

# Lower Apgar scores and Caesarean sections are related to attention deficit hyperactivity disorder.

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Acta Paediatr. 2018 Mar 31.

doi: 10.1111/apa.14349.

## Abstract

### AIM:

We examined the associations between prenatal, birth-related and newborn risk factors and attention deficit hyperactivity disorder (ADHD).

### METHODS:

In this population-based study, 10,409 subjects diagnosed with ADHD by 31 December 2011 and 39,124 controls, born between 1 January 1991 and 31 December 2005, were identified from Finnish nationwide registers. Perinatal data were obtained from the Birth Register. Conditional logistic regression was used to examine the associations after controlling for confounders.

### RESULTS:

Lower Apgar scores were associated with a higher risk of ADHD, with odds ratios of 1.12 (95% confidence intervals 1.06-1.19), for one-minute Apgar scores of 7-8, 1.17 (95% CI 1.02-1.35) for scores of 5-6 and 1.41 (95% CI 1.18-1.68) for scores of 0-4, compared to Apgar scores of 9-10. Elective Caesarean sections were associated with an increased risk of ADHD with an adjusted odds ratio of 1.15 (95% CI 1.05-1.26). Other identified risk factors were breech presentation, induced labour and admission to a neonatal intensive care unit. Low umbilical artery pH did not increase the risk of ADHD.

### CONCLUSION:

Elective Caesareans and perinatal adversities leading to lower Apgar scores increased the risk of ADHD. Future research to identify the mechanisms behind these findings are warranted.