Cannabis Use in Pregnant females: Importance for a Need of Biomarker for Perinatal Cannabis Use

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Methodological Issue Being Addressed Self-disclosure of cannabis use during pregnancy is often unreliable, leading to underestimation of fetal and early life exposure. This study addresses the need for biomarker-based methods to accurately assess perinatal cannabis exposure in order to identify windows of vulnerability in offspring.

Introduction The use of marijuana and/or cannabidiol (CBD) during pregnancy is increasing with growing legislative acceptance in the US whether recreationally or to self-medicate for conditions such as morning sickness or anxiety. The active compound of marijuana, Δ9-tetrahydrocannabinol (Δ9-THC), and its metabolites cross the placenta, and are detected in breastmilk, viable exposure pathways for fetuses and infants.

Previous studies relying on self-disclosure of marijuana use in pregnant women suggest under reporting, confirming the importance of biomarker measurement for exposure assessment. Existing literature does not examine the patterns of marijuana use across the perinatal period, which is crucial for identifying windows of vulnerability for health effects in offspring. As such, a need of biomarker for cannabis use during pregnancy and post-natal period is critical given the long-term effects of prenatal and early life cannabis exposure in offspring.

Methods Banked urine samples of 74 mothers in the NYU Children's Health and Environment Study were analyzed. Pregnant women, 18 years and older and <18 weeks pregnant were recruited at three NYU-affiliated hospitals in NYC. The pregnant women reported cannabis use perinatally. Three urine samples were collected serially-early pregnancy, mid-gestation, and postnatal at 12 months. Ultra-high-performance liquid chromatography coupled with tandem mass spectrometry was used to detect several metabolites of cannabinoids including 11-nor-9-carboxy-Δ9-tetrahydrocannabinol (COOH-THC), Δ9-THC, CBD, cannabinol, and 11-hydroxy-THC to determine the active or recent use from intermittent use from their half-life.

Results Out of these 74 mothers, only 3% (n=2) mothers self-disclosed marijuana use before and during pregnancy, while 22% (n=16) mothers tested positive for urinary cannabinoids. The mean maternal age of these 16 mothers was 31 years. Cannabis use was equally seen between nulliparous (n=8) and parous (n=8) women in these 16 women. No statistical significance was seen with race, marital status, and education in them. An intermittent cannabis use pattern was observed in 12 women during perinatal period indicated from the longer half-life of the metabolite, COOH-THC. While a recent cannabis use during perinatal period was determined through presence

of urinary metabolites with shorter half-life, Δ9-THC (n=10), CBD (n=4), cannabinol (n=2), and 11-hydroxy-THC (n=15). Ten women showed postnatal detection at 12 months visit while eight tested positive in early pregnancy.

Conclusion As the New York State legislature considers legalization of recreational marijuana use, a need of biomarker is critical to identify the cannabis use in female given an active and passive exposure risk in offspring.

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Keywords

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