Meta-Analysis of the Association Between Prenatal Cocaine Exposure and Youth Substance Use

Jerrika Kim, Rachel Bittner, Shivani Patel, David Bennett, PhD

Drexel University College of Medicine, Philadelphia, PA., U.S.A.

Introduction

Prenatal drug exposure remains a significant public health concern, with illicit substance use among pregnant women increasing from 5.9% in 2012 to 7.7% in 2021. Among these substances, cocaine is used by approximately 0.7–0.8% of pregnant women aged 15–44.

Unlike other substances such as alcohol, tobacco, or opioids, cocaine has unique teratogenic, vasoconstrictive, and dopaminergic effects that may result in distinct neurodevelopmental disruption.

A systematic synthesis of the literature is needed to clarify whether PCE contributes to increased risk of adolescent and young adult substance use and to identify potential developmental pathways and intervention targets.

Objectives

- Evaluate the **strength and consistency** of associations between PCE and later substance use
- Examine outcomes across **developmental stages** (adolescence → emerging adulthood)
- Identify **mediating and moderating factors** (e.g., early initiation)
- Provide an evidence base to inform **early intervention and public health policy**

Methods

Search Strategy

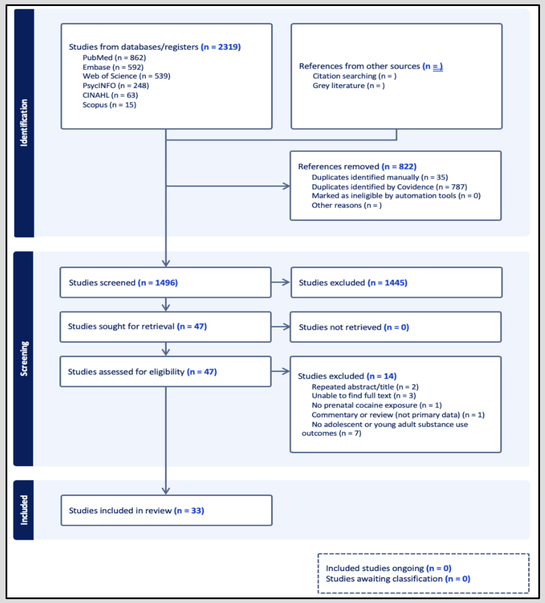
Databases: PubMed/MEDLINE, Embase, PsycINFO, Web of Science,Scopus, CINAHL

Methods

Study Selection:

- Total records: **2,345**
- Duplicates removed: **848**
- Screened: **1,497**
- Full-text reviewed: **52**
- Excluded: **14**
- Final included studies: **38 articles** (k = [X] cohorts)

Study flow diagram



Methods

Data Extraction & Coding

- Extracted:
  - Study design, sample size, demographics
  - PCE measurement (self-report, records, biological assays)
  - Age at follow-up
  - Substance use outcomes
- Outcomes categorized as:
  - Initiation
  - Past 30-day use
  - Frequency/severity
  - Lifetime use
  - Substance use disorder
- Effect sizes:
  - Adjusted/unadjusted estimates

Results

- Based on first **5 longitudinal studies**:
- **Hedges' g = 0.29 ($p < 0.05$)**
- Indicates a **small but statistically significant association** between PCE and later substance use

Conclusion

Preliminary evidence suggests:

- Increased vulnerability to substance use among exposed offspring
- Findings consistent with prior literature on adverse developmental outcomes
- Additional studies are currently under review for final meta-analysis