

# Drug Abuse During Pregnancy and its Effects on the Child - Literature Review on Commonly Abused Drugs



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## Background

Singapore remains vulnerable to the development of the international drug abuse situation with the proportion of new drug abusers remaining high at 38% in 2020. Notably, among new drug abusers, 62% were under 30 years of age and the most abused drugs were methamphetamine, heroin and new psychoactive substances. In addition, limited information exists about the effects of drug abuse on pregnant women and their children hence it is timely to examine the effects of drug abuse, specifically on pregnant women and their fetuses and/or newborns, as well as the later development of these children.

## Objectives

- 1 Examine the short-term and long-term effects of drug abuse in pregnancy on the physical, psychological and behavioural functions of the mother
- 2 Examine the short-term and long-term effects of prenatal and neonatal drug exposure on childhood growth and development

## Drugs reviewed



## Methods

PubMed, Embase and Google Scholar were searched from inception to April 2021 using a prespecified search strategy for commonly abused drugs including methamphetamine / amphetamine, heroin, cannabis, cocaine, 3,4- Methyleneedioxymethamphetamine (MDMA) and new psychoactive substances (NPS). Only randomized controlled trials and observational studies (cohort, case-control or cross-sectional) with full text available in the English language were included.

## Results

We included 13 studies for heroin, 35 studies for methamphetamine/amphetamine, 53 studies for cannabis, 57 studies for cocaine and 8 studies for MDMA in our review. No eligible studies were identified for NPS. Drug abuse during pregnancy can have detrimental effects on pregnancy and lead to poor child health outcomes. The exact nature and extent of the poor outcomes depend on the type of drug(s) involved. Most substances of abuse cross the placenta and can affect fetal brain development with long-lasting implications for brain structure and function as well as produce alterations in neurodevelopmental trajectory. However, many of the published studies are often confounded by polysubstance abuse, poor lifestyle factors and poor maternal health and nutrition. The tables below highlight the different effects on the mother, infant and possible long term effects on the child.

### Methamphetamine / amphetamine

Effect on mother	Effect on infant	Long term effects on child
<ul style="list-style-type: none"><li>No differences in obstetric outcomes</li><li>More likely to have psychiatric issues</li><li>Less likely to breastfeed</li></ul>	<ul style="list-style-type: none"><li>Not known to be teratogenic</li><li>Vasoconstriction and restriction of nutrients to fetus</li><li>Smaller head circumferences</li><li>Shorter length</li><li>Lower birth weight</li><li>Small for gestational age</li><li>More stress and decreased arousal at birth</li></ul>	<ul style="list-style-type: none"><li>May affect long term developmental outcomes</li></ul>

### Heroin

Effect on mother	Effect on infant	Long term effects on child
<ul style="list-style-type: none"><li>Spontaneous abortion</li><li>Preterm labour</li><li>Premature rupture of membrane</li><li>Pre-eclampsia</li><li>Abruptio placentae</li><li>Intrauterine passage of meconium</li><li>Intrauterine death</li><li>Toxaemia</li><li>Postnatal depression</li></ul>	<ul style="list-style-type: none"><li>Neonatal withdrawal syndrome (NOWs)</li><li>Low birth weight</li><li>Intrauterine growth retardation</li><li>Increased risk of infections</li><li>Respiratory distress syndrome</li><li>Lower Apgar scores</li><li>Premature birth</li><li>Reduced head circumference</li><li>Sudden infant death syndrome</li></ul>	<ul style="list-style-type: none"><li>Possible developmental delay</li><li>Possible increased risk of disruptive behaviours (e.g ADHD)</li><li>May impair neurodevelopment &amp; deficits in spatial learning</li></ul>

### Cannabis

Effect on mother	Effect on infant	Long term effects on child
<ul style="list-style-type: none"><li>Conflicting outcomes on risk factor for stillbirth and higher spontaneous preterm birth.</li><li>Higher incidence of maternal anaemia observed</li><li>Cannabinoid hyperemesis syndrome (CHS)</li></ul>	<ul style="list-style-type: none"><li>Conflicting outcomes with birth defects</li><li>Small for gestational age</li><li>Lower birth weight</li></ul>	<ul style="list-style-type: none"><li>Developmental delay of fine motor and social skills as well as decline in cognitive performance.</li></ul>

### Cocaine

Effect on mother	Effect on infant	Long term effects on child
<ul style="list-style-type: none"><li>Crosses placenta and decrease placental progesterone production</li><li>Placental previa</li><li>Premature rupture of membranes</li><li>meconium staining of amniotic fluid</li><li>Preterm labour</li><li>Hypertension</li></ul>	<ul style="list-style-type: none"><li>Reduced volume of brain matter noted on MRI</li><li>Poorer cognitive and fine motor development of infant</li></ul>	<ul style="list-style-type: none"><li>High risk of developing behavioural issues</li><li>Poorer performance in reading and language skills</li></ul>

### 3,4- Methyleneedioxymethamphetamine (MDMA)

Effect on mother	Effect on infant	Long term effects on child
<ul style="list-style-type: none"><li>Mothers typically decrease their use during pregnancy</li></ul>	<ul style="list-style-type: none"><li>Unclear if teratogenic due to limited data</li><li>No differences in birth outcomes</li></ul>	<ul style="list-style-type: none"><li>Exhibit poorer motor skill and slower milestones attainment (long-lasting?)</li><li>Impaired spatial learning</li></ul>

### New Psychoactive substances

Effect on mother	Effect on infant	Long term effects on child
<ul style="list-style-type: none"><li>Increased risk of complications during pregnancy (hallucinations, tachycardia)</li></ul>	<ul style="list-style-type: none"><li>Synthetic cannabinoids-associated with preterm delivery, low birth weight, withdrawal symptoms</li><li>Synthetic cannabinoids-possible effect on brain development</li></ul>	<ul style="list-style-type: none"><li>Synthetic cannabinoids : Limited data from animal studies may suggest effects on brain development</li></ul>

## Conclusions/ Future Plans

Drug abuse during pregnancy often results in various adverse maternal and child outcomes. It may cause miscarriage, preterm labor, birth defects, stillbirth, withdrawal symptoms in the baby after birth, sudden infant death syndrome, poor fetal growth rate, lower birth weight and cognitive & behavioral problems. Public and healthcare professional education to deter initiation and support cessation of drug abuse among women of childbearing age are crucial. Early identification of pregnant drug abusers for timely provision of necessary social and medical support to these women, their children and families is important. These would mitigate the potential risks.