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Cannabis Use in Women and Sexual Dysfunction

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Abstract

The purpose of this study is to evaluate the differences in sexual functioning in women who used cannabis before sex and those who used cannabis but not before sex, among those with sexual dysfunction. The cross-sectional study, conducted from August 2019 to January 2020 at an academic sexual dysfunction clinic in the Midwest region of the United States, included 187 participants. Patients completed an anonymous questionnaire during their visit, which included the Female Sexual Function Index (FSFI), cannabis use, and sociodemographic factors. The primary objective of this study was to assess the relationship between cannabis use and female sexual dysfunction (FSD). The secondary objective was to examine the FSFI domains of sexual function with cannabis use over the past four weeks. Among the participants, 90% (n = 168) had sexual dysfunction based on the FSFI scores among those with FSD. Women with FSD who used cannabis before sex reported significantly higher lubrication scores and trends toward higher arousal and total FSFI scores than those who used cannabis but not before sex. However, no significant differences were observed in sexual desire, satisfaction, or pain. Quality of life was statistically significant across cannabis groups, with those who never used cannabis indicating "very good to excellent" health more often than those who used cannabis before sex. In addition, women with FSD who had never smoked cigarettes had a significantly higher proportion of never having used cannabis compared to those who used cannabis not before sex and those who used it before sex. These findings suggest that women with sexual dysfunction who use cannabis before sex may experience improvements in lubrication, arousal, and overall sexual function, highlighting the potential benefits of cannabis use in enhancing specific aspects of sexual health in this population.

Keywords: female sexual response; epidemiology; sexual dysfunction; cannabis use; women's sexuality

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1. Introduction

Over the last decade, both cannabis use and its legalization, both medically and recreationally, have continued to increase [1]. Several small observational studies of women without sexual dysfunction (SD) have shown that cannabis may positively affect sexual functioning. Recently, Lynn et al. reported that most women who used cannabis before sex experienced increased libido, improved orgasms, and reduced pain [2]. Those experiencing

SD, which includes issues such as decreased libido, impaired arousal, and difficulties in achieving orgasm, affect a significant proportion of individuals throughout their lifespan and can severely impact their quality of life and intimate relationships [3]. Among the various biopsychosocial contributors to SD, emerging evidence highlights the role of substance use, including cannabis, in modulating sexual health [4]. To our knowledge, no other studies have evaluated the perceived effects of cannabis on the sexual experience of women *with SD.*

Endocannabinoids, which are structurally similar to cannabis, help regulate sexual function. One of the cannabinoid receptors, CB1, discovered in the 1990s, has been mapped to several areas of the brain that play a role in sexual function. Cannabinoids and endocannabinoids interact with hormones and neurotransmitters that affect sexual behavior by binding to this receptor. Although these interactions have not been fully understood, some studies in rodents have helped clarify the relationship between cannabinoids and hormones and neurotransmitters influencing sexual behavior. While there is less data on human subjects, some studies have measured patients' perceptions of the effects of cannabis on sexual function. One study reported an increase in desire and improvement in the quality of the orgasm. In the same study, the researchers evaluated the correlations between the serum levels of two endogenous endocannabinoids and found a significant negative correlation between endocannabinoids and physiological and subjective arousal in women. Another study reported that drugs such as cannabis and ecstasy were more frequently used to enhance sexual experience than alcohol.

To our knowledge, no studies have specifically addressed women's perceptions of cannabis use before sex in women with SD. However, SD has been linked to cannabis use. In 2004, researchers conducted a survey-based community epidemiological study to examine the incidence and prevalence of SD in the general population (inhibited orgasm, functional dyspareunia, inhibited sexual excitement, and inhibited sexual desire) [5]. Of the 3004 participants, 60% were female. After controlling for multiple variables, such as demographics, health status, and psychiatric comorbidities, cannabis was found to be associated with inhibited orgasm, as well as inhibited sexual excitement and desire [5].

Cannabis use affects the menstrual cycle by disrupting the release of gonadotropin-releasing hormone (GnRH), leading to alterations in hormones crucial to sexual function, such as testosterone and estrogen [5,6]. Furthermore, reproductive hormones like estrogen, progesterone, and testosterone exert a bidirectional effect on the impact of cannabis in rats, influencing the subjective, behavioral, and physiological effects of cannabis [7,8]. For instance, estrogen enhances the ability of cannabis to alleviate pain in ovariectomized female Sprague-Dawley rats, whereas testosterone reduces cannabis-induced slowed movements [7]. Cannabis is known to play a role in several pathways that affect sexual function. CB1 receptors are located in the axon terminals of GABAergic, dopaminergic, adrenergic, glutamatergic, and cholinergic neurons [9]. Another study found evidence of CB1 receptors in a subset of serotonergic neurons. Dopamine and serotonin play critical roles in sexual functioning [10]. Dopamine and norepinephrine are involved in the excitatory processes of sexual function, such as desire and arousal, while serotonin regulates inhibitory processes like the loss of desire. These neurotransmitters interact with testosterone, estrogen, melanocortin, progesterone, prolactin, and oxytocin to modulate the female sexual response [11]. Furthermore, cannabinoids can influence prolactin and oxytocin release, affecting reproductive behavior and emotional bonding [12]. Oxytocin can stimulate the release of endocannabinoids like anandamide, activating cannabinoid receptors to promote social bonding and reward [13].

Therefore, this study aimed to assess the relationship between cannabis use and female sexual dysfunction. Additionally, the researchers sought to determine the relationship

between FSFI domains of sexual function and cannabis use over the past four weeks among those with SD.

2. Materials and Methods

Women were prospectively enrolled from a single academic SD clinic in the Midwest region of the United States between August 2019 and January 2020 using purposive sampling. Participants were recruited consecutively as part of a prospective observational study, and all eligible patients who presented to the clinic during this period were approached for enrollment, thereby minimizing selection bias within the clinical setting. A total of 187 participants consented to and completed the questionnaire (Supplementary Material). This represents a consecutive sampling approach, a form of non-probability sampling commonly used in clinical environments to reduce selection bias while capturing real-world patient experiences over a specific time frame. A formal sample size calculation was not performed because the study aimed to describe the characteristics and experiences within a clinical population rather than to test a predefined hypothesis that would require statistical power estimation. The data were retrospectively reviewed. The Institutional Review Board approved this study protocol. The eligibility criteria included being female, aged 18 years or older, and presenting for gynecologic care at the SD clinic, which was staffed by the clinic director, a physician, and an investigator from this study. Each participant completed a confidential survey that included demographic data but no unique identifiers after their visit. The completed survey was placed in a sealed envelope and returned to the medical assistant. The staff physician then completed a separate questionnaire with potential SD diagnoses for each patient. The questionnaire and the original sealed envelope were placed in another sealed envelope.

The Female Sexual Function Index (FSFI) [14] was included in the questionnaire. The FSFI assesses several domains of sexual function (sexual desire, sexual arousal, lubrication, orgasm, satisfaction, and pain) over the past four weeks using a five-point Likert scale. The score ranges from 2 to 36, with higher scores indicating higher sexual functioning [14]. A total score of $\leq$26 has been validated as the cutoff score for the diagnosis of female sexual dysfunction (FSD) [14], but it does not address cannabis or other substance use specifically; therefore, additional questions regarding cannabis use and the effects of cannabis use within 2 h before sex on sex drive, sexual satisfaction, orgasm, libido, and pain were answered. 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 cannabis use before sex increased their sexual desire, they were then asked, "By how much did or does cannabis use within 2 h before sex increase or decrease your sex drive?"

Demographic data were collected, which included age, race (Black, Indigenous, and People of Color [BIPOC] and White), relationship status (married, single and in a relationship, or single and not in a relationship), insurance status (Medicaid/Medicare, commercial, no insurance), quality of life (very good to excellent, good, and poor to fair), cigarette smoking status (never, former, current), and types of clinical SD diagnoses. Sex was defined as caressing, foreplay, oral sex, masturbation, and vaginal intercourse. The frequency of cannabis use was categorized into three groups: several times a day, week, or year.

The groups consisted of non-cannabis users (who reported never using cannabis in their lifetime), cannabis users before sex (meaning use within two hours of sex, and the measurement was dichotomized as yes or no), and cannabis users who did not use before sex.

Bivariate analyses were conducted to measure sample characteristics. The Shapiro-Wilk test was used to test the normality of the data. Depending on the data's distribution, one-way ANOVA, Kruskal-Wallis test, Chi-square, and Fisher's exact test were used to

assess group comparisons. The Mann-Whitney *U* test was used to test for pairwise comparisons across the three cannabis use groups. Data were analyzed using SAS Version 9.4 for Windows (SAS Institute Inc., Cary, NC, USA).

3. Results

A total of 187 participants completed the questionnaire, and 90% (n = 168) were diagnosed with SD based on their FSFI scores. Among those with SD (n = 168), approximately 59% (n = 99) reported never using cannabis, 26% (n = 43) reported cannabis use but not before sex, and 15% (n = 26) reported cannabis use before sexual intercourse. The average age of the participants across the three groups was 41–47 years (Table 1).

Table 1. Association between FSD and cannabis use.

	Never Use Cannabis (n = 109)	**Cannabis Use, Not Before Sex (n = 47)**	**Cannabis Use, Before Sex (n = 31)**	***p* ***
No Sexual Dysfunction	10 (9.2)	4 (8.5)	5 (16.1)	0.48
Sexual Dysfunction	99 (90.8)	43 (91.5)	26 (83.9)	

Data are presented as n(%). * Fisher's exact test.

Among those with FSD, all three groups had the most or more than the majority of participants reporting that they had never been cigarette smokers, and they were statistically significant from one another ($p < 0.01$). Specifically, women with FSD who had never smoked cigarettes had a significantly higher proportion of never having used cannabis (n = 79, 79.8%) than those who used cannabis not before sex (n = 21, 48.8%; $p < 0.01$) and those who used it before sex (n = 15, 57.7%; $p = 0.02$). Additionally, quality of life was statistically significant across cannabis groups, with those who never used cannabis indicating "very good to excellent" health more often (n = 45, 45.5%) than those who used cannabis before sex (n = 9, 34.6%; $p = 0.01$). There was no statistically significant relationship between the three cannabis groups and the frequency of cannabis use. Among the various clinical SD conditions, there were statistically significant differences between those who never used cannabis (n = 2, 2.1%) and those who used cannabis before sex (n = 3, 11.5%) in terms of fibromyalgia ($p = 0.03$) (Table 2).

Table 2. Demographic and sexual dysfunction conditions in those with FSD.

	Cannabis Use						
	Never Use Cannabis (n = 99) (1)	**Cannabis Use, Not Before Sex (n = 43) (2)**	**Cannabis Use, Before Sex (n = 26) (3)**	***p* ***	***p* (1) vs. (2)**	***p* (1) vs. (3)**	***p* (2) vs. (3)**
Age, years	46.6 ± 13.9	46.4 ± 15.5	41.3 ± 12.9	0.56	0.40	0.64	0.32
Race (n = 167)				0.35	0.20	0.38	0.87
BIPOC	23 (23.2)	6 (14.0)	4 (15.4)				
White	75 (75.8)	37 (86.0)	22 (84.6)				
Relationship status				0.28	0.16	0.21	0.89
Married	77 (77.8)	28 (65.1)	16 (61.5)				
Single, in a relationship	19 (19.2)	11 (25.6)	8 (30.8)				
Single, not in a relationship	3 (3.0)	4 (9.3)	2 (7.7)				
Cigarette Smoker (n = 163)				<0.01	<0.01	0.02	0.30

Table 2. *Cont.*

	Cannabis Use						
	Never Use Cannabis (n = 99) (1)	**Cannabis Use, Not Before Sex (n = 43) (2)**	**Cannabis Use, Before Sex (n = 26) (3)**	***p* ***	***p* (1) vs. (2)**	***p* (1) vs. (3)**	***p* (2) vs. (3)**
Never	79 (79.8)	21 (48.8)	15 (57.7)				
Former	16 (16.2)	18 (41.7)	7 (26.9)				
Current	2 (2.0)	2 (4.7)	3 (11.5)				
Insurance status				0.40	0.27	0.83	0.62
Medicaid/Medicare	13 (13.1)	7 (16.3)	3 (11.5)				
Commercial	86 (89.9)	35 (81.4)	23 (88.5)				
No insurance	0 (0.0)	1 (2.3)	0 (0.0)				
Quality of life (n = 162)				0.04	0.24	0.01	0.26
Very good to excellent	45 (45.5)	14 (32.6)	9 (34.6)				
Good	45 (45.5)	21 (48.8)	8 (30.8)				
Poor to fair	7 (7.0)	6 (14.0)	7 (26.9)				
Cannabis Use Frequency (n = 68)				<0.01	--	--	0.24
Several times a day	0 (0.0)	1 (2.4)	5 (19.2)				
Several times a week	0 (0.0)	2 (4.8)	11 (42.3)				
Several times a year	0 (0.0)	39 (92.9)	10 (38.5)				
Clinical Sexual Dysfunction							
Low libido	59 (59.6)	23 (53.5)	13 (50.0)	0.61	0.50	0.38	0.78
Dyspareunia	66 (66.7)	33 (73.7)	19 (73.1)	0.46	0.23	0.53	0.73
Orgasm dysfunction	14 (14.1)	8 (18.6)	5 (19.2)	0.72	0.50	0.52	0.95
Genitourinary syndrome of menopause	44 (44.4)	19 (44.2)	8 (30.8)	0.44	0.98	0.21	0.27
Breast cancer	19 (19.2)	4 (9.3)	3 (11.5)	0.27	0.14	0.36	0.77
Vulvodynia	14 (14.1)	7 (16.3)	4 (15.4)	0.94	0.74	0.87	0.92
Pelvic floor muscle spasm	31 (31.3)	14 (32.6)	12 (46.2)	0.36	0.88	0.16	0.26
Interstitial cystitis	6 (6.1)	3 (7.0)	2 (7.7)	0.95	0.84	0.76	0.91
Endometriosis	10 (10.1)	5 (11.6)	4 (15.4)	0.75	0.79	0.45	0.65
Irritable bowel syndrome	7 (7.1)	6 (14.0)	2 (7.7)	0.41	0.19	0.91	0.43
Migraines	6 (6.1)	2 (4.7)	2 (7.7)	0.87	0.74	0.76	0.60
Fibromyalgia	2 (2.1)	3 (7.0)	3 (11.5)	0.09	0.14	0.03	0.52
Sexual trauma/abuse	8 (8.1)	4 (9.33)	1 (3.9)	0.70	0.81	0.46	0.40

Data are presented as n(%) or mean ± standard deviation; * one-way ANOVA, chi-square, or Fisher's exact test.

Regarding the FSFI score domains, women who used cannabis but not before sex and those who used cannabis before sex had statistically significant differences in the lubrication domain (1.2 vs. 3.2, $p = 0.02$) and a trend toward higher scores for arousal (1.5 vs. 2.4, $p = 0.07$) and total FSFI (11.8 vs. 12.2, $p = 0.06$). No significant differences were observed in the domains of sexual desire, orgasm, satisfaction, or pain (Table 3). Approximately 30% ($n = 20$ of 67) of women reported that using cannabis two hours before a sexual experience made it more pleasurable, and about 85% ($n = 17$ of 20) of those women reported either always or sometimes when asked how much it impacted pleasure.

Table 3. FSFI score association with cannabis use in those with FSD.

	Never Use Cannabis (n = 99) (1)	Cannabis Use, Not before Sex (n = 43) (2)	Cannabis Use, before Sex (n = 26) (3)	*p* *	*p* (1) vs. (2)	*p* (1) vs. (3)	*p* (2) vs. (3)
Desire	1.8 (1.2, 3.0)	1.8 (1.2, 3.6)	2.4 (1.2, 2.4)	0.77	0.47	0.72	0.85
Arousal	2.1 (1.2, 3.3)	1.5 (1.2, 30)	2.4 (1.5, 3.9)	0.17	0.26	0.22	0.07
Lubrication	2.1 (1.2, 3.9)	1.2 (0.3, 3.3)	3.2 (1.5, 4.2)	0.06	0.10	0.29	0.02
Orgasm	2.4 (0.8, 3.6)	1.6 (0.0, 3.2)	3.0 (1.2, 3.6)	0.27	0.29	0.36	0.11
Satisfaction	2.8 (1.2, 4.0)	2.0 (1.2, 3.2)	2.6 (1.2, 4.0)	0.20	0.08	0.43	0.58
Pain	2.0 (0.0, 4.4)	1.6 (0.0, 2.8)	3.2 (1.2, 4.8)	0.19	0.14	0.48	0.11
Total Score	15.2 (8.8, 19.3)	11.8 (7.2, 16.2)	12.2 (9.1, 16.4)	0.14	0.12	0.39	0.06

Data are represented as median (IQR); * Kruskal-Wallis test for comparison across all three groups; Mann–Whitney *U* test for pairwise comparisons.

4. Discussion

This study highlighted important aspects among women with FSD and the interactions between various FSFI domains and the three categories of cannabis use in the academic SD clinic in the Midwestern region of the United States. Notably, among those with FSD, women who used cannabis but not prior to sex and those who used cannabis before sex exhibited statistically significant differences in the lubrication domain, with FSFI scores increasing between the two groups, alongside a trend towards higher scores for arousal and total FSFI. Interestingly, there was no trend towards higher desire or orgasm scores, as observed in a study that evaluated cannabis use before sex in women without sexual dysfunction [2]. This study also did not demonstrate a significant effect on lubrication.

This study highlights the need for continued research on cannabis use and its impact on sexual experiences among women. Specifically, a recent study surveyed approximately 400 women and found a dose-response relationship between increased frequency of cannabis use and reduced odds of FSD using the same validated FSFI scale [15]. In a different study, a survey of an estimated 8650 women and men was conducted, of which about 11% (n = 754) of women reported cannabis use; however, there was no statistically significant relationship between cannabis use or frequency and sexual dysfunction [3]. Notably, this study did not use a validated questionnaire, as our research did, to measure sexual dysfunction.

Our research provides imperative insights into the perceptions of cannabis use and its impact on the sexual experiences of women with FSD. Given the various clinical conditions that women can face when experiencing FSD, which can be chronic and painful, it can be postulated that cannabis use could subsequently assist in pain reduction for individuals at these crossroads. In a recent Australian study, 13% of close to 500 participants used cannabis symptom management for their symptoms associated with the diagnosis of endometriosis [16]. Therefore, there is an opportunity to further research cannabis use among women with SD and elucidate the relationships between cannabis use, symptom management, and sexual experience.

Additionally, these results underscore the importance of contextualizing cannabis use within specific clinical populations under study. For clinicians and healthcare administrators, these findings underscore the importance of integrating questions about cannabis use patterns into sexual health assessments and treatment planning. Customizing care models to account for such factors through routine screening, provider education, and individualized care may improve outcomes in women with SD. As the landscape of cannabis legalization and use continues to evolve, ongoing evaluation of its association with sexual health outcomes is crucial for guiding responsive and evidence-based clinical care.

This study had several strengths and limitations that should be considered. Our study represents a case study of a single SD clinic in the United States, which limits our ability to generalize our findings to other areas, but provides an opportunity for consistency in patient recruitment. An additional limitation was that this was a cross-sectional survey design with no follow-up surveys, which introduced recall bias due to the need for memory recall regarding experiences and perceptions of sexual encounters. However, given the sensitivity of the information being requested, the researchers obtained thorough responses from the participants to complete the analysis. It did not address the context of the relationship, co-use with other drugs, route, timing, and quantity of cannabis use before sex, all of which contribute to the memory of the sexual experience. Further research should examine the specific timing of cannabis use in sexual contexts; however, this would be challenging unless patients were enrolled in a study that required precise timing. The questionnaire utilized a validated measure, the FSFI, along with other questions related to the participant's sexual health history. However, incorporating validated sexual dysfunction measures may have provided additional insights. This study included only cisgender women, thus limiting our understanding of how transgender individuals experience their sexual encounters in this context. Finally, although the data for this study were collected between August 2019 and January 2020, just before the COVID-19 pandemic, the findings remain relevant for understanding the clinical characteristics and experiences of women seeking care for sexual dysfunction. However, the researchers acknowledge that the healthcare landscape has evolved significantly since then, including the increased use of telehealth, changes in care-seeking behavior, and heightened psychosocial stressors. These shifts may have impacted the generalizability of our findings to current clinical contexts. Nevertheless, this dataset offers valuable pre-pandemic baseline information that can inform future comparative studies on how the pandemic and associated structural changes have affected sexual health and access to care.

5. Conclusions

This study contributes to the growing body of literature highlighting the need to understand the impact of cannabis use on sexual experiences among those with SD. It is critical to conduct prospective research studies to learn more about the potential causal pathways between the type and frequency of cannabis use and sexual experiences in women suffering from SD. To effectively address the intersection of SD and cannabis use, healthcare providers must adopt an integrated, multidisciplinary approach to support patient needs in an open and non-stigmatizing manner. This includes promoting education on the potential sexual health risks associated with chronic cannabis use and ensuring access to comprehensive sexual health services that assess cannabis use. Furthermore, targeted interventions should be evidence-based by integrating behavioral therapy, hormonal evaluation, and substance use counseling to improve sexual health outcomes holistically.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/sexes6030031/s1, Document S1. Women's Sexual Health Questionnaire.

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Abbreviations

The following abbreviations are used in this manuscript:

FSFI	Female Sexual Function Index
SD	sexual dysfunction
GnRH	gonadotrophin-releasing hormone
FSD	female sexual dysfunction
BIPOC	Black, Indigenous, and People of Color

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