International Journal of Population Data Science

Journal Website: www.ijpds.org

Pre-pregnancy maternal cardiovascular diseases and risk of offspring's neurodevelopmental disorders: a population-based cohort study.

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Objectives

Maternal exposure to cardiovascular disease (CVD) is associated with adverse maternal and neonatal health outcomes. However, its association with offspring's long-term neurodevelopmental disorders (NDDs) is not yet known. We aimed to investigate the association between maternal pre-existing CVDs and children's NDDs.

Approach

This nationwide cohort study included 2.7 million live singleton births recorded in the Swedish Medical Birth Register between 1990 and 2019. Information on maternal pre-pregnancy CVDs was extracted from the National Patient Register, including diagnosis of cerebrovascular disease, heart failure, arrhythmia, valvular and congenital heart diseases. Registered diagnoses of offspring NDDs included Attention-Deficit/Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), and intellectual disability. Cox proportional hazards models were fitted to estimate Hazard Ratios (HRs) and 95% Confidence Intervals (CIs) for the associations. All estimates were adjusted for offspring's age at diagnosis, sex, calendar period, and maternal characteristics including age at birth, parity, education, country of birth, cohabitation status, smoking, psychiatric illness, pre-gestational diabetes, and hypertension.

Results

The overall prevalence of maternal CVDs was 0.8% between 1990 and 2019. A total of 141 651 individuals (5.2%) received a diagnosis of ADHD, 64 691 (2.4%) of ASD, and 22 913 (0.9%) received a diagnosis of intellectual disability. The adjusted analyses showed that offspring of mothers with CVD had 16% higher rate of ADHD (HR 1.16; 95% CI: 1.09-1.24) and 12% higher rate of ASD (HR 1.12; 95% CI: 1.02-1.23), compared with offspring of mothers without CVD. Specifically, maternal heart failure was associated with 1.93-fold increased HR of ASD (95% CI: 1.21-3.08), maternal arrhythmia with 14% increased rate of ADHD (95% CI: 1.04-1.24), and maternal cerebrovascular disease was associated with 30% elevated rate of ASD (95% CI: 1.07-1.59) and 17% elevated rate of ADHD (95% CI: 1.02-1.36). No association was found between maternal CVDs and intellectual disability.

Conclusion

Maternal CVD before pregnancy may be a risk factor for offspring's ADHD and ASD, with varied risks by CVD subtypes. The mechanisms behind the associations warrant further investigations.

https://doi.org/10.23889/ijpds.v7i3.1804