Assessment of caffeine consumption, altered caffeine metabolism and pregnancy outcome

Research programme National Diet and Nutrition Survey (NDNS) NDNS
Study duration January 2003 to March 2008
Project code T01033
Conducted by University of Leeds

Background

It has been suggested that higher caffeine intakes may carry an increased risk of both spontaneous miscarriage and low birth weight. However, previous research has been hampered by difficulties in obtaining accurate measurements of caffeine intake and assessment of individual differences in caffeine metabolism. This study is of importance as it links, for the first time, accurate estimates of caffeine intake, interindividual variations in caffeine metabolism and pregnancy outcome.

The research should help to reduce uncertainties in the current risk assessment and provide a robust basis for our advice to pregnant women on caffeine consumption.

Unlike much of the previous research into the possible effects of caffeine on reproductive health, this study is prospective. It includes biomarkers of caffeine intake and explores interindividual variations in caffeine metabolism. In addition it considered all sources of caffeine intake, not just tea and coffee.

Research Approach

This study was carried out simultaneously in Leeds and Leicester. Each site recruited about 1500 pregnant women (3,000 in total). It was estimated that about 300 (10%) of the women will deliver low birth weight babies.

Caffeine consumption during pregnancy was determined by measuring caffeine and its metabolites in urine and saliva, in conjunction with information from a specially designed caffeine assessment questionnaire and diet recalls.

Results

Caffeine consumption throughout pregnancy was associated with an increased risk of fetal growth restriction (odds ratios 1.2 (95% CI 0.9 to 1.6) for 100-199 mg/day, 1.5 (1.1 to 2.1) for 200-
299 mg/day, and 1.4 (1.0 to 2.0) for >300 mg/day compared with <100 mg/day; test for trend P<0.001). Mean caffeine consumption decreased in the first trimester and increased in the third. The association between caffeine and fetal growth restriction was stronger in women with a faster compared to a slower caffeine clearance (test for interaction, P=0.06).

Caffeine consumption during pregnancy was associated with an increased risk of fetal growth restriction and this association continued throughout pregnancy. Sensible advice would be to reduce caffeine intake before conception and throughout pregnancy.

Research report

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