

## WOMEN'S SEXUAL HEALTH

## The Relationship between Marijuana Use Prior to Sex and Sexual Function in Women



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## ABSTRACT

**Introduction:** Scientific research on the effects of marijuana on sexual functioning in women, including libido, arousal, orgasm, and satisfaction, is limited.

**Aim:** To evaluate women's perceptions of the effect of marijuana use before sexual activity.

**Methods:** A cross-sectional design, from March 2016–February 2017, within a single, academic, obstetrics and gynecology practice, was performed. Patients were given a questionnaire at their visit and asked to complete it anonymously and place it in a locked box after their visit.

**Main Outcome Measures:** The primary outcome was satisfaction in the sexual domains of drive, orgasm, lubrication, dyspareunia, and overall sexual experience. The secondary outcome was the effect of the frequency of marijuana use on satisfaction.

**Results:** Of the 373 participants, 34.0% (n = 127) reported having used marijuana before sexual activity. Most women reported increases in sex drive, improvement in orgasm, decrease in pain, but no change in lubrication. After adjusting for race, women who reported marijuana use before sexual activity had 2.13 higher odds of reporting satisfactory orgasms (adjusted odds ratio = 2.13; 95% CI = 1.05, 4.35) than women who reported no marijuana use. After adjusting for race and age, women with frequent marijuana use, regardless of use before sex or not, had 2.10 times higher odds of reporting satisfactory orgasms than those with infrequent marijuana use (adjusted odds ratio = 2.10; 95% CI = 1.01–4.44).

**Conclusion:** Marijuana appears to improve satisfaction with orgasm. A better understanding of the role of the endocannabinoid system in women is important, because there is a paucity of literature, and it could help lead to development of treatments for female sexual dysfunction. **Lynn BK, López JD, Miller C, et al. The Relationship between Marijuana Use Prior to Sex and Sexual Function in Women. Sex Med 2019;7:192–197.**

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**Key Words:** Female Sexual Response; Epidemiology; Health Behavior and Attitudes; Women's Sexuality

## INTRODUCTION

Over the last decade, marijuana use and the legalization of marijuana, medically and recreationally, has continued to increase in the United States.<sup>1</sup> The internet is rife with claims of the beneficial effects of marijuana on several aspects of sexual function including libido, arousal, and orgasm. However, our scientific research on the effects of marijuana on sexual functioning is limited. Recently Palamar et al<sup>2</sup> evaluated self-reported sexual effects of marijuana, ecstasy, and alcohol use in a small cohort of men and women aged 18–25. They found that the majority of marijuana users reported an increase in sexual enjoyment and orgasm intensity, as well as either an increase or no change in desire.<sup>2</sup>

Endocannabinoids, which are structurally similar to marijuana, are known to help regulate sexual function.<sup>3</sup> The cannabinoid

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**Table 1.** Demographics of study population

Characteristics	Non-marijuana users (n = 197)	Marijuana users who don't use before sex (n = 49)	Marijuana users who use before sex (n = 127)	P value*
Age, years	36.3 ± 13.1	37.4 ± 13.1	34.0 ± 11.3	.17
Race <sup>†</sup>				.03
African American/other minorities	79 (40.7)	13 (26.5)	62 (48.8)	
Caucasian	115 (59.3)	36 (73.5)	65 (51.2)	
Sexual orientation <sup>‡</sup>				.02
Heterosexual	180 (91.4)	46 (93.9)	111 (87.4)	
Lesbian	3 (1.5)	0 (0.0)	4 (2.7)	
Bisexual	1 (0.5)	0 (0.0)	7 (5.5)	
Marital status <sup>§</sup>				.18
Married	95 (49.0)	24 (49.0)	46 (36.2)	
Living with a partner	62 (32.0)	18 (36.7)	55 (43.3)	
Single	37 (19.1)	7 (14.3)	25 (19.7)	
Cigarette smoker	17 (8.6)	10 (20.4)	30 (23.6)	<.01

Table values are frequencies (%) or means ± SD.

\*χ<sup>2</sup>, Fisher's exact test, and 1-way ANOVA. Significant at the P < .05 level.

<sup>†</sup>3 participants were missing for race and quality of life.

<sup>‡</sup>21 participants were missing for sexual orientation.

<sup>§</sup>4 participants were missing for marital status.

receptor, discovered in the 1990s, has been mapped to several areas of the brain that play a role in sexual function.<sup>3</sup> Cannabinoids and endocannabinoids interact with the hormones and neurotransmitters that affect sexual behavior. Although these interactions have not been clearly illuminated, some studies in rodents have helped to clarify the relationship between cannabinoids and the hormones and neurotransmitters that affect sexual behavior.<sup>4</sup> Although there is less data on human subjects, some studies have measured patient's perceptions of the effects of marijuana on sexual function. Studies have reported an increase in desire and improvement in the quality of orgasm.<sup>5</sup> Most recently, Klein et al<sup>6</sup> evaluated the correlation between serum levels of 2 endogenous endocannabinoids and found a significant negative correlation between endocannabinoids and both physiological and subjective arousal in women. Sumnall et al<sup>7</sup> reported that drugs such as cannabis and ecstasy were more frequently taken to improve the sexual experience than was alcohol.

The primary aim of this study was to determine how women perceive the sexual experience, specifically overall sexual satisfaction, sex drive, orgasm, dyspareunia, and lubrication, when using marijuana before sex. The magnitude of the change was also evaluated. The secondary aim sought to understand the effect of the frequency of marijuana use, regardless of marijuana use before sex, on satisfaction across the different sexual function domains.

## MATERIAL AND METHODS

Women were enrolled prospectively from a single, academic, obstetrics and gynecology practice from March 2016–February

2017, and their data were retrospectively reviewed. The protocol was approved by the Institutional Review Board. Eligibility criteria consisted of being a female, ≥18 years of age, and presenting for gynecologic care irrespective of the reason. Each participant completed a confidential survey, including demographic data without unique identifiers after their visit, which was placed in a sealed envelope and dropped in a lock box at the clinic. The Sexual Health Survey was developed for the purpose of this study based on the aims of the study. There are several validated tools for evaluation of sexual function. The Female Sexual Function Index (FSFI)<sup>8</sup> assesses several domains of sexual function, but it does not address specifically marijuana or other substance usage. The Golombok Rust Inventory of Sexual Satisfaction<sup>9</sup> specifically relates to vaginal intercourse, but, for purposes of this study, sexual activity was deliberately left open-ended and not restricted to vaginal penetration. In addition, the goal was not to measure whether women had sexual dysfunction, which the FSFI addresses, but to assess basic questions regarding overall sexual activity. To limit bias, the authors embedded the questions about marijuana deeper into the questionnaire. If these specific questions had been added to the standard FSFI, there was concern that the questionnaire would have been too long and that the patients would get questionnaire fatigue and not finish or answer thoughtfully.

Measurement of marijuana use before sex was dichotomized as yes or no. The exact timing of marijuana use in relation to sex was not defined, and the majority of users were smokers of marijuana. For purposes of the study, groups consisted of non-marijuana users, marijuana users before sex, and marijuana users who didn't use before sex. Patients reported their usage as

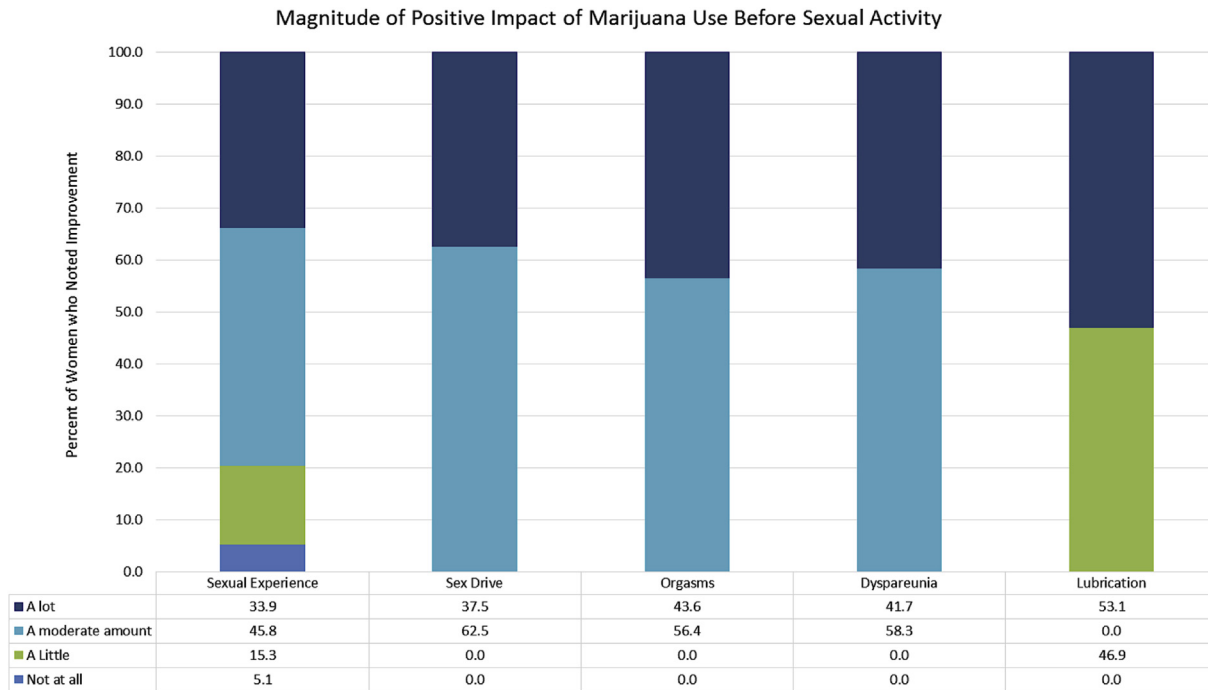


Figure 1. Magnitude of positive impact of marijuana use before sexual activity.

several times a day or week or year, once a day, week or year and less than once a year. For purpose of analysis, frequency of marijuana use was measured by dichotomizing into frequent (once a week—several times a day) and infrequent (several times a year—<once a year).

“Sex” was not specifically defined in the questionnaire, so each respondent used her own definition of sex. Initial questions assessed their perception of their overall sexual health, including satisfaction or dissatisfaction with current sex life, sex drive, orgasms, lubrication, and dyspareunia. An example survey question was, “How satisfied are you with your ability to maintain lubrication during sexual activity or intercourse?” This was followed by questions regarding marijuana usage, the frequency of use, and whether participants perceived any positive or negative effect of this on the above sexual domains. The magnitude of change was measured on a Likert scale of always, sometimes, rarely, or never, and then dichotomized as always—sometimes vs

rarely—never. For example, if patients reported that marijuana use before sex increased their sexual desire, they were then asked, “How often did/does marijuana use before sex increase your sex drive?” If they reported a decrease in sex drive, they then answered the same question within the context of by how much.

Bivariate analyses were conducted to measure the sample characteristics. The Shapiro-Wilk test was conducted to test for normality of the data. 1-way ANOVA,  $\chi$  and Fisher’s exact tests were used to assess for comparisons among the groups. Multivariate logistic regressions identified the independent predictors in the sample and included all covariates with  $P < .05$  established in the bivariate correlations. Then, covariates were retained in the final regression model if they changed the effect size between exposure and outcome by more than 10%, indicating a confounding effect. Final models were adjusted for race and tested using Hosmer-Lemeshow for goodness of fit. Data were analyzed using SAS Version 9.4 for Windows (SAS Institute Inc, Cary, NC, USA).

Table 2. Differences in sexual function domains between those who use before sexual activity and those who do not

Sexual function	Marijuana before sex (n = 127)	Marijuana users don’t use before sex (n = 49)	P value*	aOR (95% CI)
Sexual life satisfaction	89 (70.1)	30 (61.2)	.11	1.85 (0.86, 3.99)
Satisfying sex drive	91 (71.7)	29 (59.2)	.10	1.84 (0.89, 3.82)
Satisfying orgasm	86 (67.7)	26 (53.1)	.04	2.13 (1.05, 4.35)
Increased lubrication	94 (74.0)	34 (69.4)	.50	1.32 (0.58, 3.00)
Reduced dyspareunia	20 (15.7)	10 (20.4)	.40	0.69 (0.30, 1.63)

aOR = adjusted odds ratio.

Table values are frequencies (%). Adjusted for race and age.

\* $\chi^2$ , significant at  $P < .05$  level.

**Table 3.** Overall satisfaction of sexual health based on frequency of use

	Frequent marijuana users n = 84	Infrequent marijuana users n = 86	P value*	aOR (95% CI)
Sexual life satisfaction	61 (72.6)	56 (65.1)	0.12	1.50 (0.64, 3.48)
Satisfying sex drive	57 (67.9)	61 (70.9)	0.94	0.77 (0.35, 1.71)
Satisfying orgasm	60 (71.4)	50 (58.1)	0.02	2.10 (1.01, 4.44)
Increased lubrication	63 (75.0)	60 (69.8)	0.23	1.41 (0.60, 3.31)
Reduced dyspareunia	12 (14.3)	18 (20.9)	0.29	0.68 (0.29, 1.59)

aOR = adjusted odds ratio.

Table values are frequencies (%). Adjusted for race and age.

\* $\chi^2$ , Significant at  $P < .05$  level.

## RESULTS

A total of 373 patients completed the sexual health survey during the study period. Non-marijuana users constituted 52.8% ( $n = 197$ ) of the sample. Of the 176 users, 34.1% ( $n = 127$ ) used before sex and 13.1% ( $n = 49$ ) did not. The mean age of the groups was not significantly different. The majority of women were white and identified as heterosexual (Table 1).

Among those who reported using marijuana before sex, 68.5% ( $n = 87$ ) stated that the overall sexual experience was more pleasurable, 60.6% ( $n = 77$ ) noted an increase in sex drive, and 52.8% ( $n = 67$ ) reported an increase in satisfying orgasms. The majority reported no change in lubrication. Participants reported their sexual experiences as “always to sometimes” positive related to all the domains of sexual function, except for lubrication (Figure 1). After adjusting for race, women who reported marijuana use before sex had 2.13 higher odds of reporting satisfactory orgasms during sexual activity (adjusted odds ratio = 2.13; 95% CI = 1.05–4.35) than women who reported no marijuana use before sex (Table 2). There was no statistically significant difference in the other domains between these groups. Women with frequent marijuana use, regardless of use before sex or not, had 2.10 times higher odds of reporting satisfactory orgasms than those with infrequent marijuana use (adjusted odds ratio = 2.10; 95% CI = 1.01–4.44) (Table 3). There was no significant difference in the other domains.

## DISCUSSION

In our study, the majority of women who used marijuana before sex reported positive sexual effects in the domains of overall sexual satisfaction, desire, orgasm, and improvement in sexual pain but not in lubrication. Women who used marijuana before sex and those who used more frequently were more than twice as likely to report satisfactory orgasms as those who did not use marijuana before sex or used infrequently.

Our study is consistent with past studies of the effects of marijuana on sexual behavior in women. In the above-mentioned study by Palamar et al,<sup>2</sup> 38.6% of respondents were women. Participants were asked questions similar to this study’s questions regarding sexual domains, including sexual enjoyment, desire, and orgasm intensity and how these were affected by being under

the influence of marijuana. The majority of respondents noted an increase in sexual enjoyment (53.5%) and orgasm intensity (44.9%), whereas 31.6% noted an increase in desire, and 51.6% noted no difference.<sup>2</sup> Our data showed a higher percentage of participants reporting improvements in each domain across the board. However, their data included both men’s and women’s responses, and their questions were worded differently.

Dawley et al<sup>10</sup> evaluated a group of marijuana using students (men and women) and found that marijuana smokers reported increased sexual pleasure, increased sensations, and increased intensity of orgasm. Only more-frequent users felt that marijuana was an “aphrodisiac,” a surrogate measure of desire. This study included only 22% women.<sup>10</sup> Finally, Koff<sup>11</sup> evaluated sexual desire and sexual enjoyment after marijuana use in women via a questionnaire. The majority of the female respondents reported that sexual desire was increased (57.8% vs 60.6% in our study). Sexual enjoyment increased 42.9% of the time.<sup>11</sup> Interestingly, Sun and Eisenberg<sup>12</sup> reported a higher frequency of sexual activity in marijuana users, even when controlling for multiple variables (ie, age, socioeconomic status). The authors surmise from their data that marijuana use does not seem to impair sexual function. However, it is important to note that marijuana use may be harmful.

Our study provides an interesting insight into women’s perceptions of the effect of marijuana on the sexual experience. It differs from other studies in that it is one of the largest series to date and has a wider range of ages. It also differed in that it was a cross-section of healthy women presenting for routine gynecologic care, where most studies target younger patients and include both sexes. For this reason, it is difficult to directly compare the studies, because the sexual activity, frequency, and expectation of these groups may be very different. However, we believe it is important to understand the potential effect in this patient population.

The question of how marijuana leads to these positive changes in sexual function is unknown. It has been postulated that it leads to improvement in sexual function simply by lowering stress and anxiety.<sup>13</sup> It may slow the temporal perception of time and prolong the feelings of pleasurable sensations.<sup>5,14</sup> It may lower sexual inhibitions and increase confidence and a willingness to experiment.<sup>7</sup> Marijuana is also known to heighten

sensations such as touch, smell, sight, taste, and hearing.<sup>15</sup> Although this was not specifically addressed in this article, according to Halikas et al,<sup>5</sup> the regular female marijuana user reported a heightened sensation of touch and increased physical closeness when using marijuana before sex.

It is postulated that marijuana works through a variety of mechanisms. It is recognized that marijuana and the hypothalamic-pituitary-gonadal axis, which controls the sex hormones, interact with each other. There are cannabinoid receptors in the hypothalamus that regulate gonadotrophin-releasing hormone and oxytocin release, both of which play a role in normal sexual functioning.<sup>16</sup> In addition, marijuana has been shown to affect testosterone levels, which play a role in sex drive, but how and in which direction in women is unclear.<sup>17,18</sup>

Female sexual function is not only regulated by hormones, but also by centrally acting neurotransmitters, such as dopamine and serotonin. Dopamine is a key pro-sexual modulator in normal excitatory female sexual function.<sup>19,20</sup> Activation of cannabinoid receptors has been shown to enhance dopamine,<sup>19</sup> which may be another pathway by which marijuana affects sexual function. Cannabinoid receptors have also been localized to other areas of the brain that control sexual function, including the hypothalamus, prefrontal cortex, amygdala, and hippocampus.<sup>21,22</sup> Serum levels of endocannabinoids have been correlated with both subjective and objective measures of arousal.<sup>6</sup>

The strength and weakness of this study is that it is a single-center study, which allows consistency of patient recruitment but does not allow for assessment of generalizability. It relied on women's memory and perceptions of the sexual experience; however, it is real life, and all questionnaires rely on recall. It did not address the context of the relationship, co-use with other drugs, or the timing and quantity of marijuana use before sex, all of which contribute to the memory of the sexual experience. It does not specifically ask whether the marijuana was taken because the patient had the perception that it would enhance performance, which would be an inherent bias. This may be less likely because women who were frequent users (that is not specifically timed with intercourse) had the same positive relationship with improvement in satisfying orgasm. A further study could address the specific timing of marijuana use on the sexual domains though this would be difficult unless patients were enrolled in a study that required certain timing (a very challenging study to get through the Institutional Review Board).

## CONCLUSIONS

This study adds to our knowledge and understanding of the effect of marijuana use on female sexual functioning. Timing appears to be important with those who use before sex reporting a positive effect on orgasm. However, with any use, the majority of women perceived improvement in overall experience, sex drive, orgasm and pain.

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