



Smoking during pregnancy and risk of stillbirth

A meta-analysis reported that the risk of stillbirth was higher in women who smoked during pregnancy than in pregnant women who did not smoke.

Overview:

- A pooled analysis of 24 studies found that the risk of stillbirth was 47% higher in women who smoked during pregnancy than in women who did not smoke while pregnant.
- The effect of smoking on the risk of stillbirth was dose dependent, and highest in women who smoked 10 or more cigarettes a day.
- Women should continue to be advised that stopping smoking at any time during the pregnancy offers significant benefits for mother and baby.



Background: In England, 11% of women are known to smoke during pregnancy ([Health and Social Care Information Centre 2015](#)). The number of pregnant smokers in England who set a quit date fell by 28% between 2011-12 and 2014-15, while the number of women who quit successfully (confirmed by carbon monoxide validation) dropped by 24% ([Health and Social Care Information Centre 2015](#)).

Smoking during pregnancy is associated with a number of adverse outcomes for mother and child, such as preterm birth and low birth weight. Previous studies have indicated that smoking during pregnancy is also associated with an increased risk of stillbirth ([Flenady et al. 2011](#)).

Current advice: The NICE guideline on [smoking: stopping in pregnancy and after childbirth](#) recommends that midwives should assess pregnant women's exposure to tobacco smoke through discussion and use of a carbon monoxide test.

Pregnant women who smoke should be provided with information (for example, a leaflet) about the risks to the unborn child of smoking when pregnant. Women should be offered an explanation about the health benefits of stopping and should be advised to stop smoking.

All pregnant women who smoke, or have stopped smoking within the past 2 weeks, should be referred to NHS Stop Smoking Services. Stop Smoking Services should provide the woman with

intensive and ongoing support (brief interventions alone are unlikely to be sufficient) throughout pregnancy and beyond.

The NICE pathway on [smoking](#) brings together all related NICE guidance and associated products on the area in a set of interactive topic-based diagrams.

New evidence: A meta-analysis by [Marufu et al. \(2015\)](#) aimed to quantify the risk of stillbirth in pregnant women who smoke. The authors searched for studies that assessed the link between smoking during pregnancy and stillbirth (defined as fetal loss or death at 20 weeks' gestation or more).

A total of 34 observational studies were identified that were conducted in Europe (14 studies), North America (14 studies), Australia (4 studies), Asia (1 study) and South America (1 study). The meta-analysis used 24 of these studies, which had more than 8 million participants.

In a pooled analysis of these 24 studies, the risk of stillbirth was 47% higher in women who smoked during pregnancy than in women who did not smoke while pregnant (odds ratio [OR]=1.47, 95% CI 1.37 to 1.57, $p<0.0001$).

The link between smoking and stillbirth appeared to be dose dependent when the 7 studies with data on number of cigarettes consumed were analysed. The risk of stillbirth was 9% higher in pregnant women who smoked 1–9 cigarettes a day than in pregnant women who did not smoke (OR=1.09, 95% CI 0.97 to 1.24, $p=0.55$). However, the risk was 52% higher in women who smoked 10 or more cigarettes a day (OR=1.52, 95% CI 1.30 to 1.78, $p<0.0001$).

When these 2 subgroups were compared, women who smoked 10 or more cigarettes a day were at significantly higher risk of stillbirth than women who smoked 1–9 cigarettes a day ($p=0.001$).

Strengths of this study include the high number of participants and that no evidence of publication bias was evident. The included studies were largely from western countries, so the results are likely to be generalisable to the UK. Limitations include that the level of heterogeneity was high among the 21 cohort studies identified ($I^2=77%$). However, heterogeneity was low among the 8 case–control studies ($I^2=20%$) and the 5 cross-sectional studies ($I^2=0%$).

Commentary by Janet Fyle, Professional Policy Advisor, Royal College of Midwives:

“This new research presents both a challenge and an opportunity to midwives and others who are working with women to reduce their smoking during pregnancy.

“On one hand, the research supports current practice, making the link between smoking and the risk of stillbirth. It also highlights that the risk is increased if the woman smokes heavily. The basic message remains that midwives and others must continue to emphasise that stopping smoking at any time during the pregnancy offers significant benefits for mother and baby. The information about the risks of smoking should remain consistent, unambiguous and non-judgemental.

“On the other hand, the research may influence what messages women internalise in relation to their own behaviour. It suggests that lower-dose pregnant smokers have a more benign risk of stillbirths than women who smoke a high number of cigarettes a day. A pregnant woman who finds it difficult to stop smoking completely may interpret the research as suggesting she should reduce the number of cigarettes she smokes to less than 10 a day. Some women may process risks like ‘9%’ versus ‘47%’ in ways that reinforce their existing behaviour. These however are relative risks – this research does not mention absolute risks, and this is perhaps a limitation of the paper.

“The fact is that the causes of stillbirths are multifactorial. Although any smoking increases risk, women who do not smoke can still have stillbirths. It will be a challenge for people who work in healthcare to represent this evidence – ‘reducing your dose reduces your risk’ – while also conveying to women that being a non-smoker has many long-term benefits, stillbirths notwithstanding.

“Will a lower dose break the cycle of smoking behaviour? Will women who reduce smoking in pregnancy remain at this lower dose once the baby is born? What are the chances for a smoke-free home? We have to work with women and families to answer these questions and encourage a life-course approach to stopping smoking and aim for smoke free families. Given that the number of pregnant women who give up smoking has fallen in recent years, the role midwives and other healthcare professionals have in supporting pregnant women to stop smoking is becoming even more important.”

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