

# Preconception Marijuana Use in Rhode Island: Rates, Demographics, and Psychosocial Correlates

KIRA A. BROMWICH, BA; NATASHA A. SOKOL, ScD; MEAGHAN MCCALLUM, PhD; CYNTHIA NGUYEN, BA; ERIKA F. WERNER, MD, MS; KRISTEN A. MATTESON, MD, MPH; CHRYSTAL VERGARA-LOPEZ, PhD; LAURA R. STROUD, PhD

## ABSTRACT

**INTRODUCTION:** Rates of marijuana use in Rhode Island (RI) exceed the national average; prevalence during preconception and characteristics of users remain unknown.

**METHODS:** Prevalence of marijuana use in the 3 months preconception was assessed by a RI-based telephone survey of a diverse, low-income sample of pregnant women ( $n=1683$ ). Sociodemographic characteristics, substance use, and mental health were compared between preconception marijuana users, tobacco users and non-users.

**RESULTS:** 25.1% of respondents reported using marijuana during preconception. Marijuana users were younger, poorer, and less educated than non-users ( $ps<0.001$ ) and more likely to report alcohol use and mental illness ( $ps<0.001$ ). Marijuana users were younger with fewer children than tobacco-only users ( $ps<0.001$ ).

**CONCLUSIONS:** Rates of preconception marijuana use in RI exceed national rates of prenatal use. Preconception marijuana users have a distinct sociodemographic profile, with higher rates of concurrent mental health conditions and alcohol use. Understanding this characterization enables targeted screening and interventions.

**KEYWORDS:** pregnancy, marijuana, cannabis, tobacco

## INTRODUCTION

Rates of marijuana use in RI climbed to 20.7% in 2018 (from 15.8% in 2002), exceeding national averages.<sup>1</sup> Increasing prevalence has paralleled a transformation in socio-political and medical acceptability of the drug.<sup>2</sup> Medical marijuana was legalized in RI in 2005, and the changing local landscape, including legalization of recreational marijuana in Massachusetts in 2016, raises the possibility of future change.<sup>3,4</sup> RI Governor Gina Raimondo's budget proposal for Fiscal Year 2020 provides for the establishment of "a strictly-regulated legal market for adult use marijuana."<sup>5</sup>

Research has shown that between 48–60% of marijuana users continue use during pregnancy.<sup>6</sup> Thus, as general rates of use have risen, rates during pregnancy have also increased.<sup>6</sup> National data showed past-month marijuana use

among pregnant women in their first trimester has increased from 5.7% to 12.1% from 2002–2017.<sup>7</sup> This is alarming, given associations between prenatal exposure to marijuana and low birthweight,<sup>8</sup> hypertensive disorders of pregnancy,<sup>9</sup> spontaneous preterm birth,<sup>9</sup> and offspring cognitive and behavioral problems.<sup>10</sup>

Little is known about the rates and correlates of marijuana use during preconception in RI. The present study aimed to address this gap in the literature. Our aims were 1) to determine rates of preconception marijuana use among low-income pregnant women in the greater RI area; 2) to identify sociodemographic, mental health, and other health characteristics of women who used marijuana in the preconception period; and 3) to examine group differences related to sociodemographic and health characteristics between preconception marijuana users, tobacco users, and controls.

## MATERIALS AND METHODS

### Sample

This is a secondary analysis of telephone surveys performed as part of two larger studies investigating associations between maternal cigarette smoking and infant neurodevelopment. All women were English-speaking and pregnant. In total, 1691 pregnant women participated in the phone interview between 2014 and 2017. To be included in this secondary analysis, women had to respond to questions about preconception marijuana use.

### Procedures

#### Telephone Survey

Participants were recruited into the parent studies at a comprehensive outpatient reproductive health and maternity services center that serves a diverse population of women in Rhode Island, as well as other clinics throughout Southern New England. All interested women were then verbally consented for the telephone survey, which included items pertaining to substance use, mental health, prenatal care, and demographics. Alcohol and tobacco use were assessed during preconception and pregnancy. Due to local reporting requirements, marijuana use was only assessed during preconception, defined as the three months prior to pregnancy. The study was approved by the Women and Infants Hospital Institutional Review Board.

Women were categorized into three groups: marijuana users, tobacco only users, and controls. Women who reported any marijuana use during the preconception period, regardless of their tobacco use, were considered marijuana users. Women who reported any tobacco product use during preconception or pregnancy but did not report preconception marijuana use were considered tobacco users. Women who reported neither marijuana nor tobacco use were considered controls.

### Measures

All measures were self-reported.

### Demographics and obstetric factors

Demographic variables included maternal age, number of people in the household, number of children, income, education, and race/ethnicity. Obstetrical factors included estimated gestational age (EGA) at the time of presentation to prenatal care. Respondents self-reported race/ethnicity. Household income, race/ethnicity, and education were analyzed as dichotomous variables (<\$30,000 vs. ≥\$30,000 per year; non-Hispanic White vs. other race/ethnicity; and high school education/GED or less vs. greater than high school education/GED, respectively).

### Marijuana use

Survey respondents were asked, *In the three months prior to this pregnancy, did you use marijuana?* Those who reported use were asked, *Approximately how much did you use (equivalent in joints)? How often? How many people shared, including yourself?* Responses were categorized for frequency, method, and mode of use. Frequency of use was categorized as: daily, two or more uses per week but less than daily, between 1 and 2 uses per week, and use once monthly or less. Method of use was categorized as: smoked vs. edible consumption, as no other modes of consumption (e.g. vaping) were reported during this time period. Finally, mode of use for marijuana was categorized as: edibles, joints, blunts, bowls, cigarillos, or other.

### Tobacco product use

To assess conventional cigarette use before and during pregnancy, respondents were first asked, *Do you smoke cigarettes?* Respondents who did not report current smoking were asked, *Did you smoke at all during this pregnancy or in the 3 months prior to pregnancy?* Those who reported cigarette use were asked how many cigarettes they smoked per day. To assess for other nicotine or tobacco use, respondents were asked, *Are you currently using any of the following tobacco or nicotine products?* and were prompted to select products used from a comprehensive list. Participants were then asked, *Did you use any of those products listed during this pregnancy or 3 months prior to pregnancy?* followed by a presentation of the same options.

### Other health problems, including mental health

Women were categorized as having symptoms of depression during pregnancy if they responded yes to both questions: *During your pregnancy, did you ever feel depressed or down or sad or irritable or lost pleasure in things you usually enjoy?* and *Did you feel like this most of the day, nearly every day, for 2 weeks or more?* Women were also asked if they had ever been diagnosed with bipolar disorder, schizophrenia, schizoaffective disorder, or psychosis; those responding “yes” were categorized as having a severe mental health condition.

### Alcohol use

Respondents were considered to have used alcohol during their pregnancy if they responded “yes” to the question, *Have you drunk any alcohol during this pregnancy, including the weeks before you found out?* Those who responded “yes” were asked, *How many drinks per week on average?*

### Statistical Analyses

Overall sample and study group characteristics were examined using Stata Version 15. Marijuana users were compared to tobacco users and controls. For continuous variables with normal distributions, independent samples *t* tests were used to compare group means. For count variables, independent samples Mann-Whitney U tests were used. This method was chosen due to skewed distributions for ease of interpretation. We conducted  $\chi^2$  tests to examine associations with categorical variables.

## RESULTS

### Sample rates, sociodemographic characteristics, mental health, and substance use

Of the 1691 women who completed phone interviews, 8 women did not complete the questions regarding marijuana use and were excluded from this analysis, yielding a final sample of 1683 women. A majority of participants were non-white (64.0%), and low-income (66.6%), and reported high rates of mental health concerns and alcohol use (**Table 1**). One quarter of our sample was categorized as preconception marijuana users ( $n=423$ ); 21% were categorized as tobacco users only ( $n=353$ ); 54% were considered controls ( $n=907$ ). More than half (51.7%;  $n=216$ ) of preconception marijuana users reported daily use. Nearly all participants who gave a method of marijuana use reported smoking marijuana ( $n=347$ , 99.1%) via joint ( $n=192$ , 45.4%), blunt ( $n=128$ , 30.3%), or bowl ( $n=21$ , 5.0%). The remainder used edibles ( $n=3$ , 0.7%), cigarillos ( $n=1$ , 0.2%), or other ( $n=63$ , 17.2%). The majority of marijuana users (58.2%,  $n=246$ ) reported tobacco co-use.

### Sociodemographic Characteristics

Women who reported preconception marijuana use were significantly younger ( $M=25.8$ ) compared to controls ( $M=27.3$ )

**Table 1.** Sociodemographic and other characteristics of marijuana users, tobacco users, and controls

	Marijuana use (n=423)	Tobacco use (n=353)	Control (n=907)	Total (N=1683)	Marijuana v. controls	Marijuana v. tobacco
	n (%)				p	
White	148 (35.6)	146 (42.1)	298 (33.7)	592 (36)	0.52	0.07
≤ HS Degree	305 (73.5)	263 (75.6)	514 (58.9)	1082 (66.2)	< .001	0.51
Income ≥ \$30,000/year	88 (24.0)	67 (21.46)	347 (42.2)	502 (33.4)	< .001	0.43
Depression symptoms during pregnancy	70 (21.6)	47 (17.3)	59 (8.3)	176 (13.5)	< .001	0.19
Serious mental health conditions	39 (11.6)	34 (12.1)	21 (3.0)	94 (7.1)	< .001	0.86
Alcohol during pregnancy	111 (33.3)	85 (30.9)	122 (17.2)	318 (24.1)	< .001	0.52
Child protective services involvement	33 (9.9)	24 (8.5)	30 (4.2)	87 (5.2)	< .001	0.57
	Mean (SD)				p	
Maternal age (years)	25.8 (5.17)	27.32 (5.29)	27.3 (5.18)	26.92 (5.24)	< .001	< .001
Cigarettes per day <sup>§</sup>	6.29 (5.05)	6.71 (5.44)	0.00 (0.00)	6.55 (5.28)	—	0.55
Number of children	0.81 (1.15)	1.38 (1.49)	1.12 (1.15)	1.10 (1.24)	< .001	< .001
Number of people in household	3.23 (1.44)	3.45 (1.77)	3.26 (1.30)	3.29 (1.45)	0.78	0.09
Gestational age presented to prenatal care (weeks)	8.90 (3.73)	9.11 (4.75)	8.76 (3.57)	8.87 (3.89)	0.58	0.54
Drinks per week <sup>§</sup>	4.09 (7.42)	2.83 (3.54)	1.92 (2.14)	2.92 (5.01)	0.06	0.95

\* Preconception is defined as the 3 months prior to pregnancy

<sup>§</sup> Cigarettes per day and Drinks per week analyses included only participants who reported any cigarette before or during pregnancy and any alcohol use during pregnancy, respectively.

and tobacco users ( $M=27.3$ ) ( $p<0.001$ ). Relative to controls, preconception marijuana users were also more likely to report low income (76.0% vs. 57.8%) ( $p<0.001$ ) and a high school education or less (26.5% vs 41.1%,  $p<0.001$ ) (Table 1).

### Concurrent Mental Health Conditions and Substance Use

Women who reported preconception marijuana use were more likely than controls to report symptoms of depression during pregnancy (21.6% vs 8.3%,  $p<0.001$ ) and other serious mental health conditions (11.6% vs 3.0%,  $p<0.001$ ). Preconception marijuana users were also more likely than controls to consume alcohol during their pregnancies (33.3% vs 17.2%,  $p<0.001$ )

## DISCUSSION

This study investigated rates of preconception marijuana use and associated demographics in a large convenience sample ( $n=1683$ ) of low-income pregnant women in the greater RI area. In this study which occurred between 2014 and 2017, 25% of pregnant women reported marijuana use in the three months prior to pregnancy, with more than 50% reporting daily use. Relative to controls, users were significantly younger, less educated, and had lower incomes. They were more likely to report alcohol use during pregnancy, symptoms of perinatal depression, and serious mental health problems. The majority of preconception marijuana users were poly substance users, with 58.2% endorsing tobacco use during pregnancy, and 33.3% endorsing alcohol during

pregnancy. Nearly all (99.1%) women who used marijuana reported use of combusted marijuana.

Our study's reported prevalence of preconception marijuana use far exceeds the overall national prevalence<sup>11</sup>, overall prevalence in RI<sup>12</sup>, and prevalence during pregnancy reported in prior studies.<sup>7,11</sup> Though our data are restricted to the preconception period, research has indicated that 48% to 60% of marijuana users continue their use during pregnancy.<sup>13</sup> Furthermore, the high percentage of daily users in our study is consistent with prior studies.<sup>7,11</sup> Given the risks posed to the fetus by prenatal marijuana use<sup>8-10</sup> and the evolving legality of marijuana in the region<sup>3,4</sup>, it is vital that interventions are initiated to reduce prenatal use.

Our findings are consistent with national survey data showing that pregnant marijuana users are younger, with lower incomes than non-users.<sup>14,15</sup> Increased knowledge of sociodemographic characteristics of preconception users may be an important means of identifying high-risk groups for intervention.

An association between preconception marijuana use and mental health conditions is consistent with prior studies, which have indicated a link between prenatal marijuana use and mood and personality disorders.<sup>16</sup> Previous research has also established an association between marijuana use and other substance use in pregnancy.<sup>15,17</sup> Enhanced understanding of comorbid psychiatric conditions and concurrent substance use among pregnant marijuana users is critical to developing screening and prevention tools for this population. As studies have demonstrated synergistic effects of

multiple substances on fetal development, reaching these co-users will be essential.<sup>13</sup>

Marijuana users only differed significantly from tobacco users in age (marijuana users significantly younger) and number of children (marijuana users had fewer children); though a large percentage of marijuana users used tobacco as well, the general lack of differences between the two groups is still striking. There have been several campaigns to reduce cigarette smoking during pregnancy.<sup>18</sup> Future studies should further investigate the overlap between preconception marijuana and tobacco users and analyze whether existing tobacco interventions may be adapted to reach pregnant marijuana users.

Future studies should develop screening and intervention tools to reduce use among pregnant women. Determining the current recommendations of local dispensaries and healthcare providers is fundamental to understand the messaging reaching pregnant users. Indeed, a 2019 study found that 70% of Colorado marijuana dispensaries recommended cannabis products to treat nausea in first trimester pregnant women.<sup>19</sup> Finally, previous studies combining urine toxicology and self-report have found increased prevalence of marijuana use. Future research should include biochemical indicators in analyses of marijuana prevalence.

We highlight three limitations to the current study. First, this study does not provide an index for prevalence rate of marijuana during pregnancy. Instead, we documented high levels of marijuana use in the three months prior to pregnancy. However, given the high rates of women using marijuana during the preconception period who continue into the pregnancy, these values serve as a useful indicator.<sup>13</sup> Second, the study used a convenience sample, raising the possibility of sampling bias and misrepresentation of the RI community and the surrounding area. However, the sample's diversity and race/ethnicity distribution closely aligns the source population.<sup>20</sup> Third, due to the tobacco focus of the parent studies, there was oversampling of tobacco users.

## CONCLUSION

In a large convenience sample of low-income pregnant women, we found that the prevalence of preconception marijuana use is 25%. Preconception marijuana use was associated with younger age, lower annual household income, less education, and fewer children living at home compared to women who reported no tobacco or marijuana use. In addition, preconception marijuana users were more likely to engage in concurrent alcohol use and to have depression and other mental health diagnoses. Increased understanding of the rates, demographics, and mental health correlates of this population provides a framework for the development of strategies to engage RI women on the subject of preconception and prenatal marijuana use and implement preventative strategies.

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### Authors

Kira A. Bromwich, BA; Warren Alpert Medical School, Brown University, Providence, RI.

Natasha A. Sokol, ScD; Center for Alcohol and Addiction Studies, Department of Behavioral and Social Sciences, School of Public Health, Brown University, Providence, RI.

Meaghan McCallum, PhD; Centers for Behavioral and Preventive Medicine, The Miriam Hospital, Providence, RI.

Cynthia Nguyen, BA; Centers for Behavioral and Preventive Medicine, The Miriam Hospital, Providence, RI.

Erika F. Werner, MD, MS; Department of Obstetrics and Gynecology, Warren Alpert Medical School, Brown University, Providence, RI.

Kristen A. Matteson, MD, MPH; Department of Obstetrics and Gynecology, Warren Alpert Medical School, Brown University, Providence, RI.

Chrystal Vergara-Lopez, PhD; Centers for Behavioral and Preventive Medicine, The Miriam Hospital; Department of Psychiatry and Human Behavior, Warren Alpert Medical School, Brown University, Providence, RI.

Laura R. Stroud, PhD; Centers for Behavioral and Preventive Medicine, The Miriam Hospital; Department of Psychiatry and Human Behavior, Warren Alpert Medical School, Brown University, Providence, RI.

### Correspondence

Laura R. Stroud, PhD  
 The Miriam Hospital  
 Centers for Behavioral and Preventive Medicine  
 Coro West, Suite 309  
 164 Summit Avenue  
 Providence, RI 02906  
[Laura\\_Stroud@brown.edu](mailto:Laura_Stroud@brown.edu)