

Results We observed 2,726 pregnancy losses in a cohort of 68,096 pregnant women. We found no consistent associations between increased heavy lifting and pregnancy losses up to gestational week 21. However, for fetal death occurring after week 21 we found an increased risk among women lifting more than 200 kg/day (Hazard Ratio (HR) = 1.55; 95% Confidence Interval (CI): 1.03–2.35) compared to non-lifting women. After controlling for potential confounders, the result for stillbirths became insignificant, but the estimate did not change much (HR = 1.40; 95%CI: 0.92–2.14).

Conclusion The study corroborates earlier findings in the Danish National Birth Cohort that occupational lifting is related to an increased risk for fetal death. Due to the prospective design with late enrollment into the study, ascertainment of early miscarriage is incomplete and therefore the study does not provide strong evidence on risk for early miscarriage.

215 PRETERM BIRTH IN RELATION TO OCCUPATIONAL LIFTING ASSESSED BY A JOB EXPOSURE MATRIX: FINDINGS FROM THE DANISH NATIONAL BIRTH COHORT

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Objective The question remains unresolved if the risk of preterm birth increases with increasing occupational lifting. Previous studies have generally used individual-based exposure assessment relying on self-report, and based on this approach, we have observed an exposure-response relation between total load lifted per day and preterm birth.¹ To corroborate our finding, we aimed to examine the risk of preterm birth among primigravidas in relation to occupational lifting during pregnancy using group-based exposure assessment.

Methods Within the Danish National Birth Cohort (DNBC), we identified 24,833 occupationally active primigravidas with singleton pregnancies, who as a minimum entered gestational week 23 and provided interview data while pregnant. We constructed a Job Exposure Matrix (JEM) based on information from all women in the DNBC, who were pregnant when interviewed. The JEM cross-tabulated job and industry information with average total loads lifted per day. Each woman received an exposure estimate from the JEM. We used Cox regression analysis adjusting for age, smoking, BMI, and alcohol consumption. The women were followed from start of week 23 or interview date, whichever came last, until end of week 37 or pregnancy termination, whichever came first.

Results A total of 1601 preterm births occurred. Adjusted HRs increased with increasing occupational lifting, reaching a HR of 1.42 (95% CI 1.13–1.77) for women in the highest exposure category (>200 kg per day), when compared to non-lifters.

Conclusion We used group-based exposure assessment to minimise information bias and attenuation of exposure-response relations. Among women in jobs categorised with a lifting exposure of >200 kg per day, we found support for a moderately increased risk of preterm birth.

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216 RISK OF CRYPTORCHIDISM IN SONS OF FARMERS AND HORTICULTURAL WORKERS IN DENMARK

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Objectives Previous studies indicate that sons of women working with pesticides may have an increased risk of cryptorchidism. This study assessed the risk of cryptorchidism among boys of parents employed as farmers or horticultural workers using nationwide registers on parental occupation and cryptorchidism diagnoses.

Methods Our study cohort of more than 600,000 boys included all boys born in Denmark from 1980 to 2007 with a mother or father in employment during pregnancy. The cohort was followed for the occurrence of cryptorchidism and orchiopexy from 1980 to 2009 comparing the risk in sons of horticultural workers and farmers with sons of parents in other occupations. Hazard ratios (HR) and 95% confidence intervals (CI) were estimated using Cox regression adjusting for maternal and paternal age, birth years and parity.

Results Maternal employment as farmer was associated with moderately increased risks of cryptorchidism (cases 157; HR 1.31; 95% CI 1.12–1.53) and orchiopexy (cases 111; HR 1.29; 95% CI 1.07–1.56) compared to children of mothers in other occupations (15511 cases of cryptorchidism and 9963 of orchiopexy). Paternal occupation as farmer was unrelated to the risk in sons. Maternal occupation as horticultural worker was associated with non-significantly increased risks of cryptorchidism (cases 72; HR 1.20; 95% CI 0.95–1.52) and orchiopexy (cases 51; HR 1.28; 0.97–1.68). Similar associations were found for paternal horticultural workers. Prior but not current maternal employment as horticultural worker or farmer was not associated with an increased risk.

Conclusions This register-based study provides support for a possible association between maternal employment as a farmer during pregnancy and cryptorchidism in boys. Our finding of similarly increased risks in sons of mothers and fathers employed as horticultural workers question whether this association is causally related to pesticide exposure or has alternative explanations.

217 PREGNANCIES IN A PROSPECTIVE COHORT OF WOMEN IN NON-TRADITIONAL WORK (THE WHAT-ME STUDY)

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Objectives The WHAT-ME study (Women's health in apprenticeship trades- metalworkers and electricians) was established because of concerns about risk to the fetus of women welding in pregnancy.

Methods Women in registered apprenticeships since 2005 in welding, boiler-making, steam fitting/pipefitting ('welders') or electrical trades are invited to join the study. They complete questionnaires on health and exposure at baseline and

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

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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

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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

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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,