

The Effects of Marijuana Use During Pregnancy on Fetal Growth Outcomes

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Abstract

Marijuana has consistently been one of the most avidly used drugs in the world, and studies have previously been conducted studying fetal and early childhood development with respect to mothers that have used marijuana in pregnancy. The literature thus far has shown mixed conclusions with some indication of growth effects in certain studies and lack of effects in others. This study aimed to investigate fetal growth parameters and neonatal outcomes in babies born to mothers using marijuana during pregnancy, and ultimately to develop clinical care recommendations related to marijuana use during pregnancy. It was hypothesized that in-utero growth would be diminished and that neonatal outcomes, such as oxygenation and neonatal intensive care admissions, would be worse in neonates whose mothers’ used marijuana during their pregnancy. Women with a positive urine drug screen for marijuana in pregnancy were included. Fetal ultrasound biometrics were noted if they were <10% for gestational age. A nuchal fold measurement ≥6 mm was considered abnormal analysis included 211 women. Among neonates, 22% required oxygen, and 25% were admitted to the NICU. Of the neonates tested for illicit substances, 67% were positive for marijuana. Marijuana use in pregnancy does not appear to affect second-trimester biometric parameters but may affect neonatal outcomes.

Introduction

- Nearly 70% of Colorado cannabis dispensaries recommended cannabis products for first trimester associated nausea when called by a mystery caller. (Dickson, 2018)
- Studies have previously been conducted studying fetal and early childhood development, literature thus far has shown mixed conclusions
- There have been studies that indicated there was depressed mean arm muscle circumference and nonfat area of the arm (Frank, 1990).
- Other studies indicate that regular use was associated with an increased risk of delivering a low birth weight (<2,500 gm) infant and small for gestational age infants after adjustment for other risk factors. (Hatch, 1986).
- Recently, a publication discussing a protocol for searching through major databases was published to identify the studies that reported the effects of prenatal cannabis exposure on fetal development and pregnancy outcomes; however, this protocol was not looking at in-utero growth parameters but fetal birth parameters (birth weight, birth length, etc.) (Gunn, 2015).
- Experimental mice studies have been done which found reduced birth weights with no difference in intrauterine fetal growth and placental development (Benevenuto et al, 2017).
- Aims: investigate fetal growth parameters and neonatal outcomes in babies born to mothers using marijuana during pregnancy with respect to growth restriction during the fetal period with a specific interest in the effects related to type, amount, and timing of fetal exposure. Another question of interest is looking beyond the exposure parameters to see if there are other factors that decrease or worsen the impact of in-utero marijuana exposure on fetal growth such as other drug exposures that moderate marijuana's effects maternal health conditions that impact effects seen with marijuana exposure on the fetus.
- Hypothesis: that in-utero growth would be diminished and that neonatal outcomes, such as oxygenation and neonatal intensive care admissions, would be worse in neonates whose mothers’ used marijuana during their pregnancy.

Methods and Materials

- Retrospective chart review study was a COMIRB approved study (IRB #: 19-1021).
- Eligible participants were identified via a review of EPIC charts for women who received prenatal care and delivered at UCHealth locations.
- **Inclusion criteria:** Women with a positive urine drug screen for marijuana in pregnancy during even years between January 2012 and December 2018 were included. The PARITY database (COMIRB #17-0209) was also used in MRN collection to access data for analysis in this study.
- **Exclusion criteria:** Women were excluded if they were <18 years old at conception, had multiple gestations, had no delivery data, or had no 16–23-week ultrasound data. Women with an unknown drug status were also excluded. Original goal N: 300 women who used marijuana during pregnancy and 300 matched controls.
- Preliminary report includes 211 of the 300 cases without matched controls

- In the future, the controls will be selected from women who did not use marijuana during pregnancy as evident by a negative biological test for marijuana use and otherwise meet the criteria as described above.
- RedCap database used, study ID was created, Information collected for each patient contained no patient health information
- Only descriptive statistics were performed



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Primary and Secondary outcomes

Primary outcome: size measurements available for 16-23 gestational-week anatomy ultrasound reports.

Secondary outcomes: fetal size at the third-trimester ultrasound (past 26 weeks) and other neonatal outcomes including size at birth (weight, length, head circumference), admission into the neonatal intensive care unit, and administration of oxygen to the neonate. Fetal ultrasound biometrics were noted if they were <10% for gestational age. A nuchal fold measurement ≥6 mm was considered abnormal.

Results

Of the women investigated, most women were non-Hispanic White (n=125, 59.2%), nulliparous (n=85, 40.3%), had public income-dependent insurance (n=171, 81.0%), and self-reported marijuana use in pregnancy. The average maternal age at the time of delivery was 25 years ±4.8 years, and the median gestational age at which women sought care for their initial prenatal visit was 11 weeks 3 days. Most women were gravida 1 (n=65, 30.8%), but over 11% of women were gravida 6 or more at their first prenatal visit (n=24, 11.4%).

Table 6. Abnormal US Measurements*

US parameter	Percent Abnormal (%)
Biparietal diameter	27
Humerus length	19
Head circumference	5
Nuchal skin fold	4
Femur length	3
Abdominal circumference	3
Intrauterine Growth Restriction	12

*abnormal findings are measurements <10% for gestational age or NSF ≥6 mm.

Table 7. Neonatal Outcomes

Outcome	Measurements
Median gestational age at delivery	38 weeks 6 days ±3 weeks 6 days
Median birth weight	2890 grams±768 grams
Required oxygen as neonate	22%
Percent admitted to the NICU	25%
Drug test positive for marijuana	67%

Discussion and Conclusion:

- Marijuana use in pregnancy does not appear to affect second-trimester biometric parameters, but the use of marijuana may affect neonatal outcomes.
- Neonatal outcomes showed the neonatal oxygen requirements at birth as well as NICU admissions rates were found to be higher in our study population compared to the national averages.
- Future research will focus on finishing data collection and the selection of matched controls to further investigate these findings (300 marijuana-exposed infants will be compared to the 300 control infants on all growth parameters via t-tests for continuous parameters, and chi-square analysis for categorical parameters.)
- For those parameters where significant differences are found (p<.05), follow-up analyses using multiple and logistic regression analysis will be performed controlling for background factors on which the two groups differ significantly.
- Though there is a role for marijuana in some patient populations, pregnant women should know the possible harmful effects of this drug on their unborn child and possibly their personal wellbeing.
- Though these are often sensitive topics, drug use should be discussed at prenatal visits and clarified by clinicians to best advise women on the risks associated with it.

References

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