



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

## INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

<http://doi.org/10.5281/zenodo.3235342>

Available online at: <http://www.iajps.com>

Review Article

### CANNABIS USE DURING PREGNANCY AND FOETAL EFFECTS: LITERATURE REVIEW

Aisha Ahmed, Mirza Jawad Ghazanfar Baig, Gurpreet Singh Aujla\*

Article Received: March 2019

Accepted: April 2019

Published: May 2019

**Abstract:**

*Cannabis is the most extensively produced, trafficked and used/ abused illicit drug in the world with an increasing demand across the globe. Legalization of cannabis consumption for recreational purposes may result in an increased consumption by women. It is the most commonly used drug during pregnancy with potential effects on the growth and development of the foetus. The available literature has presented a very variable data in terms of the effects of cannabis consumption during pregnancy on the foetus. Future research is recommended in order to elaborate and further educate women about the cannabis consumption during pregnancy and to ensure that appropriate recommendations can be made by the public health professionals to the authorities and decision makers.*

**Key words:** Tetrahydrocannabinol, foetus, Gestation.

**Corresponding author:**

**Dr. Gurpreet Singh Aujla,**

Ludhiana, Punjab, [gurpreetaujla719@gmail.com](mailto:gurpreetaujla719@gmail.com)

QR code



Please cite this article in press Aisha Ahmed et al., *Cannabis Use during Pregnancy and Foetal Effects: Literature Review.*, Indo Am. J. P. Sci, 2019; 06[05].

**INTRODUCTION:**

Illicit drug use has become a severe public health matter in the recent years [1] with an enormous financial and social burden globally [2]. Cannabis is the most extensively produced, trafficked and used/abused illicit drug in the world. Most of the drug confiscations globally are cannabis confiscations which is widespread in almost every country. Worldwide tendencies in drug consumption suggest that cannabis is the most common drug in both industrialized and unindustrialized countries [3]. An estimated 147 million people [2.5% of global population] uses cannabis [3]. It is the most commonly used psychoactive drug under international control, with highest prevalence in Central Africa, North America and Oceania but there is an increased demand for cannabis use in high and middle income countries [4].

An estimated 8.3 million children live with one parent needing treatment for illicit drug use [2]. Use of cannabis is considered to be harmless in many parts of the world [5]. Cannabis is by far the most common illicit drug used by women during pregnancy and lactation and continues to be a serious public health problem due to substantial maternal and foetal morbidity [6]. The research for the prevalence of cannabis use during pregnancy is very limited with a reported prevalence rates varying from 3% to a high 34% [7]. It has been suggested that pregnant women turn to the use of cannabis due to the antiemetic properties of the substance [8]. Estimated 2.5% women continue the use of cannabis during their pregnancy [5].

The use of cannabis in the pregnancy poses a big risk for the foetus. Cannabis has a long half-life ranging from several days to weeks [9] and the lipophilic nature enables it to cross blood/ brain and placental barriers [10] and the metabolites are noticeable in placenta, amniotic fluid and breast milk [5, 7]. Cannabis use during pregnancy may cause lower birth weight [11], foetal growth restrictions, still births, decreased gestational period [12] and congenital defects. The effects of the drug may be elusive and may not be noticeable for numerous years after birth. The use of cannabis during first month of lactation may interfere with neurodevelopment of the child [5]. Cannabis use during pregnancy is linked with reduced birth weight and may also lead to rare forms of cancer [3]. With the beginning of the legalization of the use of cannabis and its products for both medicinal and recreational purposes there is a rising number of cannabis users [13]. These facts

present great concerns for health care providers and public health specialists.

**DISCUSSION:**

The effects of cannabis use during pregnancy by mothers can affect the foetus in many ways. Some of the foetal growth and development effects are discussed in this review.

**Pre term Birth:**

The effects of use of cannabis during pregnancy on pre term birth are also very variable. Some conclude no association whereas some suggest an increase in the possibility of preterm birth due to cannabis use in pregnancy.

Two retrospective studies were found addressing the association. One cohort study by Hayatbaksh et al, found that cannabis use during pregnancy is strongly linked to pre term births after adjusting for the confounders [OR, 1.5; 95% CI, 1.1-1.9] [14] and another retrospective study by Burns et al, supported the findings of high incidence of preterm births in women using cannabis [18.8% vs 5.8%;  $P < .001$ ] [15].

On the contrary a cohort study by Fergusson et al, in the UK found that there is no association of maternal cannabis use during pregnancy and preterm birth and preterm birth rate was identical for both consumers and non-consumers of cannabis during pregnancy [16].

A prospective study by Shiono et al, demonstrated the difference amongst self-reporting of cannabis use and serum level of the active psychogenic constituent of cannabis known as delta-9- tetrahydrocannabinol [THC] [17]. It was found that there was no relationship between cannabis consumption and pre term birth when only self-reported status was considered. But when women with positive serum THC only were considered the cannabis users, there was an association amongst preterm births and cannabis use [OR, 1.1; 95% CI, 0.8-1.3] [18].

These variabilities in the results are likely due to differences in establishing the consumption of cannabis and lack of obstetrical history.

**Foetal Growth:**

Growth of the foetus may incur limitations due to the use of cannabis by mother. The data available for foetal growth and use of cannabis during pregnancy is very variable in terms of the findings or effects of cannabis on foetal growth due to availability of a diversified data [7].

A multi- centre prospective cohort study by Bada et al, found that there was no association between the foetal growth and use of cannabis during pregnancy. There was no association found for the SGA [Small for gestational age] or lower birth weight [LBW] in women who consumed cannabis suggesting that there is no effect of cannabis use on birth weight when consumed during pregnancy [19].

On the contrary a prospective study by El Marroun et al, the only study in which ultrasounds were performed sequentially during pregnancy to determine the foetal growth in contrast to other studies that simply relied on birth weight as an indicator of the growth. This study suggested that use of cannabis prior to pregnancy had no effect on foetal growth but the exposure of the foetus to cannabis during early pregnancy results in a decrease of 11.2 grams per week in the growth and is further reduced to 14.4 grams per week if cannabis is used further during the pregnancy [20].

As mentioned earlier the data available on the effects of the use of cannabis during pregnancy on foetal growth is very variable [21] where some studies suggest no association, some suggest a decrease in the birth weight. This variability in the literature is due to the difference in the method used in various studies to establish the use of cannabis in pregnant women which range from one question survey [yes/no] to detailed self-reported use to sampling and detailed data collection for the use of cannabis. The discrepancy also resulted from the studies that did not included smoking in their analyses. There may be a small decrease in the growth of the foetus related to cannabis exposure during pregnancy but the clinical importance of this reduction is uncertain [7].

#### **Neurological development:**

Studies have been conducted to establish an association between maternal cannabis use and neurological development of the foetus. Jutras-Aswad et al, have found less number of dopamine receptors in the amygdala of foetus who were born to cannabis consuming mothers as compared to non-consuming mothers [22].

De Moraes et al, found that foetus with an exposure to cannabis in utero have dissimilar behaviour compared to others who were not exposed to cannabis on Neonatal Intensive Care Unit Network Neurobehavioral Scale [23]. Fried P, found that children born to mothers who use cannabis have no problems till the age of 4 years but after that age there

are behavioural issues in term of tasks, language comprehension and memory [24].

The research on neurological development and cannabis use by mothers during pregnancy is limited due to confounding factors and dependence on data which is self-reported.

#### **Congenital Anomalies:**

The literature available at this stage does not provide any evidence of the relationship between cannabis consumption and development of congenital anomalies. There are studies available which have explored this association. One study was a prospective cohort study by Linn et al, found no association of maternal cannabis consumption and development of congenital anomalies for the foetus [OR1.36, 95% CI 0.97-1.91] [25].

Another retrospective cohort study by Van Gelder et al, also found the similar results with no association of cannabis use during pregnancy and congenital anomalies for the foetus [26].

The majority of studies that highlight the association of maternal cannabis use and congenital anomalies have only used birth defect registries for data collection with little or no consideration for confounders and bias.

#### **Still birth:**

There is a shortage of information available on the association of maternal cannabis use and still births. One case control study in the still birth Collaborative Research Network has found THC [Tetra hydro cannabinol] in the umbilical cord in women who consume cannabis during pregnancy establishing an association between still births and cannabis consumption [OR, 2.34; 95% CI, 1.13-4.81]. This study did not account for the time of cannabis use and confounders like maternal smoking [27].

#### **Lactation:**

Cannabis consumption by mothers can pass cannabinoids onto the infant through breast milk to an estimated 0.8% of the amount consumed by the mothers [28]. Some studies also suggest a reduction in the breast milk in mothers who use cannabis [29]. Infants with cannabis using mothers often show reduced psychomotor development [30].

#### **CONCLUSION AND GAPS:**

Cannabis use has grown into a prominent public health issue in the last few years due to the changes in the legal frame work. Cannabis use by women during their pregnancy may bring harmful effects to the mother and also pose serious health concerns for the developing

foetus with evidence suggesting that maternal cannabis consumption during pregnancy may be negatively associated with foetal growth, neuro development of the foetus, lower birth weight, pre term births and behavioural patterns. Breast fed infants who have mothers that use cannabis during lactation have behavioural and developments problems in their educational and learning pathways and can effect long term goals of the children.

There is a lack of evidence for the effects of cannabis use during pregnancy or breast feeding on the perinatal and infant outcomes both in the short and long term. This lack of evidence is due to a number of factors which include lack of prospective data on the association, establishing the consumer status of the mothers which should be based upon biological serum testing instead of the questionnaires, there is need to determine effects of cannabis on developing foetus through a systematic ultrasound during pregnancy rather than depending upon the birth weight as indicator of the foetal development and evidence gathering for the effects of breast feeding and cannabis use during that time.

There is need for sufficient evidence to support or establish this association so that appropriate recommendations can be made by the public health professionals to the authorities.

## REFERENCES:

1. Degenhardt L, Whiteford H, Hall WD. The Global Burden of Disease projects: What have we learned about illicit drug use and dependence and their contribution to the global burden of disease? 2014;33[1]:4-12.
2. Lester BM, Tronick EZ, LaGasse L, Seifer R, Bauer CR, Shankaran S, et al. The maternal lifestyle study: effects of substance exposure during pregnancy on neurodevelopmental outcome in 1-month-old infants. *Pediatrics*. 2002;110[6]:1182-92.
3. WHO. Management of substance abuse 2019 [Available from: [https://www.who.int/substance\\_abuse/facts/cannabis/en/](https://www.who.int/substance_abuse/facts/cannabis/en/).
4. WHO. The health and social effects of nonmedical cannabis use 2019 [Available from: [https://www.who.int/substance\\_abuse/publications/cannabis\\_report/en/index6.html](https://www.who.int/substance_abuse/publications/cannabis_report/en/index6.html).
5. Jaques S, Kingsbury A, Henshcke P, Chomchai C, Clews S, Falconer J, et al. Cannabis, the pregnant woman and her child: weeding out the myths. *Journal of Perinatology*. 2014;34[6]:417.
6. Kuczkowski KM. The effects of drug abuse on pregnancy. *Current Opinion in Obstetrics and Gynecology*. 2007;19[6]:578-85.
7. Metz TD, Stickrath EHJajoo, gynecology. Marijuana use in pregnancy and lactation: a review of the evidence. 2015;213[6]:761-78.
8. Young-Wolff KC, Sarovar V, Tucker L-Y, Avalos LA, Conway A, Armstrong MA, et al. Association of nausea and vomiting in pregnancy with prenatal marijuana use. 2018;178[10]:1423-4.
9. Hadland SE, Knight JR, Harris SKJJod, JDBP bp. Medical marijuana: Review of the science and implications for developmental behavioral pediatric practice. 2015;36[2]:115.
10. Grotenhermen FJCP. Pharmacokinetics and pharmacodynamics of cannabinoids. 2003;42[4]:327-60.
11. Zuckerman B, Frank DA, Hingson R, Amaro H, Levenson SM, Kayne H, et al. Effects of maternal marijuana and cocaine use on fetal growth. *New England Journal of Medicine*. 1989;320[12]:762-8.
12. Fried P, Watkinson B, Willan A. Marijuana use during pregnancy and decreased length of gestation. *American journal of obstetrics and gynecology*. 1984;150[1]:23-7.
13. Gordon AJ, Conley JW, Gordon JM. Medical consequences of marijuana use: a review of current literature. *Current Psychiatry Reports*. 2013;15[12]:419.
14. Hayatbakhsh MR, Flenady VJ, Gibbons KS, Kingsbury AM, Hurrion E, Mamun AA, et al. Birth outcomes associated with cannabis use before and during pregnancy. *Pediatric research*. 2012;71[2]:215.
15. Burns L, Mattick RP, Cooke M. The use of record linkage to examine illicit drug use in pregnancy. *Addiction*. 2006;101[6]:873-82.
16. Fergusson DM, Horwood LJ, Northstone K. Maternal use of cannabis and pregnancy outcome. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2002;109[1]:21-7.
17. Sharma P, Murthy P, Bharath MSJJop. Chemistry, metabolism, and toxicology of cannabis: clinical implications. 2012;7[4]:149.
18. Shiono PH, Klebanoff MA, Nugent RP, Cotch MF, Wilkins DG, Rollins DE, et al. The impact of cocaine and marijuana use on low birth weight and preterm birth: a multicenter study. *American Journal of Obstetrics & Gynecology*. 1995;172[1]:19-27.
19. Bada HS, Das A, Bauer CR, Shankaran S, Lester BM, Gard CC, et al. Low birth weight and preterm births: etiologic fraction attributable to prenatal

- drug exposure. *Journal of Perinatology*. 2005;25[10]:631.
20. El Marroun H, Tiemeier H, Steegers EA, Jaddoe VW, Hofman A, Verhulst FC, et al. Intrauterine cannabis exposure affects fetal growth trajectories: the Generation R Study. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2009;48[12]:1173-81.
21. Gunn J, Rosales C, Center K, Nuñez A, Gibson S, Christ C, et al. Prenatal exposure to cannabis and maternal and child health outcomes: a systematic review and meta-analysis. *BMJ open*. 2016;6[4]:e009986.
22. Jutras-Aswad D, DiNieri JA, Harkany T, Hurd YL. Neurobiological consequences of maternal cannabis on human fetal development and its neuropsychiatric outcome. *European archives of psychiatry and clinical neuroscience*. 2009;259[7]:395-412.
23. de Moraes Barros MC, Guinsburg R, de Araújo Peres C, Mitsuhiro S, Chalem E, Laranjeira RR. Exposure to marijuana during pregnancy alters neurobehavior in the early neonatal period. *The Journal of pediatrics*. 2006;149[6]:781-7.
24. Fried P. The Ottawa Prenatal Prospective Study [OPPS]: methodological issues and findings—it's easy to throw the baby out with the bath water. *Life Sciences*. 1995;56[23-24]:2159-68.
25. Linn S, Schoenbaum SC, Monson RR, Rosner R, Stubblefield PC, Ryan KJ. The association of marijuana use with outcome of pregnancy. *American journal of public health*. 1983;73[10]:1161-4.
26. van Gelder MM, Reefhuis J, Caton AR, Werler MM, Druschel CM, Roeleveld N. Maternal periconceptional illicit drug use and the risk of congenital malformations. *Epidemiology*. 2009;20[1]:60-6.
27. Varner MW, Silver RM, Hogue CJR, Willinger M, Parker CB, Thorsten VR, et al. Association between stillbirth and illicit drug use and smoking during pregnancy. *Obstetrics and gynecology*. 2014;123[1]:113.
28. Djulus J, Moretti M, Koren G. Marijuana use and breastfeeding. *Canadian Family Physician*. 2005;51[3]:349-50.
29. Murphy LL, Muñoz RM, Adrian BA, Villanúa MaAJNod. Function of cannabinoid receptors in the neuroendocrine regulation of hormone secretion. 1998;5[6]:432-46.
30. Astley SJ, Little REJN, teratology. Maternal marijuana use during lactation and infant development at one year. 1990;12[2]:161-8.