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Pregnancy

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1. Summary

- Current recommendations for caffeine intake during pregnancy range from 200-300 mg per day from all sources, not just coffee*.
- The majority of the research focuses on the effects of caffeine during pregnancy, not coffee consumption specifically.
- The onset of nausea, vomiting and appetite loss in early pregnancy is usually responsible for a reduction in coffee consumption, and hence caffeine intake
 - Women with healthy pregnancies may have a higher level of circulating hormones, provoking a stronger avoidance of caffeine in early pregnancy than those women who later miscarry.
- Studies over the last decade fail to show convincing evidence for an increase in risk of reproductive or perinatal complications with moderate caffeine consumption (200-300mg/day from all sources, not simply coffee*).

*A regular cup of coffee contains approximately 100mg of caffeine.

2. Recommendations for caffeine intake during pregnancy

Evidence for reducing coffee intake during pregnancy

Current recommendations are that caffeine intake should be limited during pregnancy. However at present, there are limited numbers of robust intervention studies looking at the relationship between coffee consumption and pregnancy specifically. A review¹ highlighted one well-designed, intervention study carried out in Denmark in 2007 that found restricting the caffeine intake of over 600 pregnant women who were regular coffee drinkers, by 2 cups of coffee a day, had no effect on length of gestation and birth weight.

Official recommendations for caffeine intake during pregnancy

Recommendations for caffeine intake during pregnancy vary between countries.

- The UK Food Standards Agency and March of the Dimes in the USA both suggest an upper limit of 200mg caffeine per day from all sources.
- The American Dietetic Association suggests maintaining the commonly accepted limit of 300mg per day as a safe upper limit in its 2008 Position Paper.
- This is in line with the EU Scientific Committee on Food which states “While intakes (of caffeine) up to 300mg/day appear to be safe, the possible question of effects on pregnancy and the offspring at regular intakes above 300mg/day remains open.”



3. Caffeine intake and fertility

Studies suggesting that caffeine may play a role in the amount of time it takes to conceive, and in infertility related to ovarian function, have limitations and their results are uncorroborated by further studies. A Danish study showed little relation between ability to conceive and caffeine or coffee intake². Evaluations of semen quality have consistently failed to find any adverse effects of caffeine intake^{3,4}.

Overall, there is little evidence to link caffeine with fertility issues. What evidence there is remains insufficient to provide any pre-conception coffee consumption advice⁵.

4. Caffeine intake and pregnancy

Healthy pregnancies may lead to reduction in caffeine intake

Caffeine consumption tends to decrease during the early weeks of pregnancy, coinciding with increasing pregnancy symptoms such as nausea, vomiting and aversions to smells and tastes². These symptoms were responsible for a 59% reduction in caffeine intake from coffee observed between weeks 5 and 6 in a group of pregnant women⁶. Data from the UK Caffeine and Reproductive Health Study (CARE) showed no evidence of a relationship between both nausea and vomiting in pregnancy and fetal growth when compared with maternal caffeine intake⁷.

The reduced caffeine consumption observed is, therefore, likely to be a response to a healthier pregnancy with higher concentrations of pregnancy hormones, rather than a higher caffeine intake being related to any reproductive complication.

Moderate caffeine consumption and miscarriages

The current evidence for any effect of caffeine on miscarriage is difficult to assess due to a lack of well-designed studies accounting for all confounding factors.

One such study by Weng et al⁸, which reported an increase in miscarriage with caffeine intake over 200mg, is the basis upon which several professional associations have revised their upper safe limit for caffeine intake during pregnancy. However, Weng's study was only stratified for caffeine intakes below or above 200mg, with no further qualification above 200mg. In addition, it did not control for cigarette smoking or duration of nausea and vomiting.

Another study in a small number of subjects found an association between caffeine intake and late miscarriage and stillbirth⁹. A further small study in Italy concluded that caffeine might increase the risk of sine causa recurrent miscarriage, but the authors did indicate that a potential recall bias cannot be ruled out, and cautioned that further clinical studies are required¹⁰. However, other studies have failed to find any association between caffeine consumption and the risk of miscarriage^{11,12}.

Further evidence for a lack of causal effect is provided by a study on miscarriage and nausea, where an increased risk of miscarriage was seen only in those consuming caffeine after the onset of nausea, but not in those who consumed caffeine before the onset of nausea, or those without nausea¹³.

No evidence for a link between caffeine and pre-term labour

There is no evidence for a link between caffeine intake and increased risk of delivery before 37 weeks³. This was confirmed by a 2010 meta-analysis of 15 cohort and 7 case control studies¹⁴. In addition, in 2010, the American College of Obstetricians and Gynecologists stated that "Moderate caffeine consumption (less than 200mg per day) does not appear to be a major contributing factor in pre-term birth"¹⁵.



5. Caffeine intake and fetal health

Effect of caffeine on fetal growth undetermined

Effects of caffeine on fetal growth have been observed in some studies, but not in others³.

In a Dutch study of 7,346 pregnant women, no consistent observations were seen between caffeine intake and fetal head circumference or estimated fetal weight, with intakes of caffeine over 540mg/day associated with shorter birth length¹⁶. However, this has not been observed elsewhere and further studies are needed.

In addition, the American College of Obstetricians and Gynecologists states that the relationship between caffeine and growth restriction remains undetermined¹⁵.

No clear link between caffeine intake and congenital malformations

There is scant published research into the effects of caffeine on congenital malformations³.

Modest associations between total caffeine intake and neural tube defects (spina bifida)¹⁷ have been observed, though there is potential for bias in this study.

Schmidt in 2010¹⁸ hypothesised that individuals may run different risks based on whether they are slow or fast metabolisers of caffeine.

Data from the National Birth Defects Prevention Study did not find any convincing evidence of an association between maternal caffeine intake and the birth defects included in this study¹⁹. Additionally they showed that coffee and tea consumption were not associated with any limb deficiency subtype²⁰.

Brent et al² concluded in their risk analyses that it's very unlikely that the usual or even high exposures to dietary caffeine increase the risk of birth defects for pregnant mothers exposed to caffeine. With a few exceptions, recent studies have not reported an increased risk of malformations with greater caffeine consumption.

Caffeine and fetal death

Studies have consistently reported modest associations between caffeine intake and fetal death³. However, the interpretation of the science on caffeine and fetal death needs to consider that these studies contain common sources of bias, which may explain the observed relationship with caffeine use. Good quality research is required before any conclusions can be reached.

6. Conclusion

The scientific evidence does not support a positive relationship between moderate (200-300mg/day) caffeine consumption and adverse reproductive or perinatal outcomes. Although associations with infertility, pre-term delivery and congenital malformations are not routinely observed, reports of any adverse effects of caffeine use tend to generate great interest and coverage. However, a majority of these studies have serious methodological weaknesses which bring into question the reliability of their results. Further well-designed studies are therefore required to fully elucidate any effects of caffeine on pregnancy and its outcomes.

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