

Prenatal exposure to nicotine and cannabis impacts neurodevelopmental outcomes in primary school-aged children with FASD

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Introduction: We hypothesized that polysubstance use would worsen neurodevelopmental outcomes in children with Fetal Alcohol Spectrum Disorder (FASD).

Aims: To explore associations between severe neurodevelopmental impairment and co-morbid diagnoses in children with FASD and prenatal alcohol exposure (PAE) alone, PAE plus nicotine (PAE+N), plus cannabis (PAE+C), or both (PAE+NC).

Method: Analysis of data from the FASD Australian Registry on children aged 7-12 years. Proportions with severe impairment in each of 10 brain domains, ADHD or sleep disorder, were compared between exposure groups using Chi-squared tests.

Results: In 365 children with FASD (mean age 9.2years; male 65%; Aboriginal and/or Torres Strait Islander 56%; three sentinel facial features 13%), PAE alone was associated with severe impairment in $\geq 6/10$ brain domains in 20% children. The mean number of domains impaired was 4.7/10 (range 3-10), most commonly attention (82.7%), executive (74.8%) and adaptive (73.1%) function, academic achievement (65.0%) and language (65.5%). Also 80% had ADHD (DSM-5) and 25% had sleep disorder.

Of 365 children, 69(19%) had PAE, 107(29%) PAE+N, 69(19%) PAE+C and 120(33%) PAE+NC. Compared to other exposure groups, a higher proportion with PAE+C had severe impairment in Affect ($p=0.023$) and a higher proportion of PAE+NC had severe adaptive dysfunction ($p=0.001$) and sleep disorder ($p=0.011$). A higher proportion of children with PAE+N or PAE+C had sleep disorders than children with PAE. Adaptive dysfunction was more frequent in PAE+C or PAE+NC than in PAE or PAE+N.

Conclusion: Neurodevelopmental outcomes in FASD are exaggerated by exposure to nicotine and/or cannabis and most evident in children with PAE+NC.

Implications for Practice or Policy: Clinician education, community awareness campaigns, pre-pregnancy care, and public health policy that aim to minimise fetal harms must address other drugs as well as alcohol use in pregnancy.

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