Maternal smoking and hyperactivity in 8-year-old children

Introduction
Children with mothers who smoke tend to have shorter attention spans, increased hyperactivity, and increased conduct-disordered behaviours, compared with children whose mothers do not smoke. This study investigated the association between maternal smoking during pregnancy and hyperactivity in 8-year-old children.

Methods
Mothers of children born alive in the Northern Finland 1985/86 Birth Cohort answered a self-reported questionnaire during pregnancy, and at age 8. Children with ADHD at age 8 were identified by their teachers using the Rutter B2 behavioural rating scale. Unadjusted univariate analysis and adjusted multivariate logistic regression analysis of the association between smoking during pregnancy and hyperactivity at 8 years old were determined.

Results
Of the study population 8,478 of the 9,432 children in the cohort, participated in follow-up. At age 8, 9.5% of children with complete data were identified as hyperactive. The prevalence of hyperactivity was higher in boys than girls in the whole study population (14.2% vs 4.6%). Smoking during gestation was more common among mothers of hyperactive than non-hyperactive children (39.7% vs 26.9%) but did not differ for sex of child.

Family structure: Hyperactivity was more prevalent in children born to always single-parent families (19.6%) compared with single-parent families (17.6%), reconstructed families (15.0%) and always two-parent families (7.7%).

Socioeconomic status: The proportion of hyperactive children was significantly higher for smokers versus non-smokers in the categories of skilled or unskilled workers (both p<0.001) but not for professionals or farmers.

Maternal age: The prevalence of hyperactivity in childhood was associated with lower maternal age during pregnancy (<20 years, 17.2%; >34 years, 9.5%).

Smoking habits: A dose-response relationship was observed between increasing maternal smoking and risk of hyperactivity in children (Figure 1). Women who continued smoking during pregnancy were more likely to come from non-intact families, have a lower socioeconomic status, or use alcohol.

Alcohol use: Of the women who used alcohol during pregnancy, 52.4% were smokers, compared with 24.8% of non-users. In contrast to results observed in the whole study population, the rate of hyperactivity in children was greater in those using alcohol during pregnancy that quit (16.0%) or reduced smoking (15.6%) compared with those who continued to smoke (14.0%).

Statistical analyses: Analysis showed that maternal smoking during pregnancy was significantly associated with hyperactivity in children whether unadjusted or adjusted for background covariates (relative risk 1.69 vs 1.30, respectively; both p<0.001).

Conclusions
- Maternal smoking during pregnancy was associated with an increased risk of childhood hyperactivity, independent of sociodemographic status or maternal alcohol use.
- Non-intact family units, poor socioeconomic status and low maternal age were identified as risk factors for the development of childhood hyperactivity.
- A dose-dependent relationship was observed between increasing smoking during pregnancy and the risk of developing childhood hyperactivity.

Key points for treatment individualisation
- Maternal smoking during pregnancy should be considered a potential risk factor for the future development of hyperactivity in childhood, particularly in single-parent families.
- Physicians should emphasise to pregnant smokers that discontinuation or decreased use of cigarettes during pregnancy may improve childhood behavioural outcomes.

References