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Women working shifts are at greater risk of miscarriage, menstrual disruption and subfertility

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Shift work, which encourages sleep deprivation and patterns of activity outside the circadian rhythm, has been associated with a greater risk of ill health and loss of well-being in some (but not all) studies. However, little is known about the effects of shift work on reproductive health and fertility.

Now, a study reported today at the annual meeting of ESHRE, by Dr Linden Stocker from the University of Southampton, UK, indicates that working shift patterns is associated with an increased risk of menstrual disruption and subfertility.

The study is a meta-analysis of all studies on the subject published between 1969 and January 2013. It compares the impact of non-standard working schedules (including night-shift work and mixed-shifts) with that in women not working shifts. The end-points were early reproductive outcome parameters, including menstrual dysregulation, female fertility and miscarriage rates.

The study, which included data on 119,345 women, found that those working shifts (alternating shifts, evenings and nights) had a 33% higher rate of menstrual disruption than those working regular hours (odds ratio 1.22, statistically significant) and an 80% increased rate of subfertility (OR 1.80, statistically significant).

Women who worked only nights did not have a statistically increased risk of menstrual disruption or difficulty conceiving, but they did have an increased rate of miscarriage (OR 1.29), although this increased risk of miscarriage was not observed in women who worked nights as part of a shift pattern.

The investigators describe their findings as "novel", but in keeping with other studies (which found adverse effects in later pregnancy). "If replicated," they said, " our findings have implications for women attempting to become pregnant, as well as for their employers".

On the implications of the study Dr Stocker said: "Whilst we have demonstrated an association between shift work and negative early reproductive outcomes, we have not proven causation. In humans, the long-term effects of altering circadian rhythms are inherently difficult to study. As a proxy measure, the sleep disruption demonstrated by the shift workers in our study creates short- and long-term biological disturbances. Shift workers adopt poor sleep hygiene, suffer sleep deprivation and develop activity levels that are out-of-sync with their body clock.

"However, if our results are confirmed by other studies, there may be implications for shift workers and their reproductive plans. More friendly shift patterns with less impact on circadian rhythm could be adopted where practical - although the optimal shift pattern required to maximise reproductive potential is yet to be established."

In noting that only some reproductive outcomes were affected by shift work, Dr Stocker reported that the underlying biological disturbances involved in reproductive difficulties "are complex and not the same across all the disease processes". "Indeed," she said, "it is probable that completely different causes underlie menstrual dysfunction, miscarriage and subfertility.

This may explain why the effects of different types of shift work are seen in some groups of women, but not others."

She added that one possible explanation for the overall findings is that the disruption of circadian rhythm can influence the biological function of "clock genes", which have been shown to be associated with changes in biological functions.

Provided by European Society of Human Reproduction and Embryology

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