



Editorial

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Physical workload - a risk factor for miscarriage?

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Physical workload – a risk factor for miscarriage?

Physical workload factors, such as shift work, long working hours, and lifting, standing and carrying or moving heavy loads, are prevalent exposures among working women. According to the European Working Conditions Survey 2010 (1), 16% of employed women work in shifts, 13% work at night, and 16% usually work >40 hours a week. Fifteen percent of women report that their work involved tiring or painful positions almost all the time and 23% of women were required to carry or move heavy loads at least a quarter of the time. Miscarriage is also a relatively common pregnancy outcome. About 10–15% of recognized pregnancies end in miscarriage. If very early loss is included, the total is one third or more of all conceptions (2). Thus, physical workload exposures may constitute an important occupational reproductive hazard for women.

Several studies have been done on the effects of work activities on preterm birth, low birth weight, and having a small-for-gestational-age (SGA) baby. A recent systematic review and meta-analysis suggests that workload factors do not have any strong effect on these pregnancy outcomes although small levels of excess risk may exist. Some evidence, however, seems to exist for slightly increased risk of preterm delivery among women with long working hours and prolonged standing (3). Another review suggests that the effects of shift work on preterm birth, low birth weight, and SGA infant are also likely to be small, with pooled risk estimates ranging from 1.1–1.3 (4).

Less research has been conducted on the effects of physical workload factors on miscarriage than outcomes in later pregnancy, and no systematic review and meta-analysis has previously been published. Thus, the review by Bonde et al (5) on miscarriage and occupational activities in this issue of the *Scandinavian Journal of Work, Environment, and Health* is a welcome paper summarizing the current evidence on the topic. Similar to the studies on outcomes in later pregnancy, the review suggests that in general physical workload factors have no large effects on risk of miscarriage. Except for a moderately increased risk of miscarriage in fixed night work, the risk increments were small with the pooled risk estimates ranging from 1.12–1.36 for 3-shift work, lifting, prolonged standing, physical workload, and long working hours. The evidence base is, however, limited, both in terms of the amount and methodological quality as the authors indicate. Because of these limitations, the results need cautious interpretation.

The design of studies to identify risk factors for miscarriage is challenging. Case ascertainment is an important problem, either when medical records or self-reported data on miscarriage are used. In both cases, there is possible bias related to the gestational age at which the woman first considers herself to be pregnant (2). This may vary with education, medical experience, and reproductive history. Reporting of miscarriage and willingness to participate a study may also vary by concern about possible harmful exposure. Potential selection bias due to differing patterns of use of medical services is a serious problem in studies using medical records for identification of miscarriages.

Assessment of exposure to various physical work activities is another major challenge. It is more likely to obtain valid data on standing or fixed night work, whereas it is more difficult to acquire valid data on lifting or physical workload in general. Moreover, workers often are simultaneously exposed to many of these activities, making it difficult to determine the independent effect of various occupational activities. For example, a Danish study (6) indicated that women with occupational lifting more often had standing or walking as the main working posture compared with non-lifters. Only a few studies on miscarriage have used exposure measures assessing the effect of various physical workload factors in combination, and – so far – the heterogeneity of these measures hampers the drawing of conclusions.

Based on five studies of higher methodological quality, the results of the review by Bonde et al (5) indicates the most consistent evidence on moderately increased risk of miscarriage among women in fixed night work. For 3-shift work, the pooled risk estimate was increased for all the studies, but only slightly elevated and statistically non-significant for high quality studies. An earlier systematic review noted a slightly increased risk for SGA infants among shift workers (4). Some potential mechanisms have been suggested whereby shift work might result in adverse pregnancy outcomes. These include disturbances of circadian rhythm, sleep disturbances, and changes in serum melatonin (4).

Divergent definitions of heavy lifting have been used in studies assessing the association between lifting and miscarriage. The pooled risk estimate for five better quality studies of the meta-analysis was close to unity among women lifting >100 kg a day (5). The findings of a recent cohort study that used more detailed exposure assessment and analyzed early and late miscarriages separately were, however, supportive of an association between occupational lifting and miscarriage (6). The risk of early miscarriage increased as the total weight load increased from 101–200 kg to >1000 kg per day. A positive association was also found between the number of heavy lifts (>20 kg) and early miscarriage. Late miscarriage was associated with a total weight load of >200 kg per day but not with the number of heavy lifts per day. Reduction in the maternal-fetal and uterine blood flow has been suggested as a potential mechanism for adverse reproductive effects of physical exertion (6).

Considering the relatively high prevalence of various physical work activities, there is an obvious need for valid scientific data on their potential adverse effects on the course and outcome of pregnancy. These data are needed for counseling of pregnant women, employers, and healthcare professionals. European Union legislation requires employers to assess the health and safety risks for pregnant and breastfeeding workers, and if needed, to change working conditions or hours or offer suitable alternative work (7). Bonde et al (5) conclude in their review that it may be prudent to advise women against work entailing high levels of exposure to these physical work activities during the first trimester of pregnancy. It is easy to agree with this conclusion, although based on the available evidence it is not possible to give any definite limit values for high exposure.

Some research suggests that job adjustments in pregnancy may be effective in reducing the risk of later adverse pregnancy outcome. Elimination of physically loading work conditions, such as long hours in a difficult posture, whole-body vibration, and a cumulative index composed of nine work conditions, was found to reduce risk of preterm birth (8). Job adjustments may also present a means to reduce sickness absence among pregnant women. Sickness absence is more common among pregnant than non-pregnant women and sick leave rates vary according to working conditions; higher rates have been observed in jobs entailing long working days, night or shift work, and physically demanding tasks (9–11). The results of two Norwegian studies suggest that the level of sick leave during pregnancy can be reduced by job adjustments for pregnant women (12, 13).

Because the current scientific evidence is limited, we cannot draw firm conclusions yet on the impact of physical workload and work schedules on the risk of miscarriage. Studies using more detailed and valid exposure assessment as well as studies assessing the effects of combinations of several strenuous factors are needed. More research that provides information on the effects of job adjustments in pregnancy is also warranted.

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