

## Maternal smoking and hyperactivity in 8-year-old children

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### 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.<sup>1,2</sup> 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.<sup>3</sup> Children with ADHD at age 8 were identified by their teachers using the Rutter B2 behavioural rating scale.<sup>4</sup> 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.

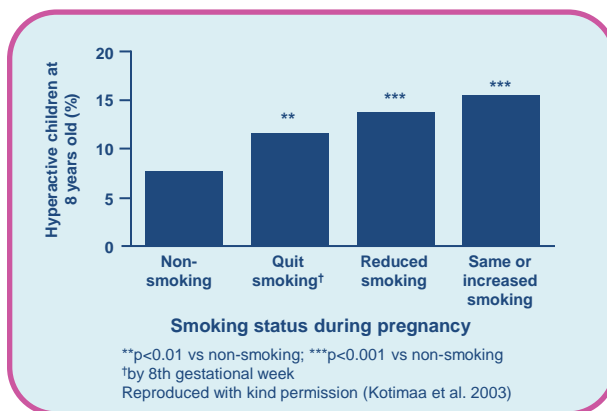
**Family structure:** Hyperactivity was more prevalent in children born to always single-parent families (19.6%) compared with single-parent families (17.6%), reconstructed families (15.0%) and always two-parent families (7.7%).

**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.

Figure 1. Observed response between smoking status in pregnancy and hyperactivity in children



**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

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