

# Epidemiology and Effects of Substance Use in Pregnancy

Jocelynn L. Cook, PhD;<sup>1,2</sup> Courtney R. Green, PhD;<sup>2</sup> Sandra de la Ronde, MD;<sup>3</sup> Colleen A. Dell, PhD;<sup>4</sup> Lisa Graves, MD;<sup>5</sup> Alice Ordean, MD;<sup>6</sup> James Ruiter, MD;<sup>7</sup> Megan Steeves, MPH;<sup>8</sup> Suzanne Wong, MD<sup>9,10</sup>

<sup>1</sup>Department of Obstetrics and Gynaecology, University of Ottawa, Ottawa, ON

<sup>2</sup>The Society of Obstetricians and Gynaecologists of Canada, Ottawa, ON

<sup>3</sup>Wabano Centre for Aboriginal Health, The Ottawa Hospital, Ottawa, ON

<sup>4</sup>Department of Sociology, University of Saskatchewan, Saskatoon, SK

<sup>5</sup>Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, MI

<sup>6</sup>Department of Family and Community Medicine, University of Toronto and St. Joseph's Health Centre, Toronto, ON

<sup>7</sup>Salus Global Corporation, London, ON

<sup>8</sup>School of Public Health, University of Saskatchewan, Saskatoon, SK

<sup>9</sup>Department of Obstetrics and Gynecology, University of Toronto, Toronto, ON

<sup>10</sup>Department of Family and Community Medicine, University of Toronto, Toronto, ON

## Abstract

Substance use during pregnancy has important implications for health care providers and policymakers and can negatively affect a woman's health and the health of her children. Understanding trends, patterns of use, and outcomes are critical to developing prevention campaigns, building awareness, and providing effective care. This review critically examines the current literature on substance use in pregnancy and during the postpartum period in terms of epidemiology, risk factors, and implications. The risk factors for substance use in pregnancy, the challenges associated with reporting these cases, and the adverse effects of common substances on maternal and fetal health are discussed.

## Résumé

La consommation durant la grossesse, qui peut nuire à la santé de la mère et de l'enfant, a une forte incidence sur les décisions des fournisseurs de soins de santé et des responsables de politiques. Il est essentiel de comprendre les tendances, les habitudes de consommation et les résultats connexes pour élaborer des campagnes de prévention, sensibiliser les femmes et offrir des soins efficaces. Cette étude analyse de façon critique la littérature sur la consommation durant la grossesse et le postpartum et s'intéresse à l'épidémiologie, aux facteurs de risque et aux conséquences. Y sont abordés les facteurs de risque de la

consommation durant la grossesse, les obstacles rencontrés lors de la déclaration des cas et les effets nocifs des substances courantes sur la santé de la mère et de l'enfant.

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## INTRODUCTION

Substance use during pregnancy is an important issue that can have significant and persistent adverse consequences for pregnant women and their babies. Pregnancy is a significant time of change for women, and for some, having contact with health care providers can lead them to make healthier choices. By receiving information and support throughout pregnancy and in the early postpartum period, women may be able to access the resources that can improve their health and the health of their newborn. This review is intended for a broad audience, including health care providers, who may be interested in accessing a general review on prenatal substance use and a cursory understanding of the major harmful effects and downstream consequences. The specific focus is to provide an overview of the current epidemiology of substance use in pregnancy and during the postpartum period and to provide information about the adverse outcomes associated with substance use and the associated risk factors.

**Key Words:** Substance use, pregnancy, cannabis, hallucinogens, opioids, stimulants

Corresponding Author: Dr. Jocelynn L. Cook, The Society of Obstetricians and Gynaecologists of Canada and Department of Obstetrics and Gynaecology, University of Ottawa, Ottawa, ON. [jcook@sogc.com](mailto:jcook@sogc.com)

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## **METHODS**

This review was formulated by the authors over a 12-month period, through a comprehensive review of published and grey literature and conference calls. Section headings were assigned to subgroups from the authorship committee and the content was developed by those groups. Final drafts were returned to the authorship committee for discussion and revision. The content of this article is the result of a thorough review of the literature, in which all relevant articles were selected, evaluated, and synthesized by the authors, and the longstanding collective expertise of the authors.

## **ADDICTION TO VARIOUS SUBSTANCES AND THEIR EFFECTS**

The WHO refers to substance abuse as the harmful or hazardous use of psychoactive substances, including alcohol and illicit drugs.<sup>1</sup> This can lead to “dependence,” which is characterized by a cluster of behavioural, cognitive, and physiological sequelae that occur after repeated use and involve a strong desire to take the drug, difficulty in controlling use, persistent use (despite harmful effects), using the drug over other activities and obligations, increased tolerance, and in some cases withdrawal.

The term “addiction” is often used interchangeably with substance use and substance abuse. The American Society of Addiction Medicine defines addiction as a primary, chronic disease of brain reward, motivation, memory, and related circuitry, including dysfunction in these circuits, leading to characteristic biological, psychological, social, and spiritual manifestations. This is reflected in an individual pathological pursuit of reward and/or relief by substance use and other behaviours.

Addiction is characterized by an inability to control use; impairment in behavioural control; craving; a diminished recognition of significant problems with one’s behaviours and interpersonal relationships; and a dysfunctional emotional response. Like other chronic diseases, addiction often involves cycles of relapse and remission. The American Society of Addiction Medicine definition underscores that without treatment and engagement in recovery activities,

addiction is progressive and can result in disability or premature death.<sup>2</sup>

Specific substances that are commonly used have evolved significantly over time and are consistently classified into the following three major categories: hallucinogens, stimulants, and depressants.

The *Diagnostic and Statistical Manual of Mental Disorders-5* discusses 10 separate drug classes<sup>2</sup> (alcohol, cannabis, hallucinogens, inhalants, opioids, sedatives, hypnotics, anxiolytics, stimulants, and tobacco) that may be more familiar to clinicians. Different patterns of effects from the use of these substances are summarized in [Table 1](#).<sup>3</sup>

In the *DSM-5*, the diagnostic term “substance use disorder” has been introduced and combines substance abuse and dependence into one category, with a continuum of severity.<sup>2</sup> A diagnosis of substance use disorder requires the presence of specific physical and psychological symptoms, and the severity is correlated to the number of criteria met.

### **The Neurobiology of Addiction**

Addiction is a neurobiological process that leads to an altered physiological state in the brain. The primary neurotransmitter associated with addiction is dopamine, which creates a feeling of pleasure, well-being, and motivation. All substances and behaviours that are associated with addiction alter the amount of dopamine in the brain, either directly or through other pathways.

When substances that release dopamine are used repeatedly, the brain attempts to regain homeostasis by reducing the number of receptors on the target cells. This accounts for the phenomenon of tolerance whereby the addict must use increasing amounts of a substance to try to achieve the same pleasurable result. Withdrawal symptoms occur when the stimulating substance is no longer available and the receptors are left inactive and do not release dopamine. Different substances work on different areas of a complicated brain circuit involving the cortex, limbic system, and thalamus. For example, nicotine stimulates receptors in the nucleus accumbens and amygdala. Reduction of nicotine levels leads to resensitization of the receptors and stimulation of cholinergic systems, causing the anxiety seen with nicotine craving.<sup>4</sup> Opioids have  $\mu$  receptors throughout the body, accounting for the physical symptoms of withdrawal such as rhinorrhea, myalgias, and diarrhea. All substances have receptors in the brain, leading to irritability, anxiety, and ultimately to craving for the substance to obtain relief, which is another hallmark of addiction. Dopamine can also be released by triggers such as people with whom, or in a place where, the addict has previously used

## **ABBREVIATIONS**

ACE	adverse childhood experience
DSM-5	Diagnostic and Statistical Manual of Mental Disorders-5
FASD	fetal alcohol spectrum disorder

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