Data was collected from all meconium specimens from March 2024 to May 2024 which is indicative of our test results prior to adding delta-9 THCA and CBDA to the method(n =1537). 31% of the specimens tested positive for delta-9-THCA (n=477). This positivity rate was compared to the positivity rate once the additional cannabinoids were added to the method.

Cannabis Use During Pregnancy: A Prevalence Study in Meconium Samples

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Abstract

Cannabis is the most used substance during pregnancy, with self-report rates of about 2-5%. Delta-9-tetrahydrocannabinol (Delta-9-THC) is the principal psychoactive component present in cannabis. Cannabidiol (CBD) is a cannabinoid found in cannabis, though it is not psychoactive. Delta-8-tetrahydrocannabinol (Delta-8-THC) is a psychoactive cannabinoid, but is produced from CBD and is less potent that Delta-9-THC. The main metabolites are delta-9-tetrahydrocannabinolic acid (delta-9-THCA), delta-8-tetrahydrocannabinolic acid (delta-8-THCA), and cannabidiolic acid (CBDA), respectively. Detection of either delta-9-THCA, delta-8-THCA, or CBDA in meconium is indicative of exposure during the second or third trimester of pregnancy. Early detection and treatment of substance exposed babies are crucial to provide the best possible outcome for these vulnerable children.
Meconium specimens were initially screened for cannabinoids using an enzyme multiplied immunoassay technique. Presumptive positive specimens were prepared for confirmatory testing using solid phase extraction and analyzed for delta-8-THCA, delta-9-THCA, and CBDA by liquid chromatography tandem mass spectrometry.
Data was collected from all meconium specimens analyzed for cannabinoids from June-September 2024 (n=1523). 30% of the specimens tested positive for either delta-8-THCA or delta-9-THCA (n=458). Of those, 43.6% tested positive for delta-8-THCA and delta-9-THCA, 55.4% tested positive for delta-9-THCA only, and 0.9% tested positive for delta-8-THCA only. CBDA was not detected in any specimens.
Delta-8-THCA and delta-9-THCA were each detected independently of each other in meconium specimens. Therefore, it is crucial to analyze both analytes for accurate detection of cannabinoid exposure in pregnancy. Early detection of cannabis exposed newborns can facilitate early treatment and overall better outcomes throughout that baby's lifetime.

Introduction

Cannabis is the most used substance during pregnancy, with self-report rates of about 2-5% (1,2). In addition, in the last two decades there has been an increase in the cannabis potency (3). Cannabis is an increasingly accepted recreational drug and has become widely available following cannabis legalization. Pregnant women may use cannabis for treating nausea, vomiting, pain, and other pregnancy symptoms. Cannabis use during pregnancy is a public health concern, since it increased adverse perinatal outcomes as well as childhood developmental, and mental disorders (4, 5). Studies suggest babies exposed to cannabinoids in-utero have lower birth weight and long-term cognitive, sensory, or motor deficits (6). Delta-9-tetrahydrocannabinol (Delta-9-THC) is the principal psychoactive component present in cannabis (7). Cannabidiol (CBD) is a cannabinoid found in cannabis which has been rising in popularity since the legalization of hemp, though it is not psychoactive. Delta-8-tetrahydrocannabinol (Delta-8-THC) is another psychoactive cannabinoid found in trace amounts in cannabis, but is also produced from CBD and is thought be less potent that Delta-9-THC.
The main metabolites of delta-9-THC, delta-8-THC and CBD are delta-9-tetrahydrocannabinolic acid (delta-9-THCA), delta-8-tetrahydrocannabinolic acid (delta-8-THCA), and cannabidiolic acid (CBDA), respectively. Detection of either delta-9-THCA, delta-8-THCA, or CBDA in meconium is indicative of cannabinoid exposure during the second or third trimester of pregnancy (8). Early detection and treatment of substance exposed babies are crucial to provide the best possible outcome for these vulnerable children (9).

Methods

Screening
- Enzyme multiplied immunoassay technique
- Cutoff 40 ng/g

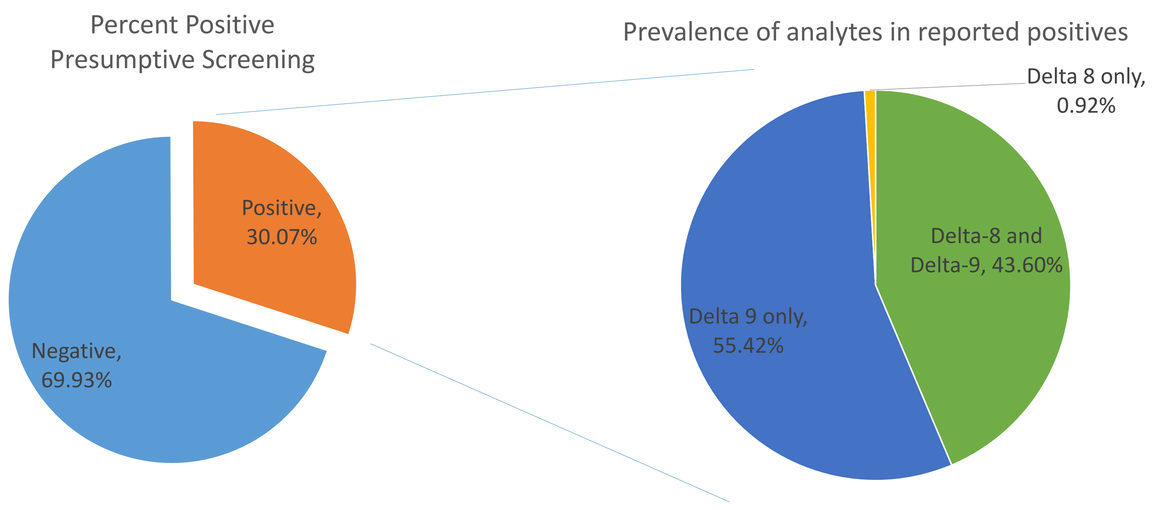
Data: March-May 2024
- GC-GC/MS-MS
- Delta-9-THCA
- 2 ng/g cutoff

Data: June-September 2024
- LC-MS/MS
- Delta-9-THCA, Delta-8-THCA: 2 ng/g cutoff
- CBDA: 20 ng/g cutoff

Results

Data was collected from all meconium specimens from March 2024 to May 2024 which is indicative of our test results prior to adding delta-8-THCA and CBDA to the method(n =1537). 31% of the specimens tested positive for delta-9-THCA (n=477). This positivity rate was compared to the positivity rate once the additional cannabinoids were added to the method.

Data was collected from all meconium specimens analyzed for cannabinoids from June 2024-September 2024 (n=1523). Approximately 30% of the specimens tested positive for either delta-8-THCA or delta-9-THCA (n=458). Of the specimens that tested positive (n=458), 43.6% tested positive for both delta-8-THCA and delta-9-THCA, 55.4% tested positive for delta-9-THCA only, and 0.9% tested positive for delta-8-THCA only. CBDA was not detected in any specimens.



Discussion

Cannabis use during pregnancy increases the risk of lower birth weight, long-term cognitive, sensory, or motor deficits, and preterm birth. The data from March to May 2024 correlated well with the data from June 2024 to September 2024. The ability to differentiate the cannabis analytes is an important step to understand how the analytes will affect the newborn long-term. It is also important since delta-9-THC is not legal in all states nor at the federal level. This allows for confidence in the reporting and interpretation of the results.

A limitation of the study was the fact that tobacco/cotinine was not included as a confounder, since data for tobacco use was not acquired due to it not being required testing for our clientele. However, studies show about 48% of cannabis users mix cannabis with tobacco (10). Another limitation was that information about use history, patterns of use, route of intake, and types of cannabis product, was not included. Other limitations of this study is the small sample size, data comes from a high risk population, and is from a convenience sampling of data.

We want to highlight the main strength of the current research. First in this study, a biological test was used for confirming cannabis use vs self-report. Second, the addition of more analytes due to the increase in recreational use of cannabidiol and delta-8-THC, due to their legalization.

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