testosterone and total sperm count. Whether this cross-sectional association reflects causal mechanisms remains to be established.

223 MOTOR DEVELOPMENT FOLLOWING PRENATAL EXPOSURE TO P,P-DDE AND CB-153: A FOLLOW-UP STUDY OF INUIT AND EUROPEAN CHILDREN AGED 5–9 YEARS

¹B B H Høyer, ²Ramlau-Hansen, ³Pedersen, ⁴Bonde, ¹Toft. ¹Aarhus University Hospital, Aarhus C, Denmark; ²Aarhus University, Aarhus C, Denmark; ³Centre for Arctic Environmental Medicine, Nuuk, Greenland; ⁴Department of Occupational and Environmental Medicine, Bispebjerg Hospital, Copenhagen NV, Denmark

10.1136/oemed-2013-101717.223

Objectives Both PCB and DDE are lipophilic compounds which bio-accumulate in adipose tissue and cross the placental barrier. Prior studies of the association between prenatal exposure to