Arkansas Department of Health
Petition to Add a Debilitating Medical Condition

Complete each section of this petition. Attach supportive documents. Attachments must include a title page which identifies the specific section to which it corresponds (section A, B, C…). Incomplete petitions will be returned. **Petitions must be sent by U.S. mail to:** Arkansas Department of Health 4815 West Markham Slot 50 Little Rock, AR 72205. For questions: toll free 1-833-214-8619 or 501-682-4982

Petitioner Information	First: Sarah	Middle:	Last: Hanson
	Home Address (including Apartment or Suite#): 300 James Drive		
	City: Centerton	State: AR	Zip Code: 72719
	Phone: 479-899-7411	Email Address: sarahhanson24@gmail.com	

A

Name the medical condition, medical treatment or disease. Provide the ICD-10 code(s).

ICD-10 code F 52.31 Female Orgasmic Disorder
F 52- Sexual dysfunction not due to a substance or known physiological condition
F52.3 Orgasmic Disorder Clinical Information - A change in the ability to obtain orgasm or in the quality of the orgasmic sensation.
F52.31 is applicable to female patients.

B

Describe the extent to which the debilitating medical condition or disease itself and/or the treatments, cause severe suffering and impair a person's daily life.

Impairment of mental health is the most important risk factor for women with FOD and other sexual dysfunctions (Basson & Gilks, 2018). Women who report FOD experience high rates of mental health diagnoses (Basson & Gilks, 2018), prescription drug use (Buffum, 1986), anxiety (Meston et al., 2004), PTSD (Yehuda et al., 2015) and sexual abuse histories (Najman et al., 2005). Please see Attachment 1.

C

Describe conventional medical therapies, to alleviate suffering caused by the condition or the treatment thereof.

There are no conventional medications that treat FOD (Conn & Hodges, 2023), which may contribute to the persistently high percentage of women suffering from FOD, an unchanged statistic for 50 years (Kontula & Miettinen, 2016). Please see Attachment 1.

D

Describe proposed benefits from the medical use of cannabis, for the named medical condition or disease.

The main benefit is the enhancement of women's health. Cannabis has been consistently and statistically proven in 50 years of research to alleviate the suffering of FOD and the shame and stigma that accompany it. Cannabis has been suggested as an adjunct to therapy since 1979. Please see Attachment 1.

E

Provide evidence generally accepted by the medical community and other experts, that the use of medical cannabis alleviates suffering caused by the named condition or disease. Supporting evidence includes full text peer reviewed journal articles and/or complete medical studies.

Please see excerpts of peer reviewed journal articles revealing cannabis' efficacy in treating FOD in Attachment 1. Full-text peer-reviewed journal articles can be found in Attachment 2a and 2b.

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JUL 23 2024
BY

F

Attach letters of support for the use of medical cannabis from physicians and or other licensed health care providers knowledgeable about the named condition or disease. This may include a letter from the physician with whom the petitioner has a bona-fide physician patient relationship. And any additional medical testimonial or scientific documentation.

Letters of support - please see Attachment 3.
News articles reference scientific documentation - please see Attachment 4.
References for this petition - Attachment 5.

I attest the information provided in this petition is true and that the attached documents are authentic.

Signature	Date (mm/dd/yyyy)
[signature]	07/18/2024

20171101

Sarah Hanson
Perfect Chaos Coaching, LLC.
(479) 899-7411
Sarahhanson24@gmail.com

June 13, 2024

Arkansas Department of Health
4815 West Markham Slot 50
Little Rock, AR 72205

Dear Arkansas Department of Health,

I am pleased to present to you the petition to add Female Orgasmic Difficulty/Disorder (FOD) as a condition of treatment with medical cannabis. FOD affects up to 41% of women globally,[1] an unchanged statistic for 50 years[2] with a paucity of treatments[3] and no conventional medications.[4] Decades of peer-reviewed research reveals cannabis helps women with FOD and it has been recommended an an adjunct to therapy to treat FOD and other sexual disorders since 1979.[5]

I worked in partnership with Dr. Suzanne Mulvehill, Clinical Sexologist and Orgasmologist, in preparing this petition and the research that supports adding FOD as a condition of treatment with medical cannabis. Dr. Mulvehill is the Executive Director of the *Female Orgasm Research Institute*, a 501c3 non-profit organization dedicated to improving women's health and wellness by identifying proven pathways to overcome FOD, and the *Women's Cannabis Project*, a public policy initiative advocating for cannabis as an FOD treatment.

The state of Connecticut approved adding FOD as a condition of treatment with medical cannabis on June 10, 2024 and the Illinois Medical Cannabis Board approved FOD on March 11, 2024. Many other states are in the petition process or awaiting meeting dates. My hope is that Arkansas will join the states that approved medical cannabis as an FOD treatment, acknowledging the importance of women's health.

Thank you for your consideration.

Warm Regards,

Sarah Hanson

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1. Laumann, E. O., Nicolosi, A., Glasser, D. B., Paik, A., Gingell, C., Moreira, E., & Wang, T. (2005). Sexual problems among women and men aged 40–80 y: prevalence and correlates identified in the Global Study of Sexual Attitudes and Behaviors. International Journal of Impotence Research, 17(1), 39–57. https://doi.org/10.1038/sj.ijir.3901250
2. Kontula, O., & Miettinen, A. (2016). Determinants of female sexual orgasms. *Socioaffective Neuroscience & Psychology*, *6*(1), 31624. https://doi.org/10.3402/snp.v6.31624
3. Marchand, E. (2020). Psychological and behavioral treatment of female orgasmic disorder. *Sexual Medicine Reviews*, *9*(2), 194–211. https://doi.org/10.1016/j.sxmr.2020.07.007
4. Conn, A., & Hodges, K. R. (2023, November 12). *Female orgasmic disorder - gynecology and obstetrics*. MSD Manual Professional Edition. https://www.msdmanuals.com/professional/gynecology-and-obstetrics/female-sexual-function-and-dysfunction/female-orgasmic-disorder#:~:text=Currently%2C%20no%20data%20suggest%20that,treatment%20of%20female%20orgasmic%20disorder
5. Dawley, H. H., Baxter, A. S., Winstead, D. K., & Gay, J. R. (1979). An attitude survey of the effects of marijuana on sexual enjoyment. *Journal of Clinical Psychology*, *35*(1), 212–217. https://doi.org/10.1002/1097-4679(197901)35:13.0.co;2-k

Arkansas Department of Health
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A

Name the medical condition, medical treatment or disease. Provide the ICD-10 code(s).

ICD-11 - Orgasmic Dysfunctions - HA02 Definition: Orgasmic dysfunctions refer to difficulties related to the subjective experience of orgasm. Anorgasmia refers to women who have never been able to have an orgasm. Description: The pattern of absence, delay, or diminished frequency or intensity of orgasm occurs despite adequate sexual stimulation, including the desire for sexual activity and orgasm, has occurred episodically or persistently over a period of at least several months and is associated with clinically significant distress.
DSM-5 name - Female Orgasmic Disorder

B

Describe the extent to which the debilitating medical condition or disease itself and/or the treatments, cause severe suffering and impair a person's daily life.

Impairment of mental health is the most important risk factor for women with FOD and other sexual dysfunctions (Basson & Gilks, 2018). Women who report FOD experience high rates of mental health diagnoses (Basson & Gilks, 2018), prescription drug use (Buffum, 1986), anxiety (Meston et al., 2004), PTSD (Yehuda et al., 2015) and sexual abuse histories (Najman et al., 2005). Please see Attachment 1.

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Describe conventional medical therapies, to alleviate suffering caused by the condition or the treatment thereof.

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D

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Provide evidence generally accepted by the medical community and other experts, that the use of medical cannabis alleviates suffering caused by the named condition or disease. Supporting evidence includes full text peer reviewed journal articles and/or complete medical studies.

Please see excerpts of peer reviewed journal articles revealing cannabis' efficacy in treating FOD in Attachment 1. Full-text peer-reviewed journal articles can be found in Attachment 2a and 2b.

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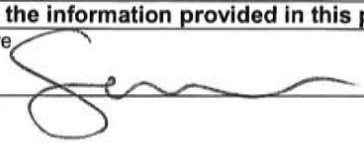
I attest the information provided in this petition is true and that the attached documents are authentic.

Signature	Date (mm/dd/yyyy)
	07/03/2024

20171101

ATTACHMENT 1

ARKANSAS Department of Health

Petition to Add a Debilitating Medical Condition

Condition: Orgasmic Dysfunctions - Female

Petitioner: Sarah Hanson

Research provided by: Female Orgasm Research Institute

B. Describe the extent to which the debilitating medical condition or disease itself and/or the treatments, cause severe suffering and impair a person's daily life.

* FOD is a serious public health concern that impairs the quality of women's lives (Laumann et al.,1999).

* Women who report FOD experience high rates of mental health diagnoses (Basson & Gilks, 2018), prescription drug use (Buffum, 1986), anxiety (Meston et al., 2004), post-traumatic stress disorder (Yehuda et al., 2015) and sexual abuse histories (Najman et al., 2005).

* Impairment of mental health is the most important risk factor for women with FOD and other sexual dysfunctions (Basson & Gilks, 2018).

* Women with FOD reported 24% more mental health issues, 52.6% more post-traumatic stress disorder (PTSD), 29% more depressive disorders, 13% more anxiety disorders, and 22% more prescription drug use than women without FOD (Mulvehill, 2023; Mulvehill& Tishler, 2023).

* Premenopausal women who have Type 1 diabetes are three times more likely to experience FOD and other sexual dysfunctions (Iapoce, 2023).

* The pooled prevalence of FOD and other sexual dysfunctions among women with heart failure was 56% (Schaffer & Regina, 2023).

* FOD is the number one sexual complaint among sexual abuse survivors (Kinzl et al., 1995).

* Women with FOD are more likely to experience relationship stress (McCabe, & Connaughton, 2016).

* Orgasm is an important component of sexual satisfaction (Laan & Rellini, 2011) and is a sexual and human right (World Organization for Sexual Health, 2008, 2014).

PREVELANCE OF FOD:

* FOD is one of the most prevalent sexual dysfunctions in women (Laumann et al., 2009).

* Up to 41% of women worldwide have FOD (Laumann et al., 2005).

* The percentage of women suffering from FOD has not changed for 50 years (Kontula & Miettinen, 2016).

* Orgasmic absence or difficulty, with or without distress is a common occurrence (Marchand, 2020).

C. Describe conventional medical therapies, to alleviate suffering caused by the condition or the treatment thereof.

* There are no conventional medications to treat FOD (Conn & Hodges, 2023).

LACK OF TREATMENTS FOR FOD:

* A recent review found no new validated treatments for decades and the need for validated treatments (Marchand, 2020).

* There is only one empirically validated treatment for FOD, directed masturbation (LoPiccolo & Lobitz, 1975), developed more than 50 years ago, and this treatment is only for women who have never had an orgasm (Heiman & Meston, 1997).

* There are no empirically validated treatments for the majority of women who have FOD (Heiman & Meston, 1997; Krans, 2018), these are women who have Situational FOD, meaning they orgasm in some situations but not others, such as during masturbation but not during partnered sex (APA, 2013).

D. Describe proposed benefits from the medical use of cannabis, for the named medical condition or disease.

- For more than 50 years, cannabis has been consistently found in research to help women orgasm, help women orgasm who have FOD, and improve the frequency, ease, intensity and/or satisfaction of orgasm (Goode, 1969,1970, 1972; Dawley et al., 1979; Halikas et al., 1982; Kasman et al., 2020; Koff, 1974; Lewis, 1970; Lynn et al., 2019; Moser et al., 2023; Mulvehill, 2023; Smith et al., 2010; Sun & Eisenberg, 2017; Tart, 1971; Wiebe & Just, 2018; Weller & Halikas, 1982).

- Summaries of 20 studies from 1970-2024 are attached IN **SUPPLEMENT 1** that reflect the proposed benefits of cannabis as a treatment for FOD. It is important to note that no studies excluded women with FOD, one study controlled for the high percentage of women with FOD (Halikas & Weller, 1982) and one study dichotomized women with and without FOD (Mulvehill, 2023; Mulvehill & Tishler, 2023).

- Peer reviewed research that reveal cannabis helps women orgasm can be found in **SUPPLEMENT 2a, 2 b.**

- Women who use cannabis before sex were twice as likely to report orgasm satisfaction.(Lynn et al., 2019).

- Female sexual dysfunction, including FOD, declined by 21% for each step-up of cannabis use (times used per week). (Kasman et al., 2020).
- Studies show that THC, the most well-known ingredient in cannabis, significantly reduces rates of anxiety, reduces traumatic memories related to trauma and PTSD by reducing activity in the amygdala (Raymundi et al., 2020) and reduces cognitive distractions by inhibiting activity in the prefrontal cortex (Baggio et al., 2020).
- THC creates an altered state of consciousness (Sayin, 2012) whereas higher sexual responsiveness is related to altered states of consciousness (Costa et al., 2016). Women's orgasm is considered an altered state of consciousness (Dubray et al., 2017; Sayin, 2011).

- FOD's well known co-morbid conditions of anxiety (Meston et al., 2004) and PTSD (Yehuda et al., 2015) have been approved as conditions of treatment for medical cannabis in several US states.

Dosage

- Dosage was first mentioned as an important criterion for experiencing cannabis' sexual enhancements when Dr. Erich Goode pioneered the first cannabis and sex study in 1969 (Goode, 1969).

- Several studies that found cannabis inhibited orgasm, did not evaluate dosage, an important criterion for experiencing cannabis' sexual benefits (Johnson et al., 2004; Palamar et al., 2016).

- Gorzalka et al. (2010), stated, "The influence of cannabis intake on sexual behavior and arousability appear to be dose-dependent in both men and women, although women are far more consistent in reporting facilitatory effects."

Medical doctors and sex therapists are recommending cannabis to treat FOD

- Medical doctors and sex therapists are recommending and/or prescribing cannabis to treat FOD (inhaleMD, 2017; Zinko, 2018).

- California-based sexologist Diane Urman and certified sex therapist Seth Prosterman, recommend cannabis to clients who have trouble orgasming or who have never orgasmed (Yagoda, 2017).

- Massachusetts-based cannabis specialist and Harvard-trained doctor, Jordan Tishler,MD, CEO of inhaleMD, Inc., treats patients who have FOD with cannabis medicine (inhaleMD, 2017).

- St. Louis, MO-based OBGYN and cannabis specialist, Becky Lynn, MD, treats patients who have FOD and other sexual disorders with cannabis medicine (Malanca, 2022).

E. Provide evidence general accepted by the medical community and other experts, that the use of medical cannabis alleviates suffering caused by the named condition or disease. Supporting evidence includes full text peer-reviewed journal articles and/or complete medical studies.

Excerpts from peer reviewed studies revealing cannabis alleviates suffering caused by FOD include the following with the full-text peer review studies found in **Supplement 2a and 2b.**

- Lynn et al. (2019) reported that the majority of women in her study perceived an improvement in orgasm and women who reported marijuana use before sexual activity had 2.13 times higher odds of reporting satisfactory orgasms.

- Kasman et al. (2020) reported that improvement in female orgasm was statistically significant (P= .0002) and for each "step up" or increase in cannabis use, from once a week to twice a week, for example, the odds of reporting female sexual dysfunction declined by 21%.

- Moser et al. (2023) reported that cannabis is statistically significant in influencing the ability to orgasm ($p<.05$) and influencing the ability to have more than one orgasm ($p<.05$). Reporting that, "Medical implications in this study include the possible use of cannabis in treating sexual dysfunctions, especially in women."

- Mulvehill & Tishler, (2024) reported that among women's who experienced challenges in achieving orgasm, 72.8% (n = 147, $P < .001$) reported that cannabis use before partnered sex increased orgasm frequency, 67% stated that it improved orgasm satisfaction (n = 136, $P < .001$), and 71% indicated that cannabis use made orgasm easier (n = 143, $P < .001$).

- Wiebe & Just, (2019) reported that increased ability to orgasm was reported by 44% of participants. Of participants who reported difficulty reaching orgasm, 50% said it was easier to reach orgasm while using cannabis.

- Dawley et al., (1979) reported that the highest percentages of positive responses pertain to increased pleasure, sexual sensation, and intensity of orgasms. "The implication is that there may be value in researching the use of cannabis in treatment of sexual disorders."

Moser *et al. Journal of Cannabis Research* (2023) 5:2
https://doi.org/10.1186/s42238-022-00169-2

Journal of Cannabis Research

ORIGINAL RESEARCH Open Access

The influence of cannabis on sexual functioning and satisfaction

Amanda Moser[1*], Sharon M. Ballard[1], Jake Jensen[1] and Paige Averett[2]

Abstract

Background The purpose of this study was to examine the perceived influence of cannabis on sexual functioning and satisfaction. This study used Kaplan's and Masters and Johnson's sexual response cycle (desire, excitement, orgasm, plateau, resolution) and included satisfaction to complete the sexual response cycle. Given increased attention in the research literature to the potential benefits of cannabis and the lack of research on the sexual benefits of cannabis use, the current study was completed.

Methods Data were collected using the online survey tool "Qualtrics" from a self-selected, convenience sample of adults over the age of 18 who reported previous cannabis use. The survey, developed by the researchers based on previous literature, included demographic questions followed by a scale to measure sexual functioning and satisfaction in relation to cannabis use ($\alpha = 0.897$).

Results The final sample was 811 participants ranging in age from 18 to 85 years old ($M = 32.11$). The majority of participants were identified as female ($n = 536$, 64.9%), White/Caucasian ($n = 640$, 78.9%), and college educated ($n = 650$, 80.1%). Almost 25% of the participants were identified as LGBTQIA+ ($n = 187$, 23.1%). Most of the participants reported being in a monogamous sexual relationship ($n = 598$, 73.7%). Data were analyzed using descriptive statistics, *t*-tests, one-way ANOVA, and multiple regression. Age and gender were not found to have significant effects on cannabis use and sexual functioning and satisfaction. Over 70% of participants reported increased desire ($M = 4.05$, $SD = 0.962$) and orgasm intensity ($M = 4.05$, $SD = 0.884$). Participants who reported masturbating indicated that cannabis enhanced their pleasure while masturbating ($n = 620$, 62.5%). Participants also stated that cannabis enhanced their sense of taste ($n = 583$, 71.9%) and touch ($n = 576$, 71.0%).

Discussion The results of this study contrast and establish new evidence within the literature. Demographic results indicate that the people who use cannabis are of a wide range of ages, from a variety of occupations, and have differing cannabis use preferences. The inclusion of LGBTQIA + respondents is a strength of this study. Overall, results indicated that both men and women perceived that cannabis use increased their sexual functioning and satisfaction, particularly increased desire and orgasm intensity.

Conclusion This study updates the current literature on cannabis and sexuality and provides implications for improving sexual quality. Medical implications of this study include the possible use of cannabis for treating sexual dysfunctions, especially within women.

Keywords Sex, Cannabis, Sensuality, Weed, Marijuana, Sexual pleasure

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[2] Social Work, North Carolina State University, Raleigh, USA

BMC

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Introduction

"*Cannabis sativa* L.," also known as "cannabis" or "marijuana", encompasses different varieties based on cannabinoid profiles (Small 2017). Cannabis has been historically used as a multi-functional crop including use as a medicine (Mechoulam et al. 2014; Mikuriya 1969; Russo, 2005), an aphrodisiac (Touw 1981), and as a potential treatment for sexual dysfunctions, such as low sexual desire or sexual pain (Dawley et al. 1979; Lynn et al. 2019). There has been increased attention given to the benefits of cannabis in recent years as it has become legal in many states (Han et al. 2018). Despite its many uses and the increased attention, there is a lack of research on the sexual benefits of using cannabis. Therefore, the purpose of this study is to examine the influences of cannabis on sexual functioning and satisfaction. This paper uses the term "cannabis" in reference to all forms of *Cannabis sativa* L., except within data collection where the term "marijuana" is used as a more recognizable term for all audiences.

Sexual functioning is physiological responses associated with the sexual response cycle that includes desire, excitement, plateau, orgasm, and resolution (Kaplan 1974; Masters and Johnson 1966). Sexual satisfaction encompasses both emotional and physical satisfaction (Basson 2001). Sensuality involves the different sensual effects (touch, taste, smell, sound, and sight) that are associated with sex. While sexual satisfaction has been shown to be influenced by sexual functioning and sensuality (Basson 2001), there is support for sexual satisfaction to be considered as a component of the sexual response cycle (Kontula and Miettinen 2016; Pascoal et al. 2018). The sexual response cycle provides a framework for this study to be organized by each phase (desire, excitement, plateau, orgasm, resolution, satisfaction).

This study compliments gender equality and may have implications for closing the orgasm inequality gap in our society (Mintz 2018). The orgasm inequality gap refers to the fact that orgasms are less consistent for women (Mintz 2018), yet research shows that orgasm is important to sexual satisfaction (Kontula and Miettinen 2016; Pascoal et al. 2018). The current research study emphasizes an individual's sexual functioning and sexual satisfaction and addresses the need to explore options to help women have more regular orgasms. One possibility for increased orgasm frequency is cannabis (Balon 2017). Using cannabis before sex has possibilities for social change by increasing sexual pleasure within our society as previous research indicates beneficial sexual implications, especially for women (Sun and Eisenberg 2017).

Background

The literature reviewed will be organized by sexual functioning (specifically using the sexual response cycle as a framework), sexual satisfaction, cannabis, and finally cannabis' influence on sexual functioning and satisfaction.

Sexual functioning and satisfaction

Masters and Johnson (1966) established the sexual response cycle that includes four phases: excitement, plateau, orgasm, and resolution. Each phase is identified by physiological responses of the body during sex; however, each phase may not be distinguishable from the next and may differ extensively each time and by each individual. Kaplan's (1979) Triphasic Concept of sexual response included desire as the first stage of the sexual response cycle and Basson (2001) considered sexual satisfaction to be an important component of the sexual response cycle.

Newer research has expanded the sexual response cycle and adds to the original work of Masters and Johnson and Kaplan. Rather than being linear, the sexual response cycle is circular with overlapping phases that follow a variable order and incorporates mental and emotional components, not just physiological responses (Basson, 2005; Cherkasskaya and Rosario 2018).

Sexual desire, also known as libido, is characterized as a sexual drive or interest in sex that lasts throughout the sexual encounter until orgasm or satisfaction is reached (Kaplan 1979). Cherkasskaya and Rosario (2018) found that sexual desire is on a spectrum that varies between absent or diminished to high desire. Without desire, one may not experience the excitement phase or any following stages of the sexual response cycle because one's mental state has greater implications than one's physical desire and arousal (Basson 2008) Toates (2009) created the incentive motivation model that considers the "intertwined progression of desire and arousal" that reinforces the idea that desire and arousal are reciprocally reinforcing.

Excitement is characterized by an increase in sexual tension from an unaroused state and occurs as a result of physical and/or psychological sexual stimulation (Masters et al. 1995). Physiological responses that occur during the excitement phase for both sexes include myotonia (increased neuromuscular tension that occurs throughout the entire body, not just the genital region) and vasocongestion (the swelling of bodily tissues in the genital region due to increased blood flow). Vasocongestion can lead to lubrication in women and an erection in men; however, vaginal lubrication alone is not an accurate measurement of arousal. Women may have genital responses such as lubrication or vasocongestion while not experiencing desire (Chivers and Bailey 2005).

During the plateau phase, sexual arousal is increased while sexual tension levels off prior to reaching the threshold levels required to trigger an orgasm (Masters et al. 1979). During orgasm, there is a release of accumulated sexual tension, and the body induces involuntary rhythmic contractions within the genital region. However, an orgasm is a total body response and is not strictly localized to the pelvic region (Masters et al. 1979).

After orgasm, the body enters the resolution phase and returns to its unaroused state. Yet, if a woman maintains sexual arousal, she is physiologically capable of being multi-orgasmic, meaning having more than one orgasm before returning to her pre-aroused state. Men are typically unable to be multi-orgasmic because of the inevitable phase of the refractory period (i.e., the recovery period required for men to orgasm again after orgasm and ejaculation, which typically gets longer with age).

Sexual satisfaction can be defined as an individual's subjective evaluation of the positive and negative aspects of one's sexual relationships (Lawrance and Byers 1995) and may be influenced by many factors such as relationship quality, physical health, and overall well-being (Pascoal et al. 2018). Multiple and consistent orgasms and frequent sex were found to be correlated with higher sexual satisfaction (Kontula 2009; Kontula and Miettinen 2016).

While more than 90% of men report usually experiencing orgasm during sex, less than 50% of women regularly experience orgasm during intercourse and only 6% reported always experiencing an orgasm during sex (Kontula 2009; Koontula and Miettinen 2016). Mintz (2018) in her book *Becoming Cliterate* coined the term "orgasm inequality" to describe the phenomenon of men having routine and consistent orgasms, while women do not. Orgasm consistency is significantly related to sexual satisfaction in women. Women who experience orgasm infrequently or not at all report, on average, lower levels of sexual satisfaction (Kontula, 2009; Kontula and Miettinen 2016). This implies that orgasms during sex are expected for men, but a bonus if accomplished for women (Kontula 2009).

Sex and cannabis

Cannabis has been identified to have sexually stimulating effects and can intensify sexual experiences (Cohen 1982). The cannabinoid profile in cannabis influences sexual functioning and satisfaction as too much tetrahydrocannabinol (THC) may cause more inhibiting effects (Palamar et al. 2018). Due to its muscle relaxant properties (Small 2017), cannabis use may be inhibitory to men's sexual functioning, yet, does not impair and may be beneficial for women's sexual functioning (Sun and Eisenberg 2017). Cannabis may indirectly enhance sexual functioning by decreasing anxiety and increasing relaxation and sensory focus (Klein et al. 2012). It also has been found to be independently associated with increased sexual frequency with daily and weekly users having significantly higher sexual frequency compared to never-users (Sun and Eisenberg 2017).

Historically, and among different cultures, cannabis has been suspected to have an aphrodisiac effect increasing desire and sexual arousal among individuals (Chopra and Jandu 1976; Dawley et al. 1979; Halikas et al. 1982; Mayor's Committee, 1944). Recent studies support this early research with reports of increased receptivity to and interest in sexual activity after using cannabis with women reporting higher rates of increased desire from cannabis use as compared to men (Androvicova et al. 2017; Lynn et al. 2019). Research has also found that cannabis users intentionally used cannabis for increased sexual desire as well as to decrease pain associated with sex (Green et al. 2003; Lynn et al. 2019).

Cannabis may also have implications during the excitement phase of the sexual response cycle which is characterized by the attainment of an erection in men and vaginal lubrication in women (Masters and Johnson 1966). Using cannabis has been reported to cause the inability to achieve and maintain an erection among men (Chopra and Jandu 1976; Masters et al. 1979) with a higher likelihood of developing erectile dysfunction among habitual users (Aversa et al. 2008). Foreplay could be considered an important part of the excitement stage and Palamar et al. (2018) found that cannabis use can increase the chances and duration of foreplay. Cannabis is also a vasodilator and because there are cannabinoid receptors in the genital region (Small 2017), cannabis may cause vasocongestion (i.e., lubrication) within female users. However, there is contradictory evidence on the influence of cannabis on female lubrication (Masters et al. 1979; Palamar et al. 2018).

During the plateau stage, which occurs after excitement but before orgasm, the vasocongestion response is at its peak in both men and women and the man's penis is at its full-potential erection (Masters and Johnson 1966). Men are more likely to report increased duration of intercourse when using cannabis compared to women (Palamar et al. 2018; Weller and Halikas 1984). However, time may be *perceived* to last longer when using cannabis due to the altered time effect of cannabis use (Chopra and Jandu 1976; Kaplan, 1974; Palamar et al. 2018) or this may be due to increased time spent during foreplay when couples may engage in sexual exploration and try new behaviors while using cannabis (Palamar et al. 2018).

Orgasm is the release of sexual tension and cannabis use may contribute to more prolonged and pleasurable orgasms (Androvicova et al. 2017; Halikas et al. 1982).

However, men's daily cannabis use has been associated with inability to reach orgasm and reaching orgasm too quickly or too slowly (Smith et al. 2010). Those who are able to orgasm when using cannabis have also reported an increase in the quality and intensity of the orgasm, which was found to be especially apparent for men (Weller and Halikas 1984; Halikas et al. 1982; Palamar et al. 2018).

Cannabis use before sex has been reported to enhance sexual enjoyment and pleasure for individuals, including oral sex (Dawley et al.1979; Halikas et al. 1982; Traub 1977). Sensuality involves the senses (taste, touch, smell, sound, and sight) and, for the purpose of this study, is incorporated as an aspect of sexual satisfaction. Cannabis has continuously been reported to enhance taste and touch but seems to have less of an effect on hearing, smell, and sight (Koff 1974; Masters et al. 1979; Halikas et al. 1982; Weller and Halikas 1984). Increased sensation and sensuality have been found to be related to cannabis use which may be related to length and intensity of intercourse (Palamar et al. 2018). Cannabis use before sex has been associated with more tender, slower, and compassionate sexual acts while also feeling more relaxed with their partner (Palamar et al. 2018).

There is a need for updated research as cannabis use is becoming more prevalent due to legalization (Substance Abuse and Mental Health Services Administration 2018). The majority of existing literature is outdated and some of it is contradictory, such as the physiological effects of cannabis on sexual functioning and satisfaction.

Research questions

The following exploratory research questions were proposed based on findings from previous literature as well as variables that have not been reported in previous literature: (a) Are there differences between men and women who use cannabis and their perceptions of sexual desire, orgasm intensity, and sexual satisfaction? (b) Does cannabis affect men's ability to achieve and maintain an erection? (c) Does cannabis use affect women's orgasm frequency? (d) How does cannabis use affect pleasure while masturbating? (e) What effect does gender, age, duration of cannabis use, intentionality, frequency of cannabis use, and cannabis form have on predicting sexual functioning and satisfaction?

Methods

This study was approved through the East Carolina University Institutional Review Board and was a self-report survey administered through the online software Qualtrics. Recruitment was purposeful and used snowball sampling. A brief description of the research and the survey were posted on the lead investigator's personal social media pages (Facebook, Twitter, Instagram, and Tumblr) with encouragement to share with others to increase the sample size. It was also shared on various Facebook groups related to cannabis, cannabidiol (CBD), alternative medicine, and related groups and emailed various cannabis organizations (e.g., medical and legal advocacy organizations) asking members to share the study information on their webpages or through email listservs. The study was voluntary and consent was obtained from all participants. Age and previous cannabis use were the first two questions on the survey to verify inclusion criteria (over 18 years old and have used cannabis in the past). Data collection was open for approximately 5 weeks in January 2019.

Measures

Study recruitment materials and questions in the survey used the term "marijuana" to refer to all forms of cannabis because it is a widely recognized term. The survey included demographic questions followed by a comprehensive scale developed by the researchers to measure sexual functioning and satisfaction in relation to cannabis use in a manner that used easy to understand format and phrasing.

Cannabis use

The questions regarding cannabis measured intentionality of use, benefits of use, where cannabis was obtained, forms used (e.g., flower, wax, etc.), frequency, and duration of use. Sensuality is a construct composed of the five senses. The question measuring cannabis forms asked participants to "check all that apply." To analyze how each form (flower, wax, oil, edible, topical) varied by scale score, each form selected was treated as a separate variable. A dichotomous variable for each of the five forms was created with 1 indicating that form was used by the participant and 0 indicating that it was not used. The frequency of cannabis use question was re-coded to be in the same direction as the other questions with a higher score indicating greater frequency.

Sensuality

Previous literature suggests that relaxation enhances sensuality so one item was included to measure relaxation during sex when using cannabis (Palamar et al. 2018). Sensuality was measured with five items with Likert scale response options ranging from *significantly decrease* to *significantly increase.*

Masturbation

Masturbation was included to measure sexual functioning and satisfaction with participants who use cannabis for self-pleasure purposes or may not have a sexual

partner. Three questions were asked about masturbation: whether or not participants masturbate, if participants use cannabis before masturbating, and if so, how cannabis affects their pleasure while masturbating.

Sexual functioning and satisfaction

A scale was developed to measure the participants' sexual functioning and satisfaction based on the incorporated framework (desire, arousal, orgasm, resolution, satisfaction) to analyze how cannabis influences each stage. This scale was developed as a direct and complete measure to analyze how cannabis specifically influences one's sexual functioning and satisfaction through each sexual response phase and overall satisfaction in a clear and concise format. The scale consisted of 14 items using the response options ranging from *significantly decrease* to *significantly increase*. These items were influenced by the following empirical studies: Dawley et al. (1974); Koff (1974); and Weller and Halikas (1984). Following development of the scale, all authors reviewed it for accuracy and clarity and to ensure that it adequately reflected current theory and research on sexual response, functioning, and satisfaction.

Arousal was measured with two questions for men (achieving and maintaining an erection) and one question for women (lubrication). In order to have a consistent number of items for both men and women, a new variable was created to measure arousal using one item measuring the ability to achieve an erection for men and one item measuring lubrication for women. The item on maintaining an erection was not used since lubrication and achieving an erection are analogous. The final scale included twelve items (see Table 1) with an internal reliability of 0.897.

Covariates

Basic demographic information collected included sex/gender, race, LGBTQIA + status, state of residency, education level, relationship status, and socioeconomic status. Participants indicated sex/gender by choosing one of three response options: male, female, or other. Eight response options were provided to measure race: White/Caucasian, Black/African American, Hispanic, Asian, Native American, Pacific Islander, Biracial, and Other. LGBTQ + status was measured by asking participants if they identified as LGBTQ + by choosing yes, no, or prefer not to answer. A drop-down menu was provided for state of residency. Education level was measured in a single item with seven response options ranging from "less than high school diploma or GED" to "Ph.D/Doctorate." Relationship status was measured with a single item with the following four response items: (a) In a monogamous relationship with one person, (b) In an open relationship, (c) Casually hooking up, (d) Not engaging in sexual activity with anybody. Socioeconomic status was measured using the participants' occupation and annual income which were open-ended questions.

Analysis plan

Descriptive statistics were used to determine the effect of cannabis use on pleasure during masturbation.

Table 1 Independent-samples *t*-tests of individual items of the sexual functioning and satisfaction scale

Item	Men *M* (*SD*)	Women *M* (*SD*)	Overall *M* (*SD*)
How does using marijuana affect your *relaxation* during sex?*	4.30 (0.830)	4.45 (0.778)	4.39 (0.801)
How does using marijuana influence your *desire* to have sex (libido, sex drive)?*	3.95 (0.963)	4.10 (0.952)	4.05 (0.962)
How does using marijuana influence your *intimacy/emotional closeness* during sex?	4.06 (0.844)	4.08 (0.930)	4.07 (0.898)
How does using marijuana influence your *physical pleasure*?	4.36 (0.803)	4.31 (0.844)	4.33 (0.830)
How does using marijuana influence your *frequency of sex* (how often you engage in sex)?	3.55 (0.865)	3.54 (0.862)	3.54 (0.860)
How does using marijuana influence your *variety of sexual activities* (i.e. locations, positions, times)?	3.63 (0.813)	3.56 (0.877)	3.58 (0.859)
How does using marijuana influence your *ability to orgasm*?*	3.48 (1.00)	3.86 (0.978)	3.72 (1.00)
How does using marijuana influence your *intensity of orgasm* (how strong the orgasm is)?	4.12 (0.822)	4.01 (0.914)	4.05 (0.884)
How does using marijuana influence your ability to have *more than one orgasm* per sexual encounter (multi-orgasmic)?*	3.45 (0.819)	3.67 (0.901)	3.59 (0.879)
How does using marijuana influence the *duration of sex* (how long sex lasts)?*	3.89 (0.928)	3.59 (0.856)	3.69 (0.894)
How does using marijuana influence your *ability to repeat sex* after orgasm?	3.48 (0.837)	3.43 (0.873)	3.45 (0.858)
Arousal			3.45 (1.01)
Males – How does cannabis influence your ability to *achieve* an erection (boner)?	3.57 (0.892)		
Females – How does using marijuana influence your *vaginal lubrication* (wetness of vagina)?		3.39 (1.05)	

Means range from 1 (significantly decreases) to 5 (significantly increases) with 3 being "does not change"

*$p < .05$

Descriptive statistics and independent-samples *t*-tests using individual items from the sexual functioning and sexual satisfaction scale were used to address the first four research questions. Prior to conducting the regression analysis, a Pearson Correlation was performed to examine associations between variables (age, gender, duration of cannabis use, form of cannabis, intentionality of using cannabis prior to sex, and frequency of cannabis use). The results of these preliminary analyses informed the inclusion of variables in the multiple regression. A multiple linear regression was then calculated predicting participants' scores on the sexual functioning and satisfaction scale based on age, gender, duration of cannabis use, form (flower, wax, oil, edible, topical), and frequency of cannabis use.

A one-way ANOVA was conducted to compare the effect of intentionality on and the sexual functioning and satisfaction scale. Intentionality was measured using one item asking if participants intentionally used cannabis before having sex which had two response options, "yes" or "no". All statistical analyses were performed using SPSS Statistics V28 (IBM Corporation).

Results

Sample description

The original sample size was 1299 participants. Participants ($n=133$) were removed from the study if they were under the age of 18 or indicated that they had never used cannabis. Another 355 participants did not answer the sexual functioning and satisfaction scale questions resulting in a final sample size of 811 for this study. Analyses were conducted to compare those who had not answered the dependent variable questions and thus excluded from this study ($n=355$) with those who answered dependent variable questions and were included in the study ($n=811$). These analyses revealed no significant association between race or ethnicity with inclusion in the study, X2 (7, 1165) = 9.974, $p=.190$, or between sex or gender with inclusion in the study, X2 (2, 1165) = 2.024, $p=.364$. However, a *t*-test revealed that there was a significant difference in age between those included and those who were not included, t (1159) = 1.898, $p=.029$. Those included in the study (m = 32.09 years) were older than those excluded (m = 29.27 years) which may have reflected greater comfort in responding to sensitive questions regarding sexual behavior and cannabis use.

Participant ages ranged from 18 to 85 years old ($M=32.11$). The majority of the participants stated their sex/gender as female ($n=536$, 64.9%), but the sample also included men ($n=277$, 34.2%) and those that identified as other ($n=8$, 1.0%). Most of the participants stated being White/Caucasian ($n=640$, 78.9%) had at least some college education ($n=650$, 80.1%) and almost 25% of the participants identified as LGBTQIA+ ($n=187$, 23.1%). A variety of occupations were represented in this study, including police officers, professors, and stay at home moms. The sample included at least one individual from each state, except South Dakota and Wyoming, and also included individuals from D.C., Puerto Rico, and participants ($n=104$) that resided outside the USA. Most of the participants reported being in a monogamous sexual relationship ($n=598$, 73.7%).

Cannabis use

Over half of the participants reported using cannabis daily ($n=509$, 62.8%), for recreational and medicinal purposes ($n=468$, 57.7%), and intentionally using before engaging in sex ($n=485$, 59.8%). A majority of participants have used cannabis at least a few years (88%; $n=714$). Almost all participants indicated using cannabis in the form of flower (i.e., pot, weed) (95.9%; $n=778$). Other forms used by participants included edible (59.2%; $n=480$), oil (48.0%; $n=389$), wax (36.5%, $n=296$), and topical (18.0%; $n=146$). The majority of participants (78.8%) stated that cannabis does not affect their sexual decision making ($n=639$) and that cannabis *slightly increases* or *significantly increases* relaxation during sex (87.7%; $n=711$). Results of the Pearson correlation indicated that there was a strong positive association between age and duration of cannabis use ($r=.457$, $p=.000$), age and frequency of cannabis use ($r=.167$, $p=.000$), and frequency of cannabis use and duration of cannabis use ($r=.239$, $p=.000$).

Sensuality

Many participants stated that cannabis *slightly increases* or *significantly increases* enhancement of sense of taste ($n=583$, 71.9%) and 71.0% stated that cannabis *slightly increases* or *significantly increases* their sense of touch ($n=576$). The majority of participants stated that the enhancement of the following senses does not change with cannabis use: smell (53.3%; $n=432$), sight (57.2%; $n=464$), and hearing (56.7%; $n=460$). Over 70% of participants ($n=583$) reported that taste was slightly or significantly enhanced when using cannabis ($M=3.96$, $SD=0.943$). Similarly, over 70% ($n=576$) reported that touch was slightly or significantly enhanced when using cannabis ($M=4.02$, $SD=0.906$). Table 2 provides mean scores for enhancement of the five senses.

Masturbation

In examining the effects of cannabis use while masturbating, the majority of the participants stated that they masturbate (88.3%; $n=716$). Of the participants who stated that they masturbate, 76.4% reported using cannabis before masturbating ($n=620$) and 62.5% indicated

Table 2 Mean scores of cannabis use and effect on sensuality by gender

Sense	Men *M* (*SD*)	Women *M* (*SD*)	Overall *M* (*SD*)
Taste	4.02 (0.928)	3.93 (0.949)	3.96 (0.943)
Touch	4.00 (0.905)	4.03 (0.911)	4.02 (0.906)
Smell	3.33 (0.895)	3.28 (0.849)	3.30 (0.865)
Sight*	3.12 (0.817)	2.97 (0.791)	3.02 (0.803)
Hearing*	3.42 (0.889)	3.22 (0.797)	3.29 (0.832)

Means range from 1 (significantly decreases) to 5 (significantly increases) with 3 being "does not change"

*$p < .05$

Table 3 Results from linear regression model predicting effects of cannabis use on sexual functioning and satisfaction

Predictor	B	SE	β	t	P
Constant	3.518	0.144		24.503	0.000
Gender	0.021	0.046	0.016	0.451	0.652
Age	0.003	0.002	0.061	1.462	0.144
Duration of cannabis use	−0.027	0.022	−0.050	-1.229	0.219
Frequency of cannabis use	−0.001	0.016	−0.003	−0.083	0.934
Form—flower	0.235	0.111	0.077*	2.126	0.034
Form—wax	0.131	0.053	0.103*	2.484	0.013
Form—oil	−0.013	0.049	−0.010	−0.261	0.794
Form—edible	0.050	0.048	0.040	1.039	0.299
Form—topical	0.107	0.061	0.067	1.767	0.078
R^2		0.029			
F		2.582*			

*$p < .05$

that cannabis slightly increases or significantly increases pleasure while masturbating ($n = 507$).

Sexual functioning and satisfaction

Over 70% of men and women ($n = 601$) reported that cannabis slightly or significantly increases desire ($M = 4.05$, $SD = 0.962$). An independent-samples t-test was conducted to compare desire in men and women. The perceived influence of cannabis on sexual desire was significantly higher for women ($M = 4.10$, $SD = 0.952$) as compared to men ($M = 3.95$, $SD = 0.963$); $t(799) = -2.187$, $p = .029$.

Men perceived either no effect or an increased ability to achieve and maintain an erection when using cannabis. Specifically 255 men (93.4%) reported no change or an increased ability to achieve an erection ($M = 3.57$, $SD = 0.892$) and 254 (92.4%) men reported no change or an increase in maintaining an erection ($M = 3.60$, $SD = 0.928$).

Over 70% of men and women ($n = 582$) reported that cannabis slightly or significantly increased orgasm intensity ($M = 4.05$, $SD = 0.884$). An independent-samples t-test was conducted to compare cannabis use and orgasm intensity in men and women. There was not a significant difference in the scores comparing men ($M = 4.12$, $SD = 0.822$) and women ($M = 4.01$, $SD = 0.914$); t (798) = 1.586, $p = .113$. However there was some support for orgasm frequency among women with over 40% of women ($n = 356$) reporting increased ability to have more than one orgasm per sexual encounter ($M = 3.67$, $SD = 0.901$).

Using descriptive statistics of the scale, men and women reported increased sexual satisfaction ($M = 3.825$, $SD = 0.613$). T-test analysis indicated that there was no significant effect based on gender, $t(801) = -0.187$, $p = .852$. However, because there were significant gender differences in other individual items, gender was included in the regression analyses. A multiple linear regression was calculated predicting participants' scores on the sexual functioning and satisfaction scale based on age, gender, duration of cannabis use, form (flower, wax, oil, edible, topical), and frequency of cannabis use. The regression equation was significant ($F(9,789) = 2.582$, $p = .006$) with a R^2 of 0.029. The forms wax and flower were significant predictors with topical forms approaching significance (Table 3). A one-way ANOVA was conducted to compare the effect of intentionality of cannabis use prior to sex on the sexual functioning and satisfaction scale. There was a significant effect of intentionality on the scale at the $p < .05$ level [$F(1,806) = 4.938$, $p = .000$] with those intentionally using cannabis before sex having higher scores on the sexual functioning and satisfaction scale.

Discussion

This nationwide study had a large sample size with the majority of participants being White college educated women. The inclusion of LGBTQIA+individuals is a strength of this study with almost 25% of the sample identifying as LGBTQIA+. Over half the sample ($n = 485$) reported intentional use of cannabis prior to engaging in sexual activities. Results indicate that the people who use cannabis are of a wide range of ages, from a variety of occupations, and have differing cannabis use preferences. This demographic profile of our sample aligns with previous research that indicates cannabis users vary in age and tend to be non-Hispanic White (Han et al. 2017; Mauro et al. 2017; O'Connell and Bou-Matar 2007). However, our sample differs from recent research regarding sex/gender and relationship status. Although approximately two thirds of our sample were women, Carliner et al. (2017) found that men continue to use at higher

rates than women despite the fact that cannabis use has increased for both men and women. Almost 74% of our sample reported being in a monogamous relationship which does not align with recent research that found that regular cannabis users were less likely to be in a relationship (Chan et al. 2021). These differences in our sample as compared to previous research on the sex/gender and relationship status of cannabis users suggest that caution should be used when generalizing results in regard to these demographic characteristics.

Sexual functioning and satisfaction

An important contribution of this study is the high reliability ($\alpha = 0.897$) for an expanded sexual functioning and satisfaction scale which incorporated Kaplan's phase of desire, Masters and Johnson's model (excitement, plateau, orgasm, resolution), and sexual satisfaction as the final stage. This comprehensive scale moves beyond the physiological effects (e.g., achieving an erection) and incorporates overall sexual functioning and satisfaction. The creation of the scale was crucial to gain a comprehensive oversight on aspects of sexual functioning and satisfaction with the ability to analyze and report how cannabis affects various sexual responses. The scale also incorporates the influence of cannabis on sexual functioning and satisfaction, as opposed to a scale that only measures sexual functioning and/or satisfaction.

In contrast to early literature (Koff 1974; Weller and Halikas 1984), no gender differences were found in regard to cannabis use and overall sexual functioning and satisfaction. Results from this study indicated that both men and women see benefits from using cannabis before sexual intercourse or masturbation. However, *t*-tests reveal that there were gender differences with the specific scale items of desire, relaxation during sex, and ability to orgasm. Decreased ability to orgasm could be influenced by both reduced desire and difficulty relaxing during sex. Therefore, if cannabis use allows women to relax and increases desire, they may then have improved orgasm capacity.

Many of the results were consistent with existing literature. One notable exception is men's ability to achieve and maintain an erection due to cannabis. Previous literature stated that men would have a more difficult time achieving and maintaining an erection when using cannabis, possibly due to the muscle relaxation properties of cannabis (Masters et al. 1979). The current study found that men did not report a decreased ability to achieve and maintain an erection. However, due to the self-report nature of this survey, social desirability may have prevented them from reporting erectile issues.

Similar to existing literature (Androvicova et al. 2017; Lynn et al. 2019), both men and women perceived increased desire and orgasm intensity when using cannabis. Women reported increased ability to have more than one orgasm per sexual encounter, which is similar to previous findings (Weller and Halikas 1984). These results align with the increased relaxation when using cannabis; those who use cannabis report being more relaxed, whether mental or physical, which would improve overall sexual functioning and pleasure. There was no difference in sexual functioning and satisfaction scale scores by age. This indicates that despite age, individuals still report sexual benefits from using cannabis. The age of the sample ranged from 18 to 85, suggesting that cannabis use may have benefits across the lifespan. The positive correlations between age and duration of cannabis use and between age and frequency of cannabis use further support the idea of regular use throughout the lifespan. Additionally, the positive correlation between individuals who have used cannabis for a longer amount of time (duration) and frequency of use means that those who use more cannabis more often were more likely to have been using cannabis for a longer period of time. However, neither duration or frequency of use influenced sexual functioning and satisfaction. People that identify as LGBTQIA + did not differ with cannabis use as one's sexual functioning and satisfaction is not generally impacted by sexual orientation.

Those who reported intentionally using cannabis before sex had significantly higher scale scores than those who reported not intentionally using cannabis before sex. This can be interpreted as those who intentionally used cannabis before sex perceived a greater benefit to their sexual functioning and satisfaction compared to those who do not intentionally use cannabis before sex. These results may be because of the mental mindset that using cannabis will increase pleasure due to the aphrodisiac notions of cannabis rather than a true physiological effect. However, the relaxation effects of cannabis may contribute to increased desire or reduced inhibitions that might contribute to increased sexual functioning and satisfaction. This also aligns with Palamar et al. (2018) who found that cannabis use can result in more and longer foreplay which can also contribute to positive sexual functioning and seuxual satisfaction. Individuals may also intentionally use cannabis before sex thinking that cannabis use helps with any sexual issues that they have, therefore increasing their sexual functioning and satisfaction.

While dosage could not be measured, forms of cannabis can give an indication of dosage, which has been found to have an impact on sexual functioning (Palamar et al. 2018). Although duration and frequency of cannabis use were not significant predictors, the forms of wax and flower predicted increased sexual functioning and satisfaction. While there is no literature on specific

cannabinoid profiles regarding sexual functioning and satisfaction, some products may have a greater influence on the physiological effects and overall satisfaction of sex due to the THC potency and cannabinoid profile.

Sensuality is an important aspect of sexual intercourse as it relates to the five senses. During sex, one uses many, if not all, of their senses. Men and women reported increased enhancement to touch and taste when using cannabis, which is consistent with previous literature (Weller and Halikas 1984). The enhancement of taste and touch could increase overall sexual functioning and satisfaction because these are two senses that are heavily used during sexual intercourse.

Implications

This study has the potential to impact policy, medicine, and practice by providing support for policy change and legalization advances for cannabis use. Increased access to cannabis may facilitate more research on its effects. Medical implications of this study include the possible use of cannabis for treating sexual dysfunctions, especially with women. Women with vaginismus (i.e., painful intercourse) may benefit from the muscular relaxation and increased sexual functioning that results from cannabis use, while women with decreased desire could also see possible benefits (Lynn et al. 2019).

Finally, regarding practice, results from this study suggest that cannabis can potentially close the orgasm inequality gap (Mintz 2018). The orgasm inequality gap states that men statistically are more likely to orgasm per sexual encounter compared to women (Kontula, 2009). Women may be more likely to orgasm when using cannabis before sexual encounters, which could contribute to equity in the amount of sexual pleasure and satisfaction experienced by both women and men. Sex therapists could incorporate use of cannabis in states where it is currently legal.

Limitations

While this study had a large sample size and was able to report evidence that has not been found in the literature, there were some limitations. Although the survey was internally reviewed multiple times by all members of the research team, it was not pilot-tested or externally validated. The sample was a convenience sample of individuals who self-selected to participate in the study which may cause selection bias. Additionally, participants were asked to retrospectively self-report based on many years which could result in recall bias. The collection of data by self-report rather than direct observation results in self-report bias in that results are measuring participants' perceptions of the effects of cannabis rather than the collection of physiological data. Respondents were largely college educated White women, so this study does not represent the majority of US cannabis users.

Dosage was not measured and many individuals are unaware of the amount and potency of cannabis that they are consuming. This is especially true for individuals who do not live in a state where cannabis has been legalized and where all products bought from a regulated dispensary are labeled. Social desirability may be another limitation to this study because of the sensitive nature of the survey questions. Participants may have answered in a desirable manner, particularly related to questions related to erection. This study did not measure medications, mental health status, and other predictors of sexual functioning (Basson 2001; Cherkasskaya and Rosario 2018). Chronic cannabis use has been found to have possible effects (Aversa et al. 2008; Hall, 2014), which this study did not extensively evaluate. Also, several variables were measured using single items and although the scale created had high reliability, it does not have established validity.

Future research

Cannabis has not been studied extensively, partly because of legalization barriers. This is especially true regarding the intersection of cannabis and sexual functioning and satisfaction. This study found that duration of cannabis use or frequency of cannabis use does not predict sexual functioning. However, previous literature indicates that daily and habitual users reported erectile difficulties in men (Aversa et al. 2008). Future research should focus on men's frequency and duration of cannabis use in regard to their sexual functioning. Additionally, age was positively correlated with both duration of cannabis use and frequency of cannabis use and the interaction between these three variables should be researched further.

Future cannabis research should focus on specific cannabinoid profiles, methods, and forms to indicate which has greatest sexual impact and implications. Clinical research to study this would be most accurate due to the social desirability effect of self-report surveys. Future research would also benefit from reviewing the endocannabinoid system and its impact on sexual functioning and satisfaction.

Conclusion

This study extended the limited literature regarding the influence of cannabis on sexual functioning and satisfaction. Results help to update the literature on cannabis and sexuality and contribute to implications for advancing policy, medicine, and practice. Expanding the sexual response cycle to include desire and sexual satisfaction

provided a useful framework for this study and results supported this expanded model. Overall, cannabis use tends to have a positive influence on perceived sexual functioning and satisfaction for individuals despite gender or age and cannabis might help to decrease gender disparities in sexual pleasure.

Abbreviations

THC	Tetrahydrocannabinol
CBD	Cannabidiol
LGBTQIA+	Lesbian/gay/bisexual/transgender/queer or questioning/other

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Authors' contributions
AM—conceived the topic of study, collected the data, data entry and processing, manuscript writing. SMB—responsible supervisor of AM, data entry and processing, manuscript writing; JJ—contributed substantially to the conception and design of the study, the acquisition of data, or the analysis and interpretation; contributed data and analysis tools; data analysis; manuscript review; and editing of final copy. PA—contributed substantially to the conception and design of the study, the acquisition of data, or the analysis and interpretation; manuscript review; and editing of final copy. All authors consent for publication. The authors read and approved the final manuscript.

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Availability of data and materials
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Declarations

Ethics approval and consent to participate
This study was approved by the Institutional Review Board and all participation was voluntary and anonymous.

Consent for publication
Consent was obtained from all participants.

Competing interests
The authors declare that they have no competing interests.

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Ejaculatory and Orgasmic Disorders

Assessment of the effect of cannabis use before partnered sex on women with and without orgasm difficulty

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Abstract

Background: Up to 41% of women face challenges achieving orgasm, a statistic unchanged for 50 years.
Aim: To evaluate the effect of cannabis use before partnered sex on women with and without difficulty achieving orgasm.
Methods: This observational study evaluated responses from female study participants relating to their demographics, sexual activities, mental well-being, cannabis usage, and orgasm-related questions from the Female Sexual Function Index (FSFI).
Outcomes: Outcomes included orgasm frequency, difficulty, and satisfaction related to cannabis use or lack of use before partnered sex, largely based on the FSFI orgasm subscale.
Results: Of the 1037 survey responses, 410 were valid and complete. Twenty-three surveys (5.6% returned) were excluded due to failure to meet the study's criteria. Of the valid surveys, most women (52%, n = 202) reported difficulty achieving orgasm during sexual activity with a partner. These women were primarily between 25 and 34 years of age (45%, n = 91); 75% identified their race as White (n = 152/202); 52% (n = 105) identified as LGBTQI+ (lesbian, gay, bisexual, transgender, queer/questioning, intersex, or other); and 82% (n = 165) were married or in a relationship. Among participants who experienced challenges in achieving orgasm, 72.8% (n = 147, $P < .001$) reported that cannabis use before partnered sex increased orgasm frequency, 67% stated that it improved orgasm satisfaction (n = 136, $P < .001$), and 71% indicated that cannabis use made orgasm easier (n = 143, $P < .001$). The frequency of cannabis use before partnered sex correlated with increased orgasm frequency for women who experienced difficulties achieving orgasm (n = 202, $P < .001$). The reasons for cannabis use before partnered sex resulted in a more positive orgasm response (n = 202, $P = .22$).
Clinical Implications: Cannabis may be a treatment for women with difficulty achieving orgasm during partnered sex.
Strengths and Limitations: The researchers examined the challenge of achieving orgasm and considered the covariates reported in the literature, including the FSFI orgasm subscale. The findings may not be generalizable to women who rarely or never use cannabis before sex, women who have never experienced an orgasm, or women who do not have female genitalia. Additionally, the specific type of cannabis used, its chemical composition, the quantity used, and whether or not the partner used cannabis were not assessed in this study.
Conclusion: Cannabis-related treatment appears to provide benefit to women who have female orgasm difficulties or dysfunction.

Keywords: female orgasmic dysfunction; female orgasmic disorder; orgasmic dysfunction; female orgasm difficulty; female sexual dysfunction; cannabis and sex; cannabis and female orgasm.

Introduction

For nearly half a century, researchers have suggested the potential benefits of cannabis in treating female orgasmic dysfunction (FOD) and other sexual maladies.[1–4] Anecdotes and general sexuality research[4–7] suggest that cannabis could treat FOD. This formal investigation focuses on the influence of cannabis on FOD, including medical and recreational usage, regardless of chemical type, dosage, usage timing, and legal status.

FOD is a significant public health concern,[8,9] affecting up to 41% of women worldwide.[10] *ICD-11* classifies the condition as "orgasmic dysfunction." A paucity of treatments exists.[11,12]

Many studies suggest that cannabis can have positive effects on female orgasm,[1,2,5–7] such as enhancing intensity,[1,7,13–16] increasing frequency,[2,4,6,15,17] easing difficulty,[7,13] and improving quality.[2,6,13,15,17,18] Other studies reported possible cannabis inhibition on women's orgasms.[2,14,19] The dosage of cannabis appears to be important, as it exhibits a dose-dependent relationship to enhanced orgasm response.[2,5,20,21] When appropriately dosed, tetrahydrocannabinol (THC), the primary component of cannabis, can reduce anxiety,[22] potentially leading to improved orgasm and satisfaction during sexual encounters.[23] THC reduces activity in the amygdala and hippocampus, parts of the brain that store and react to trauma.[24] THC also inhibits neural activity in the prefrontal cortex,[25] central to high-level cognitive function, reflecting categories, rules, and cognitive control.[26] Does cannabis use before sex increase orgasm frequency, ease, or satisfaction in women who report orgasm difficulty?

Methods

In addressing factors related to FOD during partnered sex, we used the term *difficulty* instead of *dysfunction* to reduce negative connotations and allow participants to express their experiences more freely. Quantitative research based on a within-study design was used in this study to establish a

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cause-and-effect relationship and to test the hypothesis that cannabis helps women orgasm who have FOD. The study's survey questions on FOD aligned with the *ICD-11* as "etiological considerations associated with relationship factors" when defining orgasmic dysfunction.[27]

Participants

We invited sexually active women who used cannabis to complete an anonymous uncompensated 41-question survey via Qualtrics software (Supplement 1) distributed from March 24 until November 18, 2022. *Sexually active* was defined as having sex with a partner within the last 30 days, which may have included a range of sexual activities. As outlined in the approved institutional review board application, participants acknowledged informed consent before beginning the survey. News of the opportunity to participate in the study was posted and promoted through social media and postcards. Relevant ID is an assignment to each participant enabled in the survey to flag duplicate surveys.

Participant eligibility was limited to those who were at least 18 years of age who had used cannabis and were involved in partnered sex within the last 30 days. Exclusions included pregnant women, those breastfeeding, and those who had used other recreational substances during the past month. Participants with other sexual issues were not excluded and had an opportunity to elaborate on such issues in the survey. Other exclusions from the analysis included incomplete surveys, surveys that indicated no use of cannabis before sex, and those that failed to indicate if the respondent had female genitalia.

Measures

The FSFI[28] orgasm subscale evaluates orgasm frequency, ease, and satisfaction within the last 30 days, with each question having a slider scale of 5 choices. Orgasm frequency ranged from *almost always to always* to *almost never or never*, orgasm difficulty from *extremely difficult to impossible* to *not difficult*, and orgasm satisfaction from *very satisfied* to *very dissatisfied*. The same 3 questions and slider scale ranges were asked twice: *with cannabis* before partnered sex, followed by *without cannabis* before partnered sex.

The study evaluated demographic factors, relationship satisfaction, cannabis use behaviors, mental health diagnosis, prescription medication, sexual abuse history, and sexual behavior. Statistical tests provided analytic depth and breadth. Table 1 presents the demographic and clinical characteristics of the participants.

Analysis

Data analysis occurred between November 20, 2022, and March 27, 2023. The researchers received 1037 survey responses. Forty percent (n = 417) failed to meet the inclusion criteria, and 210 were excluded for being incomplete, leaving 410 completed surveys. In addition, 23 surveys indicated that participants never used cannabis before sex or did not clearly state their gender. Thus, 94% (N = 387) of completed surveys constituted the primary source of data analyzed.

The grouped responses in reporting *yes* or *no* to the question related to orgasm difficulty during partnered sex determined FOD. Upon evaluation, we moved the responses of 17 women to the category that best reflected their orgasm response without cannabis before partnered sex. For example, we moved a woman's *no* response to orgasm difficulty to the *yes* category if a respondent stated that she *almost never or never* orgasmed without cannabis before partnered sex. As a result of this objective dichotomization, 52% (n = 202) of the participants were characterized as having FOD.

The study examined 202 women with FOD and all women with and without FOD (N = 387). The study first examined the participants with FOD, and if a statistically significant relationship existed with the use of cannabis before partnered sex, the analysis then turned to all study participants. The only exception to this methodology was for primary intake method, sexual abuse history, and mental health diagnosis. The measurement of these factors was for all women in the study despite the lack of statistical significance found among women with FOD.

The statistical test used in each analysis was based on 2 factors—the level of measurement and the number of treatments—with 3 statistical tests used overall: McNemar, 1-factor analysis of variance (ANOVA), and 1-sample *t*-test. The McNemar test is a nonparametric statistical test for a before-and-after design where a person is one's own control; each has a control and a treatment response. The McNemar test evaluated the paired responses to the FSFI orgasm subscale regarding orgasm frequency, ease, and satisfaction with and without cannabis use before sex.

For orgasm frequency, responses indicating *almost always or always*, *most times*, *sometimes*, and a *few times* were combined to represent *yes* to orgasm, while *almost never or never* represented *no* to orgasm. Among women with FOD (n = 202), responses fell into 4 categories: orgasm with and without cannabis (n = 121), orgasm with cannabis and no orgasm without cannabis (n = 58), no orgasm with cannabis and orgasm without cannabis (n = 7), and no orgasm with or without cannabis (n = 16).

For orgasm difficulty, *extremely difficult or impossible*, *very difficult*, *difficult*, and *slightly difficult* were combined to represent the *difficult* category, while *not difficult* represented the *not difficult* category. Among women with FOD (n = 202), responses fell into 4 categories: difficult with or without cannabis (n = 123), difficult with cannabis and not difficult without cannabis (n = 1), not difficult with cannabis and difficult without cannabis (n = 70), and not difficult with or without cannabis (n = 8). Table 2 represents these data.

For orgasm satisfaction, *very satisfied*, *moderately satisfied*, and *about equally satisfied and dissatisfied* were combined to represent the *satisfied* category, while *moderately dissatisfied* and *very dissatisfied* were combined to represent the *dissatisfied* category. Among women with FOD (n = 202), responses fell into 4 categories: satisfied with or without cannabis (n = 157), satisfied with cannabis and dissatisfied without cannabis (n = 34), dissatisfied with cannabis and satisfied without cannabis (n = 3), and dissatisfied with or without cannabis (n = 8).

A 1-sample *t*-test or 1-factor ANOVA was used when the measurements were independent with different subjects in each of the groups. The FSFI orgasm subscale, demographics, sexual behavior, mental health, and cannabis use behavior were analyzed.

For orgasm frequency, 2 represented *almost always or always* and 6 *almost never or never*. Orgasm frequency responses were grouped by scores 2 to 5 as *yes orgasm* and 6 as *no orgasm* with and without cannabis before sex. The *no cannabis* orgasm frequency score was subtracted from

Table 1. Demographics, sexual behavior, mental health, sexual abuse history, cannabis use behavior, and cannabis effect on orgasm.

Characteristic	Women, No. (%)		*P* value: cannabis effect on orgasm based on variable	
	With orgasm difficulty	With + without orgasm difficulty	With orgasm difficulty	With + without orgasm difficulty
No.	202	387		
Demographics				
Age, y			.683	—[a]
18-24	43 (21.3)	76 (19.6)		
25-34	91 (45)	181 (46.8)		
35-44	42 (21)	83 (21.4)		
45-54	17 (8)	28 (7.2)		
55-64	3 (1)	11 (2.8)		
≥65	6 (3)	8 (2.1)		
Education			.704	—
Less than high school diploma or GED	4 (2)	6 (1.6)		
High school diploma or GED	15 (7)	22 (5.7)		
Some college	38 (19)	74 (19.1)		
Associate degree	16 (8)	34 (8.8)		
Bachelor degree	76 (30)	149 (38.5)		
Graduate degree	53 (26)	102 26.4)		
Ethnicity			.437	—
Asian	6 (3)	15 (3.9)		
Black/African American	10 (5)	22 (5.7)		
Hispanic	19 (9)	40 (10.3)		
Multiracial	6 (3)	15 (3.9)		
Native American	3 (1)	4 (0.8)		
Pacific Islander	1 (0)	1 (0.3)		
White/Caucasian	152 (75)	279 (72.1)		
Other	5 (2)	11 (2.8)		
Income, $			.235	—
<20 000	39 (19.3)	62 (16)		
20 000-34 999	24 (11.9)	54 (14)		
35 000-49 999	30 14.9)	54 (16)		
50 000-74 999	49 24.3)	94 24.3)		
75 000-99 999	27 13.4)	55 14.2)		
≥100 000	33 16.3)	68 17.6)		
Relationship status			.141	—
Single	24 (11.9)	45 (11.6)		
Married	67 (33.2)	127 (32.8)		
In a relationship	98 (48.5)	193 (49.9)		
Divorced	13 (5.4)	6 (1.6)		
Other	0	16 (4.1)		
Religion			.889	—
Buddhist	0 (0)	2 (.50)		
Christian (Catholic, Protestant, any denomination)	25 (12.4)	53 (13.7)		
Hindu	1 (.50)	1 (.30)		
Jewish	11 (5.4)	15 (3.9)		
Muslim	0 (0)	2 (.50)		
Sikh	1 (.50)	1 (.30)		
I do not practice a religion	152 (75.2)	296 (76.5)		
Other	12 (5.9)	17 (4.4)		
Sexual orientation: LGBTQI+			.898	—
Yes	105 (52)	192 (49.6)		
No	93 (46)	188 (48.6)		
Sexual behavior and relationship satisfaction				
Masturbation frequency			.620	—
≥1/d	16 (7.9)	31 (8.0)		
2-3/wk	77 (38.1)	136 (35.1)		
4-5/wk	16 (7.9)	33 (8.5)		
Few times per month	62 (45.5)	117 (30.2)		
Once every few months	19 (9.4)	45 (11.6)		
I do not masturbate	12 (.50)	25 (6.5)		
Sexual issues besides orgasm difficulty			—	—
Yes	47 (23.3)	75 (19.4)		
No	155 (76.7)	312 (80.6)		

(*Continued*)

Table 1. Continued

Characteristic	Women, No. (%)		*P* value: cannabis effect on orgasm based on variable	
	With orgasm difficulty	With + without orgasm difficulty	With orgasm difficulty	With + without orgasm difficulty
Partnered sex frequency			.541	.617
≥1/d	11 (5.4)	23 (5.9)		
2-3/wk	83 (41.1)	162 (41.9)		
4-5/wk	21 (10.4)	52 (13.4)		
Few times per month	79 (39.1)	139 (35.9)		
Once every few months	8 (4.0)	11 (2.8)		
Relationship satisfaction			.606	—
Very satisfied	100 (49.6)	221 (57.1)		
Moderately satisfied	59 (29.2)	103 (26.6)		
About equally satisfied and dissatisfied	22 (10.9)	32 (8.3)		
Somewhat dissatisfied	15 (7.4)	19 (4.9)		
Very dissatisfied	3 (1.5)	4 (1.0)		
I am not in a partnered relationship	3 (1.5)	8 (2.1)		
Sexual relationship status			.629	—
In a sexual relationship with 1 person <10 y	121 (59.9)	226 (58.4)		
In a sexual relationship with 1 person >10 y	43 (21.3)	87 (22.5)		
Engaging in sex with >1 person	34 (16.8)	66 (17.1)		
Not in a sexual relationship with 1 person	4 (2.0)	8 (2.1)		
Mental health, prescription drug use, sexual abuse history				
Mental health diagnosis			.164	.004*
Yes	129 (63.9)	231 (59.7)		
No	73 (36.1)	156 (40.3)		
Mental health diagnosis type: ≥1 per person			—	—
ADHD	16 (7.9)	31 (8.0)		
Anxiety disorder	95 (47)	172 (44.4)		
Bipolar disorder	12 (5.9)	18 (4.7)		
Depressive disorder	86 (42.6)	147 (38.0)		
Obsessive compulsive disorder	5 (2.5)	8 (2.1)		
PTSD	40 (19.8)	64 (16.5)		
Other	13 (6.4)	24 (6.2)		
Prescription drug use			.232	.114
Yes	123 (60.9)	215 (55.6)		
No	79 (39.1)	172 (44.4)		
Sexual abuse history			.206	.003*
Yes	74 (36.6)	125 (32.3)		
No	128 (63.4)	262 (67.7)		
Cannabis use behavior				
Cannabis use frequency before sex			<.001*	<.001*
Never	0 (0)	0 (0)		
Rarely	20 (9.9)	36 (7.4)		
Some of the time	59 (29.2)	122 (31.5)		
About half the time	36 (17.8)	70 (18.1)		
Most of the time	64 (31.7)	116 (30.0)		
Every time	23 (11.4)	43 (11.1)		
Length of time using cannabis before sex, y				
<1	40 ((19.8)	65 (16.8)	.797	—
1-3	71 (35.1)	144 (37.2)		
>3-5	30 (14.9)	55 (14.2)		
>5	60 (29.7)	122 (31.5)		
I do not use cannabis before partnered sex	1 (.50)	1 (.30)		
Primary intake method			.524	<.0001*
Smoking	100 (49.5)	183 (47.3)		
Vaping oil	33 (16.3)	66 (17.1)		
Vaporizing cannabis flower (weed)	12 (5.9)	26 (6.7)		
Edibles	48 23.8)	95 (24.5)		
Tincture	5 (2.5)	9 (2.3)		
Topicals	1 (.50)	1 (.30)		
Other	3 (1.5)	7 (1.8)		

(*Continued*)

Table 1. Continued

Characteristic	Women, No. (%)		*P* value: cannabis effect on orgasm based on variable	
	With orgasm difficulty	With + without orgasm difficulty	With orgasm difficulty	With + without orgasm difficulty
Primary reason for use			.022*	<.001*
Relaxation	127 (62.9)	233 (60.2)		
Sleep	11 (5.4)	33 (8.4)		
Sex	21 (10.4)	37 (9.6)		
Other medical problem	9 (4.5)	19 (4.9)		
Prescription	20 (9.9)	38 (9.8)		
Pain	14 (6.9)	27 (7.0)		

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; LGBTQI+, lesbian, gay, bisexual, transgender, queer/questioning, intersex, or other; PTSD, posttraumatic stress disorder. [a]Dashes indicate that the larger group was not analyzed when the *P* value was not significant for women with orgasm difficulty, except for mental health, prescription drug use, sexual abuse history, and primary intake method *Statistically significant.

Table 2. Paired FSFI orgasm subscale questions with and without cannabis before sex.

Measure: how calculated	Cannabis used	No cannabis used		χ^2 (*P* value)[b]
Orgasm frequency: paired orgasm frequency response with and without cannabis before sex		Orgasm	No orgasm	
	Orgasm	121 (59.9)	58 (28.7)	38.5 (<.0001)*
	No orgasm	7 (3.5)	16 (7.0)	
Orgasm ease/difficulty: paired orgasm difficulty response with and without cannabis before sex		Difficult	Not difficult	
	Difficult	123 (60.9)	1 (0.5)	69.01 (<.0001)*
	Not difficult	70 (34.7)	8 (4.0)	
Orgasm satisfaction: paired orgasm satisfaction response with and without cannabis before sex		Satisfied	Dissatisfied	
	Satisfied	157 (77.7)	34 (16.8)	27.68 (<.0001)*
	Dissatisfied	3 (1.4)	8 (4.0)	

Abbreviation: FSFI, Female Sexual Function Index. [a]Data are presented as No. (%). [b]Results per McNemar test: women with female orgasmic dysfunction (n = 202; *df* = 1). *Statistically significant.

the *with cannabis* score for each participant and totaled. A 1-sample *t*-test was performed.

For orgasm difficulty, 2 represented *extremely difficult or impossible* and 6 *not difficult*. Orgasm difficulty responses were grouped by scores 2 to 5 as *difficult* and 6 as *not difficult*. The orgasm difficulty score without cannabis was subtracted from the score with cannabis. One-factor ANOVA was performed.

For orgasm satisfaction, 2 represented *very satisfied*, 4 *about equally satisfied/dissatisfied*, and 6 *very dissatisfied*. Orgasm satisfaction responses were grouped by scores 2 and 3 representing *satisfied*, 4 *about equally satisfied/dissatisfied*, and 5 and 6 *dissatisfied*. The orgasm satisfaction score without cannabis was subtracted from the score with cannabis. One-factor ANOVA was performed.

Demographic data, sexual behavior, mental health, sexual abuse history, and cannabis use behavior were tested with 1-factor ANOVA. The exception was race, which was computed with a 1-sample t-test. A score from 2 to 6 was given to each participant's orgasm frequency response with and without cannabis before sex, with 2 representing *almost always or always* and 6 *almost never*. The *no cannabis* score was subtracted from the *with cannabis* score for each participant and computed per the variable.

Results

Orgasm subscale of the FSFI

Of women with FOD (n = 202), 28.7% (n = 58) experienced orgasm with cannabis and no orgasm without cannabis ($\chi^2 = 38.5$, $P < .0001$, McNemar); 34.7% (n = 70) reported that it was not difficult to orgasm with cannabis and difficult to orgasm without cannabis ($\chi^2 = 69.01$, $P < .001$, McNemar); and 16.8% (n = 34) indicated that they were satisfied with cannabis and dissatisfied without cannabis ($\chi^2 = 27.68$, $P < .0001$, McNemar). Table 2 presents the data.

Orgasm frequency

Orgasm frequency increased 39.8% for women with FOD (n = 202), with 88.8% (n = 179) experiencing orgasm almost always, most times, sometimes, or a few times when using cannabis as compared with 63.3% (n = 128) without cannabis. Women with FOD who almost never or never orgasm decreased 68.9%, with 36.6% (n = 74) almost never or never experiencing orgasm without cannabis as compared with 11.4% (n = 23) with cannabis, Mean difference −1.50 with $t(201) = 14.68$ $P < .0001$ (1-sample t-test). Figure 1 presents the data. Comparative data revealing differences in women's orgasm frequency with and without FOD and with and without cannabis are presented in Figure 2.

Orgasm difficulty

Orgasm difficulty decreased 35.4%, with 61.4% of women with FOD (124/202) reporting that orgasm was slightly difficult, difficult, very difficult, or extremely difficult or impossible with cannabis as compared with 95.1% (n = 192) without cannabis. Women who indicated that it was extremely difficult or impossible decreased 67.4%, with 22.8% (n = 46) finding it extremely difficult or impossible with cannabis vs 7.4% (n = 15) without cannabis, $F(1, 200) = 36.37$, $P < .0001$ (1-factor ANOVA). Figure 3 presents the data.

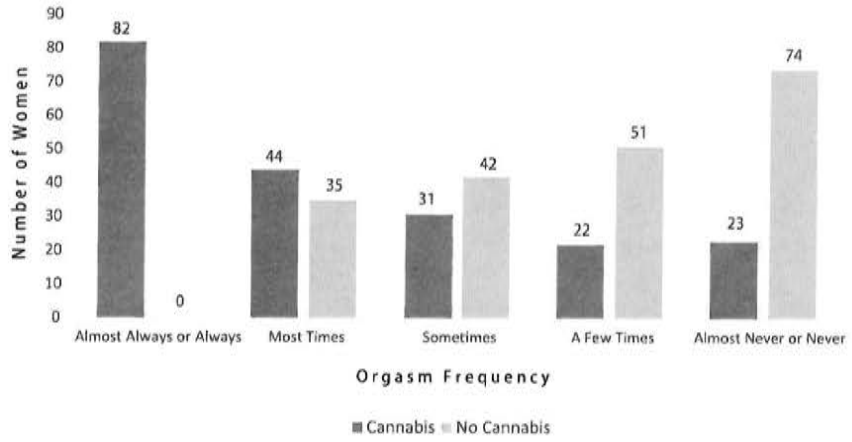

Figure 1. Measures for orgasm frequency during partnered sex for women with orgasm difficulty were fielded from March 23 to November 18, 2022, of women aged at least 18 years who reported orgasm frequency within the last 30 days with and without cannabis use before partnered sex. Orgasm frequency responses after cannabis and no cannabis were given a score from 2 (almost always) to 6 (almost never) for each participant. The difference of each score with cannabis and without cannabis was computed. If there is no cannabis effect, the mean of the scores should be zero. A negative score indicates a negative cannabis effect. The hypothesis that the mean of the differences was zero was tested per the 1-sample *t*-test. The mean difference was −1.50; $t(201) = -14.68$, $P < .0001$.

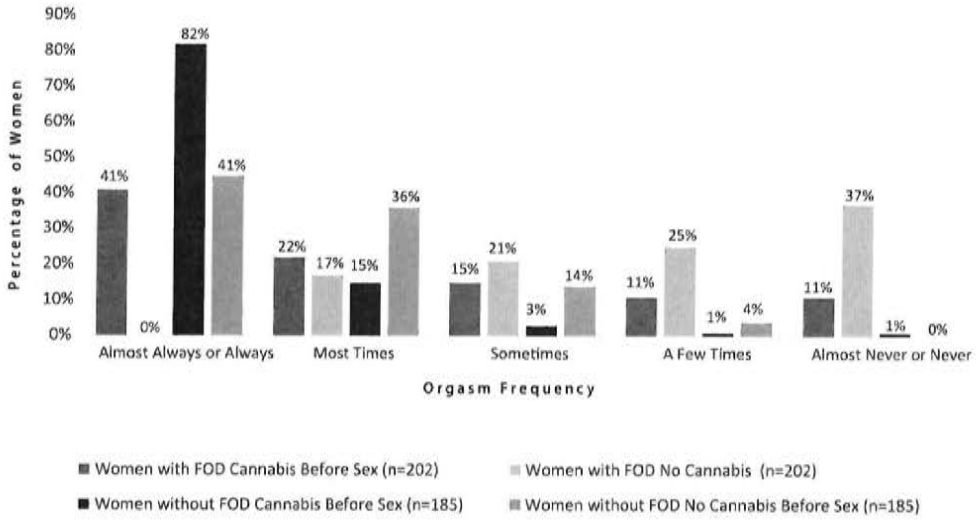

Figure 2. Measures for orgasm frequency during partnered sex for women with and without orgasm difficulty were fielded from March 23 to November 18, 2022, of women aged at least 18 years who reported orgasm frequency within the last 30 days with and without cannabis use before partnered sex. Respondents were asked, "Over the past month, when you USED cannabis BEFORE partnered sex, how often did you reach orgasm (climax)?" and "Over the past month, when you DID NOT USE cannabis BEFORE partnered sex, how often did you reach orgasm (climax)?" Possible responses included *almost always or always, most times (more than 1/2 of the time), sometimes (about 1/2 of the time), a few times,* and *almost never or never.* Comparative data are presented.

Orgasm satisfaction

Orgasm satisfaction increased 97.7%, with 86.1% of women with FOD (174/202) reporting that they were very satisfied, moderately satisfied, or about equally satisfied and dissatisfied with cannabis as compared with 43.6% (n = 88) without cannabis. Women who reported that they were moderately or very dissatisfied decreased 75.4%, with 56.4% (n = 114) being moderately or very dissatisfied without cannabis vs 20.8% (n = 28) with cannabis, $F(2, 199) = 61.88$, $P < .0001$ (1-factor ANOVA). Figure 4 presents the data.

Frequency of cannabis use and length of time using cannabis before sex

The frequency of cannabis use before sex increased orgasm frequency in women with FOD, $F(4, 197) = 5.13$, $P < .001$ (1-factor ANOVA). The largest group of women with FOD used cannabis most of the time (31.7%, 64/202). Those who responded *almost always or always* orgasmed 47% of the time. Table 1 presents the data.

The duration of a woman's history of using cannabis before sex was not statistically significant for women with FOD, $F(3, 197) = 0.34$, $P = .797$ (1-factor ANOVA). However, this result is relevant because women reported improved orgasm experiences regardless of how many months or years before sex they had used cannabis. The largest group of women (35%, 71/202) used cannabis before sex for 1 to 3 years.

Reasons for cannabis use and intake method

Cannabis reason for use was statistically significant in creating a more positive orgasm characterization for all respondents, $F(5, 381) = 5.81$, $P < .001$ (1-factor ANOVA) and particularly for women with FOD, $F(5, 196) = 2.71$, $P = .022$ (1-factor

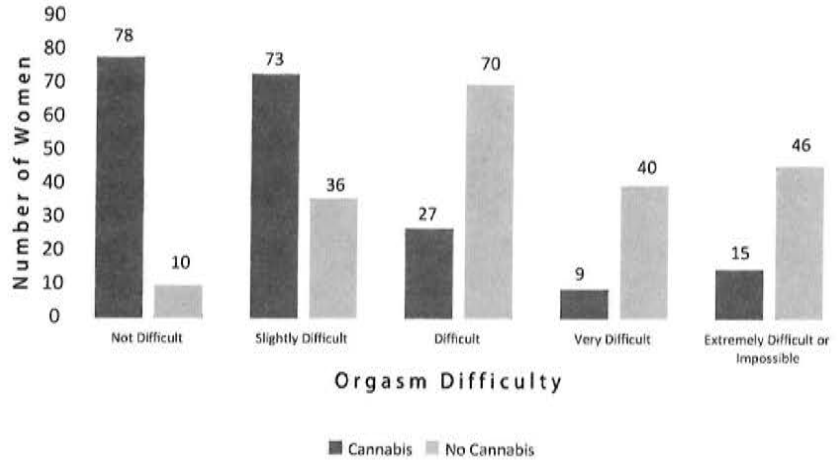

Figure 3. Measures for orgasm difficulty during partnered sex for women with orgasm difficulty were fielded from March 24 to November 18, 2022, of women who reported orgasm difficulty with and without cannabis use before partnered sex. Orgasm difficulty responses were given a score from 2 to 6, with *slightly difficult*, *difficult*, *very difficult*, and *extremely difficult* given a score of 2 to 5 and grouped as *difficult* and *not difficult* given a score of 6. A 1-factor analysis of variance was done to test the hypothesis of no differences among the means between the 2 categories tested. The result was $F(1, 200) = 36.37$, $P < .0001$.

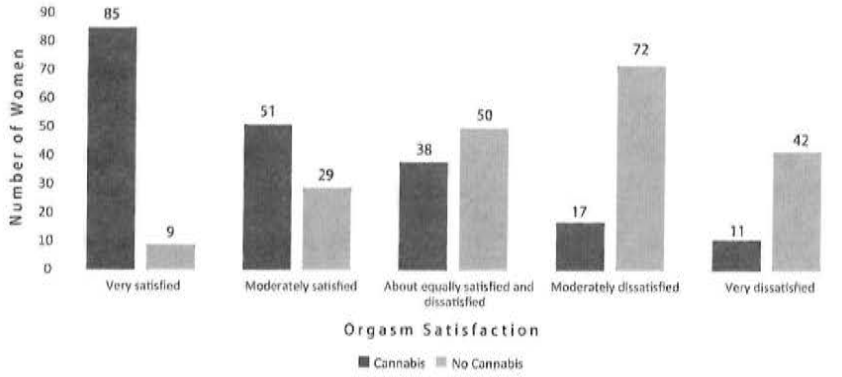

Figure 4. Orgasm satisfaction for women with orgasm difficulty with and without cannabis use before partnered sex. Measures for orgasm satisfaction during partnered sex for women with orgasm difficulty were fielded from March 24 to November 18, 2022, of women aged at least 18 years who reported orgasm satisfaction with and without cannabis use before partnered sex. Orgasm satisfaction responses were given a score from 2 to 6. Scores of 2 (very satisfied) and 3 (moderately satisfied) were combined into 1 category (satisfied; group 1); a score of 4 (about equally satisfied and dissatisfied) stayed the same (group 2); and scores of 5 (moderately dissatisfied) and 6 (very dissatisfied) were combined into 1 category (dissatisfied; group 3). The means are as follows: group 1, –2.0 (n = 136, SD = 1.2); group 2, 0.5 (n = 38, SD = 0.8); group 3, 0.1 (n = 28, SD = 0.7). A 1-factor analysis of variance was done to test the hypothesis of no differences among the means. The result was $F(2, 199) = 61.88$, $P < .0001$.

ANOVA). Survey participants selected from 5 categories when describing their orgasm experience: pain, relaxation, sleep, sex, and other medical problems, including the use of prescription medications. Of the women with FOD, 63% (127/202) reported using cannabis for relaxation.

Smoking was the foremost method of cannabis intake by all study participants (47.2%, 183/387). Among all women, this method of cannabis ingestion was significantly related to a more positive orgasm response, $F(4, 382) = 7.58$, $P < .0001$ (1-factor ANOVA). However, the same could not be said for women with FOD, $F(4, 197) = 0.80$, $P = .524$ (1-factor ANOVA).

FOD and other sexual issues

The majority of women who reported FOD (n = 202) during partnered sex claimed the ability to orgasm in some situations but not others (71%, n = 144), and 77% (n = 155) had no other sexual difficulties. Of the 23% who identified other sexual difficulties, pain during sex was the number 1 sexual complaint. Of women without FOD (n = 185), 85% (n = 157) cited no other sexual challenges. Of the remaining 15% (n = 28) who reported other sexual challenges, the majority (57%, n = 16) experienced low sexual desire.

Demographics, relationship status, and sexual behavior

When consumed before partnered sex, cannabis had no statistically significant relationship with age, race, income, education, religion, sexual orientation, sexual relationship status, relationship status, relationship satisfaction, sexual orientation, partnered sex frequency, or masturbation frequency. Among women with FOD (n = 202), women aged 25 to 34 years (45%), in a relationship (not married; 48.5%, 98/202), holding a bachelor degree (38%, 76/202), and earning between $50 000 and $75 999 (24%, 49/202) constituted the largest group.

The majority of women with FOD noted their sexual orientation as LGBTQI+ (lesbian, gay, bisexual, transgender, queer/questioning, intersex, or other (52%, n = 105) and their race as White (75%, n = 152), expressed being very satisfied in their partnered relationship (49.5%, n = 100) with 1 person

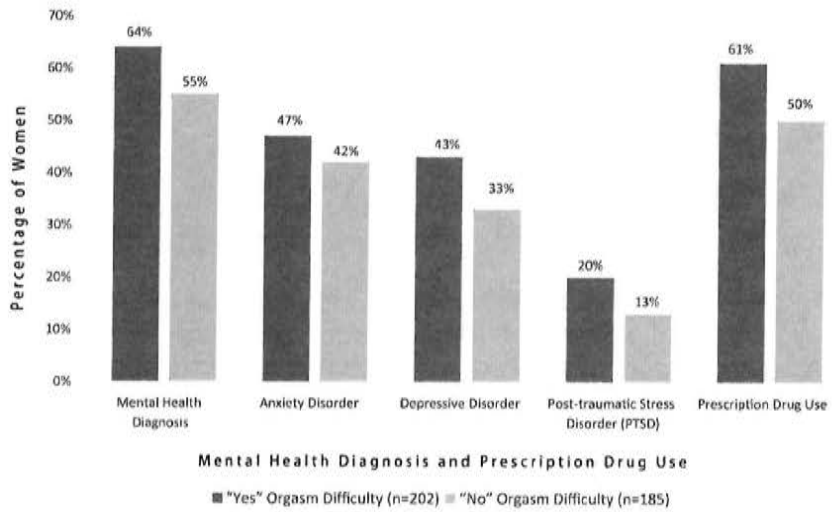

Figure 5. Measures for mental health diagnosis, diagnosis type, and prescription drug use for women who responded yes or no to orgasm difficulty were fielded from March 23 to November 18, 2022, of women aged at least 18 years who reported using cannabis before partnered sex. Respondents were asked, "Do you have a mental health diagnosis?" and if yes, respondents were asked the following question: "Please check your mental health diagnosis with the following options: anxiety disorder, depressive disorder, bipolar disorder, posttraumatic stress disorder, or other." Respondents were also asked, "Are you on any prescription medication?" (yes or no). Comparative raw data are presented.

<10 years (60%, n = 121), and indicated not practicing a religion (75%, n = 152).

Mental health and prescription medication

Statistically significant differences were found among all women who had a mental health diagnosis (231/387) regarding a more positive orgasm response when using cannabis before sex, N = 387, $F(1, 385) = 8.60$, $P = .004$ (1-factor ANOVA). Of the women with FOD (n = 202), 64% (n = 129) had a mental health diagnosis, and 61% (n = 123) took prescription medication. On average, women with FOD had 24% more mental health issues, 52.6% more cases of posttraumatic stress disorder (PTSD), 29% more depressive disorders, 13% more anxiety disorders, and 22% more prescription drug use than women without FOD. Figure 5 presents the data.

Sexual abuse history

A statistically high percentage (32.3%, 125/387) of women who had a history of sexual abuse, with or without FOD, reported experiencing a more positive orgasm response to cannabis before sexual activity, $F(1, 385) = 8.84$, $P = .003$ (1-factor ANOVA). Among women with FOD (n = 202), those with a history of sexual abuse (38.6%, n = 74) represented 32.9% more sexual abuse history than women without FOD (27.6%, 51/185). Figure 6 presents the data.

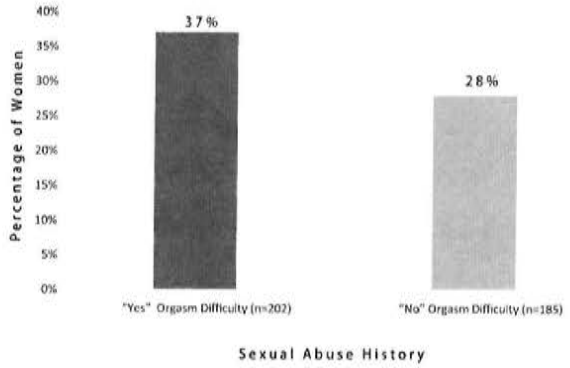

Figure 6. Measures for sexual abuse history for women who responded yes or no to orgasm difficulty were fielded from March 23 to November 18, 2022, of women aged at least 18 years who reported using cannabis before partnered sex. Respondents were asked, "Do you have a history of sexual abuse?" (yes or no). Comparative data are presented.

Discussion

The results corroborate 50 years of anecdotal and learned speculation about cannabis helping women with FOD. The research found that cannabis use increased orgasm frequency, eased orgasm difficulty, and improved orgasm satisfaction. At the same time, the results opened new areas of discussion.

Improved orgasm response for women with a mental health diagnosis

Women in this study with 1 or more mental health diagnoses who use cannabis before partnered sex have a more positive orgasm response regardless of whether they have FOD. These results are consistent with research finding that women with FOD experience high rates of mental health diagnoses,[8,29–32] prescription drug use,[33–35] or PTSD.[36–39] Women with anxiety disorders represented 44% (172/387) of women in this study. They were 3.5 times more likely to have FOD than nonanxious women.[40]

Cannabis use resulted in more orgasms for sexual abuse survivors

Sexual abuse survivors' number 1 sexual complaint is orgasm difficulty,[41] coupled with high rates of PTSD.[42,43] This study revealed that 33% more women with sexual abuse histories reported FOD than women without FOD. THC in cannabis reduces activity in the hippocampus and amygdala,[22,24] the parts of the brain that store and react to traumatic memories.[44,45] This activity may play a role in extinguishing traumatic memories[24] and result in a more positive orgasm response.

Cannabis and FOD treatment theories

Several theories explore why cannabis may be an effective treatment for FOD.[46] Dishabituation theory[46] proposes that cannabis lessens the routine of habits,[47] such as cognitive distraction, a known FOD cause,[48–53] and proposes that dishabituation may positively affect FOD.[46] Neuroplasticity theory proposes that some women learn to orgasm while using cannabis,[46] as seen in comments in this study and anecdotally.[13,54] Cannabis and endocannabinoids, the cannabinoids created by the human body, are increasingly recognized for their roles in neural development processes, including brain cell growth and neuroplasticity.[55]

Multimodal treatment theory proposes that women who use cannabis for any reason may lessen their FOD,[46] as noted by Kasman et al, who found that for each step up of cannabis use, female sexual dysfunction declined by 21%.[5] Amygdala reduction theory proposes that reduced amygdala activity can positively affect FOD.[46] Hypervigilance, anxiety, and PTSD are responses of the amygdala[45] and commonly impair sexual response.[38,56]

Limitations

This study may not be generalizable to women who rarely use or do not use cannabis before sex, women who have never had an orgasm, or women who do not have female genitalia. The cultivar of cannabis was not a focus of this study, nor was the chemotype or amount of cannabis used. The partner's use or nonuse was also not evaluated in the study.

Cannabis use before sex did not help all women

Cannabis use before sex did not help all women orgasm. Among survey respondents, 4% reported never having had an orgasm, even though they used cannabis before partnered sex.

Conclusions

This study's findings support 50 years of speculation and research suggesting cannabis as a treatment for FOD. Key results of improved orgasm frequency, ease, and satisfaction for women reporting FOD during partnered sex show the potential of cannabis becoming a recognized treatment.

Cannabis use before partnered sex appears valuable to women who use it to treat FOD. Indeed, women with FOD experienced improvement during partnered sex regardless of the time frame of cannabis use.

Future research should focus investigations on the potential of cannabis as a treatment option for women who have been diagnosed with mental health diagnoses or have a sexual abuse history. Previous studies have indicated that women with these conditions experienced more positive orgasmic responses and greater satisfaction when using cannabis before sex. It is also essential to explore the use of cannabis as a treatment for primary anorgasmia, as well as for women who used to be able to orgasm but are now unable to do so. This study, with anecdotal reports and less focused studies, suggests that cannabis may improve orgasmic functioning in these women as well.[13,54] To further evaluate the effectiveness of cannabis in treating female sexual dysfunction and determine the appropriate dosage, it is recommended to conduct randomized controlled studies.

Supplementary material

Supplementary material is available at *Sexual Medicine* online.

Funding

None declared.

Conflicts of interest

None declared.

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Assessment of the Association of Cannabis on Female Sexual Function With the Female Sexual Function Index

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ABSTRACT

Introduction: Cannabis use has increased in the last decade, and the impact of cannabis on female sexual function remains unclear.

Aim: To assess the impact of frequency of use, chemovar (tetrahydrocannabinol, cannabinol, or both) type, and method of consumption on female sexual function among cannabis users.

Methods: Adults who visited a single-partner cannabis dispensary's locations were invited to participate in an uncompensated, anonymous online survey October 20, 2019 and March 12, 2020. The survey assessed baseline demographics, health status, cannabis use habits as well as used the validated Female Sexual Function Index (FSFI) to assess sexual function.

Main Outcome Measure: The main outcomes of this study are the total FSFI score (sexual dysfunction cutoff <26.55) and subdomain scores including desire, arousal, lubrication, orgasm, satisfaction, and pain.

Results: A total of 452 women responded with the majority between the ages of 30−49 years (54.7%) and in a relationship or married (81.6%). Of them,72.8% reported using cannabis more than 6 times per week, usually through smoking flower (46.7%). Women who reported more cannabis use, reported higher FSFI scores (29.0 vs 26.7 for lowest vs highest frequencies of reported use, $P = .003$). Moreover, an increase in cannabis use frequency by one additional use per week was associated with an increase in total FSFI ($\beta = 0.61$, $P = .0004$) and subdomains including desire domain ($P = .02$), arousal domain ($P = .0002$), orgasm domain ($P = .002$), and satisfaction domain ($P = .003$). For each additional step of cannabis use intensity (ie, times per week), the odds of reporting female sexual dysfunction declined by 21% (odds ratio: 0.79, 95% confidence interval: 0.68−0.92, $P = .002$). Method of consumption of cannabis and chemovar type did not consistently impact FSFI scores or odds of sexual dysfunction.

Conclusion: Increased frequency of marijuana use is associated with improved sexual function among female users, whereas chemovar type, method of consumption, and reason for use does not impact outcomes. **Kasman AM, Bhambhvani HP, Wilson-King G, et al. Assessment of the Association of Cannabis on Female Sexual Function With the Female Sexual Function Index. Sex Med 2020;XX:XXX−XXX.**

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Key Words: Cannabis; Marijuana; Female Sexual Function; Female Sexual Dysfunction; FSFI

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INTRODUCTION

The impact of cannabis use on sexual function is a matter of debate. An estimated 22.2 million people within the United States use cannabis monthly, and there are more than a 100 million lifetime users.[1−3] There have been major policy changes governing cannabis use since the 1960s as calls for legalization began with medical legalization in 1996 by California followed by adult use in 2012 by Colorado and Washington State.[4] There are now 29 states, and the District of Columbia have legalized use of cannabis either for medical or adult use.[5] As legalization has become more prevalent and users have become more widespread, there is a need to better understand the systemic effects of cannabis.[6]

Cannabis' effect on sexual arousal and sex steroid hormones has been previously studied.[7,8] Women who use cannabis have reported increased sexual frequency and increased endocannabinoids have been associated with increased arousal; however, examination of sexual function with regard to cannabis has led to conflicting reports.[7,9] Prior studies have either examined sexual function using a mix of validated and non-validated instruments with varied results.[10,11] Although a few studies have found a positive dose-dependent effect on arousal and shown a positive effect with pleasure, these studies have been small and have not examined other domains of female sexual function such as lubrication, pain, and overall satisfaction.[12] Interestingly, a large Australian survey found that men who used cannabis were more likely to report impaired sexual function, whereas women cannabis users did not have higher rates of sexual dysfunction.[13] To date, no studies have examined female sexual function with a validated survey in a large sample size nor have examined the impact of the cannabis chemovar (categorization of a plant species based on chemical composition, eg, tetrahydrocannabinol [THC] or cannabinol [CBD] dominant) or the method of consumption. Chemovar may be important as the receptors for THC and CBD are different, which may account for the psychoactive effects of THC compared with CBD.[14] Therefore, we sought to characterize the association between female sexual function and cannabis use by using a validated questionnaire (Female Sexual Function Index [FSFI]) using a U.S. population.

METHODS

Study Population

After institutional review board approval, adults who visited a single-partner cannabis dispensary were invited to participate in an uncompensated, anonymous online survey via a provided hyperlink or QR code upon purchase between October 20, 2019 and March 12, 2020. The partner dispensary was chosen based on a large customer base and willingness to distribute our survey. The survey was distributed throughout all locations of the partner dispensary.

Survey Instruments

All participants were administered the same anonymous survey in the English language via the online survey platform Qualtrics (Provo, UT). Informed consent was waived given the online nature of the survey, and waiver of documentation was provided before proceeding with the survey. The first half of the survey queried participants for demographic information, past medical history, and adult drug use habits. After selection of sex, female participants were directed to the validated FSFI. The FSFI is a validated 19-item survey instrument designed to assess female sexual function over the preceding 4 weeks.[15] It assesses 6 individual domains including desire, arousal, lubrication, orgasm, satisfaction, and pain. Each domain is scored via a Likert scale score from either 0−5 or 1−5 with a cutoff total score of 26.55 to define sexual dysfunction as per previous validation studies to define female sexual dysfunction.[15,16] To score, each domain sum is multiplied by a specific factor ratio and then summed to obtain the total FSFI score with a maximum of 36. As the FSFI was developed and validated in sexually active women, sexually inactive participants were excluded from the analysis.

Covariates

Demographics collected included age, race, primary region of residence (international or per U.S. census divisions), and relationship status. Clinical variables were height, weight, number of visits to a primary care provider in the last 3 months, tobacco smoking history, and the presence/absence of 13 common chronic comorbidities within the United States (ie, hypertension, hypercholesterolemia, diabetes, heart disease, arthritis, lung disease, kidney disease, thyroid disease, cancer, neurologic disease, liver disease, depression, and anxiety).[17] Responses (yes/no) to these variables were collapsed to a single continuous variable, "total comorbidities" for the purpose of analysis. The complete distribution of these comorbidities can be found in Supplemental Table 1.

Cannabis use variables included frequency of use within the last 4 weeks, method of consumption, primary cannabis chemovar (THC or CBD dominant), and reason for use. Options for frequency of use were never, 1−2 times per week, 3−5 times per week, and 6+ times per week. The frequency-response relationship was assessed in our regression analyses by converting this categorical variable to a continuous variable as follows: never users were assigned a value of 0; 1−2 times per week, a value of 1.5; 3−5 times per week, a value of 4; and 6+ times per week, a value of 6.1. These continuous variable values were chosen as the average weekly use frequency of their respective categorical variables. The options for method of consumption included smoking flower, edibles, smoking concentrates/extracts, tincture/oils, vaping, and other. 9 options were given for reason for use after performing a review of the literature: relax/unwind, improve mood, help with pain, help with sleep, help with stress, help with depression, glaucoma, nausea/loss of appetite, and neurologic condition.[18] The complete distribution of reason for use is illustrated in Supplemental Table 1.

Statistical Methods

Patient characteristics and survey responses were analyzed using descriptive statistics, including proportions, median, and mean ± SD. Categorical variables were analyzed by the χ^2 test or Fisher's exact test as appropriate. Normally distributed continuous variables were analyzed by Student's t-test, whereas skewed continuous variables were analyzed by the Wilcoxon rank sum test. Multiple linear regression was used to identify factors associated with the overall FSFI score, as well as each FSFI domain. We used multivariable logistic regression to identify factors associated with female sexual dysfunction. In this analysis, female sexual dysfunction was defined as a FSFI score of less than 26.55.[15] All data were analyzed using R v3.5.3 (R Foundation for Statistical Computing, Vienna, Austria). The significance

Table 1. Cohort demographics and stratification by frequency of cannabis use

Characteristic	Overall	Frequency of cannabis use		
		≥3 times per wk	≤2 times per wk	
N	452	392	60	*P* value
Age, y Overall (range)	42 (20–79)			
<30	67 (14.8)	58 (14.8)	9 (15.0)	.23
30–39	117 (25.9)	101 (25.8)	16 (26.7)	
40–49	130 (28.8)	109 (27.8)	21 (35.0)	
50–59	81 (17.9)	76 (19.4)	5 (8.3)	
60+	55 (12.2)	47 (12.0)	8 (13.3)	
Race (%)				
Caucasian	337 (74.6)	300 (76.5)	37 (61.7)	.02*
Black/African	15 (3.3)	14 (3.6)	1 (1.7)	
Hispanic/Latino	55 (12.2)	45 (11.5)	10 (16.7)	
Other	45 (10.0)	33 (8.4)	12 (20.0)	
Region (%)				
West	159 (35.2)	130 (33.2)	29 (48.3)	.05*
International	96 (21.2)	87 (22.2)	9 (15.0)	
Midwest	34 (7.5)	27 (6.9)	7 (11.7)	
Northeast	81 (17.9)	74 (18.9)	7 (11.7)	
South	75 (16.6)	69 (17.6)	6 (10.0)	
Unknown	7 (1.5)	5 (1.3)	2 (3.3)	
Relationship status (%)				
Married	245 (54.2)	210 (53.6)	35 (58.3)	.59
In a relationship	124 (27.4)	111 (28.3)	13 (21.7)	
Single	79 (17.5)	67 (17.1)	12 (20.0)	
Education (%)				
4-y degree	130 (28.8)	118 (30.1)	12 (20.0)	.01*
2-y degree	67 (14.8)	58 (14.8)	9 (15.0)	
Doctorate	32 (7.1)	27 (6.9)	5 (8.3)	
High school or less	33 (7.3)	33 (8.4)	0 (0.0)	
Professional degree	108 (23.9)	84 (21.4)	24 (40.0)	
Some college	82 (18.1)	72 (18.4)	10 (16.7)	
Weight, lbs (mean [SD])	155.20 (37.44)	154.69 (37.73)	158.48 (35.54)	.47
Height, cm (mean [SD])	165.41 (6.97)	165.43 (6.88)	165.31 (7.54)	.91
PCP visits in last 3 mo (%)				
0	213 (47.1)	181 (46.2)	32 (53.3)	.59
1	170 (37.6)	150 (38.3)	20 (33.3)	
2+	69 (15.3)	61 (15.6)	8 (13.3)	
Cannabis use frequency (%)				
Never	7 (1.5)	0 (0.0)	7 (11.7)	<.001
1–2 times per wk	53 (11.7)	0 (0.0)	53 (88.3)	
3–5 times per wk	63 (13.9)	63 (16.1)	0 (0.0)	
6+ times per wk	329 (72.8)	329 (83.9)	0 (0.0)	
Tobacco use (%)				
Never smoker	203 (44.9)	167 (42.6)	36 (60.0)	.05*
Current smoker	59 (13.1)	56 (14.3)	3 (5.0)	
Former smoker	189 (41.8)	168 (42.9)	21 (35.0)	
Method of consumption (%)				
Smoking flower	211 (46.7)	193 (49.2)	18 (30.0)	<.001*
Edibles	50 (11.1)	38 (9.7)	12 (20.0)	
Other	22 (4.9)	15 (3.8)	7 (11.7)	
Smoking concentrates	24 (5.3)	23 (5.9)	1 (1.7)	

(continued)

Table 1. Continued

Characteristic	Overall	Frequency of cannabis use		P value
		≥3 times per wk	≤2 times per wk	
N	452	392	60	
Tincture or oils	69 (15.3)	56 (14.3)	13 (21.7)	
Vaping	73 (16.2)	67 (17.1)	6 (10.0)	
Primary reason for use (%)				
Medical	364 (80.5)	327 (83.4)	37 (61.7)	<.001*
Recreational	88 (19.5)	65 (16.6)	23 (38.3)	
Cannabinoid (%)				
THC dominant	208 (46.0)	189 (48.2)	19 (31.7)	<.001*
Both THC and CBD	192 (42.5)	168 (42.9)	24 (40.0)	
Only CBD dominant	49 (10.8)	35 (8.9)	14 (23.3)	
Total comorbidities (%)				
0	111 (24.6)	87 (22.2)	24 (40.0)	.004*
1	111 (24.6)	94 (24.0)	17 (28.3)	
2	123 (27.2)	110 (28.1)	13 (21.7)	
3+	107 (23.7)	101 (25.8)	6 (10.0)	
FSFI score (mean [SD])				
Total score	28.6 (5.44)	28.9 (5.30)	26.7 (5.98)	.003*
Desire score	3.74 (1.11)	3.8 (1.10)	3.5 (1.12)	.03*
Arousal score	4.7 (1.19)	4.8 (1.17)	4.3 (1.24)	.003*
Lubrication score	5.2 (1.19)	5.2 (1.15)	4.9 (1.43)	.09
Orgasm score	4.9 (1.35)	5.0 (1.32)	4.6 (1.48)	.01*
Satisfaction score	4.74 (1.34)	4.79 (1.32)	4.39 (1.42)	.03*
Pain score	5.27 (1.18)	5.30 (1.12)	5.06 (1.49)	.14

BMI = body mass index; CBD = cannabidiol; FSFI = female sexual function index; OR = odds ratio; PCP = primary care physician; SD = standard deviation; THC = tetrahydrocannabinol.
Comorbidities included hypertension, diabetes, heart disease, arthritis, lung disease, kidney disease, thyroid disease, hypercholesterolemia, cancer, neurologic disease, liver disease, depression, and anxiety.
Region represents primary residence.
*Significant ($P < .05$).

level for all statistical tests was set at <0.05, and all tests were 2 sided.

RESULTS

Survey respondent demographics including age, race, relationship status, education, and cannabis use characteristics are outline in Table 1. In total, 452 women completed the survey with the majority between the ages of 30–49 years (54.7%) and in a relationship or married (81.6%). Most participants were educated with either a 4 year or professional degree (52.7%) and had not seen their primary care physician within the last 3 months (47.1%). Of them, 72.8% reported using cannabis more than 6 times per week in the last 4 weeks, usually through smoking flower (46.7%). Overall, 118 women reported sexual dysfunction with a FSFI score of <26.55.

When stratified by frequency of use (≥3 times per week vs <3 times per week), those who used more frequently had overall higher FSFI scores (28.9 vs 26.7, $P = .003$) and had higher FSFI subdomain scores except for pain (5.3 vs 5.06, $P = .14$). More frequent users tended to smoke flower (49.2% vs 30%) and vape (17.1% vs 10%), whereas less frequent users reported using edibles more commonly (20% vs 9.7%; $P < .001$). In addition, the dominant cannabinoid chemovar that more frequent users reported was THC dominant (48.2% vs 31.7%) compared with CBD dominant (8.9% vs 23.3%, $P < .001$). More frequent users had more comorbidities compared with less frequent users with 25.8% with 3 or more compared with 10% ($P = .004$). The most common reason for cannabis use was to relax (81%) followed by relieve stress (74.1%) and help with sleep (73.9%; Supplemental Table 1).

Demographics, health status (eg, body mass index, primary care provider visits, tobacco use), and cannabis use and methods were assessed in relation to total FSFI and FSFI subdomains using linear regression (Table 2). Women older than the age of 50 years were more likely to have lower total FSFI scores (25.04 vs 27.12, $P = .03$) as were those who had more comorbidities (26.68 vs 27.12, $P = .02$). An increase in cannabis use frequency by one additional use per week was associated with an increase in total FSFI ($\beta = 0.61$, SE = 0.17, $P = .0004$) and subdomains

Table 2. Linear regression models of female sexual function index scores and demographics, health status, and marijuana use habits

	Total FSFI		Desire domain		Arousal domain		Lubrication domain		Orgasm domain		Satisfaction domain		Pain domain	
Characteristic	β	*P* value	β	*P* value	β	*P* value	β	*P* value	β	*P* value	β	*P* value	β	*P* value
Age, y														
<30	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
30–39	−1.32	.12	−0.29	.11	−0.28	.14	−0.08	.69	−0.25	.24	−0.40	.06	−0.02	.91
40–49	−0.32	.71	−0.30	.10	−0.15	.42	−0.09	.62	0.11	.62	−0.08	.73	0.19	.31
50–59	−2.08	.03*	−0.54	.008*	−0.53	.01*	−0.57	.008*	−0.14	.57	−0.16	.51	−0.14	.50
60+	−1.32	.21	−0.48	.03*	−0.22	.34	−0.48	.04	0.29	.27	−0.22	.40	−0.21	.38
Race														
White	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Black	−1.06	.46	0.02	.94	−0.26	.40	−0.03	.93	−0.58	.10	−0.40	.27	0.18	.56
Hispanic	0.69	.42	0.45	.01*	0.22	.25	0.19	.30	−0.09	.68	−0.11	.62	0.02	.90
Other	−2.12	.02*	−0.21	.27	−0.51	.01*	−0.33	.10	−0.70	.002*	−0.22	.33	−0.16	.42
Relationship status														
Married/in a relationship	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Single	0.86	.21	0.23	.12	0.43	.005*	0.24	.12	0.06	.71	−0.19	.28	0.09	.57
Region														
West	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
International	−0.18	.82	0.00	.99	−0.08	.63	0.10	.54	−0.05	.80	−0.11	.57	−0.04	.80
Midwest	1.87	.07	0.16	.46	0.37	.09	0.41	.07	0.48	.06	0.51	.05*	−0.06	.78
Northeast	−0.33	.66	−0.05	.77	−0.10	.53	−0.02	.89	−0.04	.82	−0.19	.31	0.07	.66
South	0.79	.30	0.03	.87	−0.03	.85	0.36	.03*	0.00	.99	0.11	.56	0.32	.05*
BMI														
Normal	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Underweight	−2.91	.11	−0.01	.97	−0.53	.19	−1.14	.01	−0.63	.17	−0.33	.48	−0.28	.49
Overweight	0.34	.59	0.03	.82	0.08	.59	0.08	.55	0.02	.91	−0.05	.73	0.19	.18
Obese	0.16	.85	0.02	.91	0.06	.75	0.12	.52	0.10	.63	−0.21	.33	0.06	.73
Extremely obese	0.43	.65	−0.08	.68	0.06	.76	0.01	.95	0.39	.11	−0.04	.88	0.09	.67
Tobacco use														
Never	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Current	0.92	.27	0.14	.42	0.17	.36	0.17	.37	0.25	.25	0.06	.79	0.14	.45
Former	−0.01	.98	0.12	.31	−0.04	.76	0.09	.46	−0.08	.59	−0.15	.29	0.04	.77
PCP visits in last 3 mo														
0.00	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
1.00	−0.91	.12	−0.23	.07	−0.14	.28	−0.12	.38	−0.11	.47	−0.24	.11	−0.02	.88
2+	−0.62	.43	−0.06	.71	−0.10	.58	−0.17	.32	−0.06	.78	−0.03	.87	−0.10	.57

(continued)

Table 2. Continued

Characteristic	Total FSFI		Desire domain		Arousal domain		Lubrication domain		Orgasm domain		Satisfaction domain		Pain domain	
	β	P value	β	P value	β	P value	β	P value	β	P value	β	P value	β	P value
Cannabis use frequency (continuous)	0.61	.0004*	0.09	.02*	0.14	.0002*	0.07	.08	0.14	.002*	0.13	.003*	0.05	.20
Method of consumption														
Smoking flower	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Edibles	−0.59	.51	−0.11	.55	−0.11	.59	−0.19	.34	−0.08	.73	−0.01	.98	−0.10	.60
Other	−1.22	.36	−0.03	.90	−0.10	.72	0.11	.71	−0.15	.66	−0.36	.27	−0.68	.02*
Smoking concentrates	−1.67	.16	−0.23	.36	−0.06	.82	−0.28	.29	−0.59	.05	−0.30	.32	−0.28	.41
Tincture or oils	−0.09	.91	−0.04	.82	0.19	.30	−0.12	.53	0.09	.67	−0.25	.23	0.04	.85
Vaping	0.04	.96	−0.13	.44	−0.06	.70	0.19	.27	−0.03	.89	−0.11	.58	0.18	.30
Primary reason for use														
Medical	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Recreational	1.03	.15	0.22	.14	0.21	.18	0.01	.93	0.27	.13	0.29	.11	0.03	.83
Cannabinoid														
THC dominant	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Both THC and CBD	0.32	.57	0.06	.61	0.11	.39	0.15	.24	0.21	.14	0.06	.69	−0.26	.03*
CBD dominant	0.28	.77	0.09	.66	−0.07	.74	0.15	.50	0.21	.40	0.01	.96	−0.10	.64
Total comorbidities (continuous)	−0.44	.04*	−0.03	.44	−0.05	.33	−0.08	.08	−0.11	.04*	−0.09	.09	−0.08	.07

BMI = body mass index; CBD = cannabidiol; FSFI = female sexual function index; OR = odds ratio; PCP = primary care physician; THC = tetrahydrocannabinol.
Comorbidities included hypertension, diabetes, heart disease, arthritis, lung disease, kidney disease, thyroid disease, hypercholesterolemia, cancer, neurologic disease, liver disease, depression, and anxiety.
Region represents primary residence.
*Significant ($P < .05$)

Table 3. Multivariable logistic regression identifying factors associated with female sexual dysfunction (FSFI total < 26.55)

Characteristic	OR (95% CI)	*P* value
Age, y		
<30	Ref	
30–39	1.65 (0.73–3.77)	.22
40–49	0.85 (0.37–2.02)	.71
50–59	1.76 (0.73–4.38)	.21
60+	1.28 (0.48–3.42)	.62
Race		
White	Ref	
Black	2.52 (0.69–8.3)	.14
Hispanic	0.51 (0.20–1.19)	.14
Other	1.71 (0.78–3.67)	.17
Relationship status		
Married/relationship	Ref	
Single	0.66 (0.33–1.27)	.23
Unknown	1.01 (0.05–9.08)	1.00
Region		
West	Ref	
International	0.66 (0.32–1.35)	.27
Midwest	0.36 (0.12–0.95)	.05
Northeast	0.63 (0.31–1.24)	.19
South	0.71 (0.36–1.40)	.34
BMI		
Normal	Ref	
Underweight	2.45 (0.43–11.85)	.28
Overweight	1.04 (0.57–1.85)	.91
Obese	0.94 (0.43–1.99)	.87
Extremely obese	1.12 (0.47–2.53)	.79
Tobacco use		
Never	Ref	
Current	0.48 (0.18–1.16)	.12
Former	1.04 (0.63–1.70)	.88
PCP visits in last 3 mo		
0	Ref	
1	1.33 (0.78–2.29)	.30
2+	0.99 (0.47–2.03)	.99
Cannabis use frequency (continuous)	0.79 (0.68–0.92)	.002*
Method of consumption		
Smoking flower	Ref	
Edibles	1.42 (0.65–3.02)	.37
Other	1.06 (0.32–3.22)	.92
Smoking concentrates	1.63 (0.55–4.48)	.35
Tincture or oils	1.2 (0.57–2.52)	.62
Vaping	1.01 (0.48–2.05)	.99
Cannabinoid		
THC dominant	Ref	
Both THC and CBD	0.64 (0.38–1.09)	.10
CBD dominant	1.34 (0.58–3.05)	.49
Total comorbidities (continuous)	1.26 (1.05–1.52)	.02*

BMI = body mass index; CBD = cannabidiol; FSFI = female sexual function index; OR = odds ratio; PCP = primary care physician; THC = tetrahydrocannabinol.

Comorbidities included hypertension, diabetes, heart disease, arthritis, lung disease, kidney disease, thyroid disease, hypercholesterolemia, cancer, neurologic disease, liver disease, depression, and anxiety.

Region represents primary residence.

*Significant ($P < .05$)

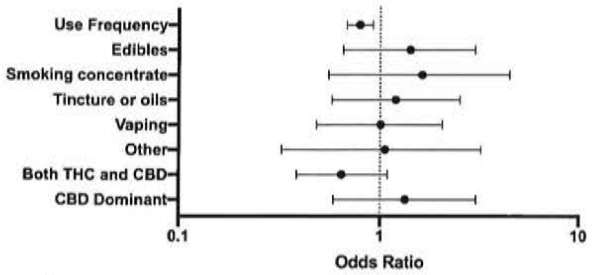

Figure 1. Forest plot demonstrating results of multivariable logistic regression with regard, to factors associated with female sexual dysfunction (FSFI total < 26.55). CBD = cannabidiol; FSFI = female sexual function index; THC = tetrahydrocannabinol.

including desire domain ($\beta = 0.09$, SE = 0.04, $P = .02$), arousal domain ($\beta = 0.14$, SE = 0.04, $P = .0002$), orgasm domain ($\beta = 0.14$, SE = 0.04, $P = .002$), and satisfaction domain ($\beta = 0.13$, SE = 0.04, $P = .003$). The method of consumption, cannabis chemovar, or primary reason for consumption did not consistently impact FSFI scores.

The odds of female sexual dysfunction, as defined by a FSFI total score less than 26.55, were assessed using logistic regression (Table 3). For each additional step of cannabis use intensity (ie, times per week), the odds of reporting female sexual dysfunction declined by 21% (odds ratio [OR]: 0.79, 95% confidence interval [CI]: 0.68–0.92, $P = .002$). In addition, having more comorbidities was associated with higher odds of sexual dysfunction (OR: 1.26, 95% CI: 1.05–1.52, $P = .02$). The methods of use and chemovar type were not associated with odds of developing sexual dysfunction (Figure 1).

DISCUSSION

To our knowledge, this study is the first to use a validated questionnaire to assess the association between female sexual function and aspects of cannabis use including frequency, chemovar, and indication. In this survey of more than 400 women, we found a dose response relationship between increased frequency of cannabis use and reduced odds of female sexual dysfunction. In addition, while the increase in index scores was small (and possible below clinical significance for some domains), increased cannabis use was associated with improved sexual desire, arousal, orgasm, and overall satisfaction as well as overall improved FSFI scores as compared with less frequent users. Older women and those with more comorbidities tended to have more sexual dysfunction. Importantly, our study did not find an association between cannabis chemovar (eg, THC vs CBD dominant), reason for cannabis use, and female sexual function.

As cannabis use has been shown to be associated with increased sexual frequency in the United States, it is possible this may cause positive effects on sexual experiences.[7] Much of the research focusing on sexual function and experiences with regard to cannabis began in the 1970s and 1980s. Cannabis' potential positive effect on female sexual function was noted as early as 1970 by Tart[19] who sought to describe the common experiences of cannabis users. He noted in interviews with college students that orgasms are improved, arousal increases, and "sexual feelings are much stronger" leading to more satisfaction. Although this was a small, non-controlled qualitative study without detailed cannabis use characterization, it was suggestive of cannabis' positive effect on female sexual function and is consistent with the current report. In a similar interview-based study with 37 female cannabis, the authors found that frequent users (>5 times per week) reported increased sexual pleasure, orgasms, satisfaction, and intimacy compared with less frequent users (<5 times per week).[20] However, this observation did not reach statistical significance. However, in interviews in 84 graduate students, of which 18 were female students, heavy users of cannabis tended to report more positive sexual experiences (ie, pleasure and intensity of orgasm) compared with lower intensity users.[21] These findings are similar to those by Koff[22] who, in a survey of 128 women, found that users of cannabis tended to enjoy sexual activity more than non-users. Interestingly, unlike most studies, he assessed if method of consumption had any impact on sexual experiences (eg, method of smoking and ingestion), and similar to the findings reported here, found no impact. However, the issue with these early studies has been that they represent a small, select sample size, and use non-validated questionnaires in an interview format.

More recently, researchers have used survey instruments to examine the effect of cannabis on female sexual function. However, many of these studies still do not use validated instruments or use sets of individual questions from them resulting in inconsistent findings. Johnson et al[23] surveyed 1,801 women asking specifically about sexual dysfunction and substance use. Although there was no significant increase in sexual dysfunction among cannabis users (10% of the survey respondents), inhibited orgasm (OR: 1.76, 95% CI: 1.12–2.74) and dyspareunia (OR: 1.69, 95% CI: 1.13–2.55) were more common among female cannabis users. This is in contrast to the present study that found orgasm to be improved in more frequent users, whereas pain during sexual activity was unaffected. In contrast, Lynn et al[10] surveyed 373 women (127 users of cannabis) and reported that frequent users had improved orgasms (OR: 2.10, 95% CI: 1.01–4.44). Other realms of sexual function, such as satisfaction, sex drive, lubrication, and dyspareunia, were not impacted by either use vs not or frequency of use. An Australian survey of 8,650 men and women, of which 754 reported cannabis use, found no association between cannabis use and sexual dysfunction in women when comparing users vs non-users as well as frequency of use.[13] While sexual dysfunction was assessed, a validated questionnaire was not used to obtain composite scores. In contrast to these studies, Johnson et al,[23] who asked questions specifically about female sexual dysfunction, found that cannabis use was associated with inhibited orgasm in a survey of more than 1,500 women.

The exact mechanisms by which cannabis may increase sexual function in women is unknown. The endocannabinoid system

has been postulated to be involved in female sexual function, and prior studies have demonstrated that increased amounts of endogenous cannabinoids such as arachidonoyl ethanolamide and 2-arachidonoylglycerol are associated with increased sexual arousal.[9] Exogenous use may similarly lead to activation of the endocannabinoid system leading to increased sexual function as we found here. As many patients use cannabis to reduce anxiety, it is possible that a reduction in anxiety associated with a sexual encounter could improve experiences and lead to improved satisfaction, orgasm, and desire.[24] Similarly, THC can alter the perception of time which may prolong the feelings of sexual pleasure.[25] Finally, CB1, a cannabinoid receptor, has been found in serotonergic neurons that secretes the neurotransmitter serotonin, which plays a role in female sexual function thus activation of CB1 may lead to increased sexual function.[12]

Several limitations of the present study warrant mention. Our cohort of women was derived from a population of cannabis users who made a purchase at a single-partner cannabis dispensary during a specific time period that may represent a unique subset of cannabis users especially as prior reports show lower prevalence of cannabis use in the general population introducing possible selection bias. In addition, while respondents had purchased a product at the partner dispensary, the specific locations from which respondents purchased their product is unknown. However, the population was geographically diverse and was not representative of only 1 region within the United States. Any survey distributed in such a manner is subject to volunteer and recall bias. Although respondents were asked about chemovar, it is possible some respondents did not know the dominant chemovar in the product they purchased thus altering the results. In addition, while frequency was assessed the exact dosage of product (eg, milligrams of THC), duration of use or chronicity is unknown. The impact of frequency of use on sexual function was compared by dichotomizing less frequent and more frequent users with no comparison to a non-user control group. It is possible that inclusion of a non-user population may alter the findings. In addition, we cannot exclude the possibility of causation in that more frequent female cannabis users happen to have higher FSFI scores rather than causal relationship. Although the multivariable linear regression was adjusted for available factors, residual confounders may exist that were not examined and therefore alter the results. While the FSFI is the most commonly used female sexual function survey, it is not the only one (eg, Sexual Quotient-Female and Golombok Rust Inventory of Sexual Satisfaction), and use of another validated survey may yield differing results. Althoough the FSFI cutoff of 26.55 for female sexual dysfunction has been validated and was examined here in associated with frequency of cannabis use, the clinical significance in FSFI subdomain scores is unknown. Although other aspects of sexuality were not assessed, such as vaginismus, this would be a potential area for future study.[26] Finally, while the survey assessed cannabis use within the last 4 weeks, it did not differentiate between chronic and new users.

Our results demonstrate that increasing frequency of cannabis use is associated with improved sexual function and is associated with increased satisfaction, orgasm, and sexual desire. Neither, the method of consumption nor the type of cannabis consumed impacted sexual function. The mechanism underlying these findings requires clarification as does whether acute or chronic use of cannabis has an impact on sexual function. Whether the endocannabinoid system represents a viable target of therapy through cannabis for female sexual dysfunction requires future prospective studies though any therapy has to be balanced with the potential negative consequences of cannabis use.

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STATEMENT OF AUTHORSHIP

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SUPPLEMENTARY DATA

Supplementary data related to this article can be found at https://doi.org/10.1016/j.esxm.2020.06.009.

WOMEN'S SEXUAL HEALTH

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

Check for updates

Becky K. Lynn, MD,[1] Julia D. López, PhD, MPH, LCSW,[2] Collin Miller, MSW,[3] Judy Thompson, RN, CCRC,[3] and E. Cristian Campian, MD, PhD[4]

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.[1] 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[2] 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.[2]

Endocannabinoids, which are structurally similar to marijuana, are known to help regulate sexual function.[3] 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†				.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‡				.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§				.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^2, Fisher's exact test, and 1-way ANOVA. Significant at the $P < .05$ level.
†3 participants were missing for race and quality of life.
‡21 participants were missing for sexual orientation.
§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.[3] 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.[4] 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.[5] Most recently, Klein et al[6] 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[7] 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)[8] assesses several domains of sexual function, but it does not address specifically marijuana or other substance usage. The Golombok Rust Inventory of Sexual Satisfaction[9] 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

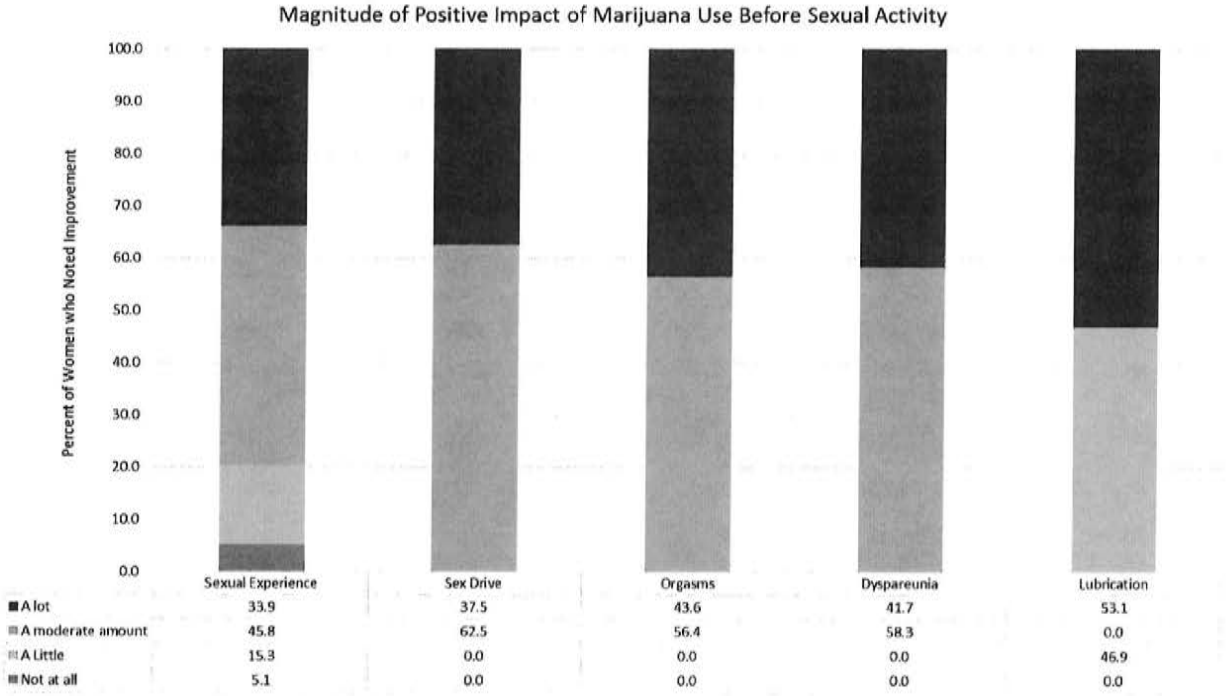

Figure 1. Magnitude of positive impact of marijuana use before sexual activity.

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, χ 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.
*χ^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.
*χ^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,[2] 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.[2] 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[10] 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.[10] Finally, Koff[11] 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.[11] Interestingly, Sun and Eisenberg[12] 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.[13] It may slow the temporal perception of time and prolong the feelings of pleasurable sensations.[5,14] It may lower sexual inhibitions and increase confidence and a willingness to experiment.[7] Marijuana is also known to heighten

sensations such as touch, smell, sight, taste, and hearing.[15] Although this was not specifically addressed in this article, according to Halikas et al,[5] 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.[16] 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.[17,18]

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.[19,20] Activation of cannabinoid receptors has been shown to enhance dopamine,[19] 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.[21,22] Serum levels of endocannabinoids have been correlated with both subjective and objective measures of arousal.[6]

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 though 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 in overall experience, sex drive, orgasm and pain.

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How Cannabis Alters Sexual Experience: A Survey of Men and Women

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Ellen Wiebe, MD,[1] and Alanna Just, MPhil[2]

ABSTRACT

Introduction: Cannabis is reported to enhance sexual function; yet, previous studies have shown that physiological and subjective indices of sexual arousal and motivation were associated with decreased availability of circulating endocannabinoid concentrations.

Aim: To explain this contradiction, we evaluated which aspects of sexual experience were enhanced or diminished by cannabis use.

Methods: We used an online questionnaire with a convenience sample of people who had experience with cannabis. We asked questions regarding various aspects of sexual experience and whether they are affected by cannabis. We also asked about sexual dysfunction.

Main Outcome Measure: Aspects of participant sexual experience enhanced by cannabis.

Results: We analyzed results from 216 questionnaires completed by people with experience using cannabis with sex. Of these, 112 (52.3%) said they used cannabis to alter their sexual experience. Eighty-two participants (38.7%) said sex was better, 34 (16.0%) said it was better in some ways and worse in others, 52 (24.5%) said it was sometimes better, and only 10 (4.7%) said it was worse. Of 202 participants, 119 (58.9%) said cannabis increased their desire for sex, 149 of the 202 participants (73.8%) reported increased sexual satisfaction, 144 of 199 participants (74.3%) reported an increased sensitivity to touch, and 132 of 201 participants (65.7%) reported an increased intensity of orgasms. Out of 199 participants, 139 (69.8%) said they could relax more during sex, and 100 of 198 participants (50.5%) said they were better able to focus. Of the 28 participants who reported difficulty reaching orgasm, 14 said it was easier to reach orgasm while using cannabis, but only 10 said that sex was better.

Clinical Implications: The information in this study helps clarify which aspects of sexual function can be improved or interfered with by cannabis use.

Strengths & Limitations: We asked about specific sexual effects of cannabis and were therefore able to understand the paradox of how cannabis can both improve and detract from sexual experience. Limitations of this study include bias that may have been introduced because the sample included only people who responded to the advertisements; it may not represent the general population of people who use cannabis. Moreover, over one-third of our sample said they use cannabis daily and so represent heavier than average users.

Conclusion: Many participants in our study found that cannabis helped them relax, heightened their sensitivity to touch, and increased intensity of feelings, thus enhancing their sexual experience, while others found that cannabis interfered by making them sleepy and less focused or had no effect on their sexual experience. **Wiebe E, Just A. How Cannabis Alters Sexual Experience: A Survey of Men and Women. J Sex Med 2019; 16:1758–1762.**

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Key Words: Cannabis; Sexual Experience; Sexual Dysfunction

INTRODUCTION

Cannabis has a reputation for enhancing sexual function. Several surveys in the 1970s found that both men and women reported that using cannabis enhanced their sexual experience.[1,2] Women reported greater increases in desire and satisfaction than men.[3] Various hypotheses for why people report cannabis-related enhancement of sexual experiences include the effect of cannabis

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Table 1. Participant demographic information

Demographic	Frequency	Percent of respondents
Gender (n = 211)		
Female	133	63
Male	76	36
Transgender	2	1
Education (n = 210)		
Some high school	5	2.4
High school diploma/General Education Development	15	7.1
Some college/university	77	36.7
College/university degree	113	53.8
Ethnic origin (n = 193)		
White/Caucasian	141	73.1
South or East Indian	52	26.9
Born in Canada (n = 209)		
Yes	142	67.9
No	67	32.1

Table 2. Participant responses regarding cannabis use

Participant responses	Frequency	Percent of respondents
Frequency of cannabis use (n = 217)		
Daily	82	37.8
Most weeks	51	23.5
Sometimes	57	26.3
Not any more	27	12.4
Experience using cannabis during sex? (n = 216)		
Yes	209	96.8
No	7	3.2
Have you used cannabis specifically to alter your sexual experience? (n = 217)		
Never	104	47.9
Rarely	27	12.4
Occasionally	64	29.5
Usually	15	6.9
Always or almost always	7	3.2
Do you prefer to be high on cannabis when you have sex? (n = 209)		
Yes	86	41.1
No	123	58.9
How has using cannabis altered your sexual experience? (n = 212)		
Better	82	38.7
No change	34	16.0
Worse	10	4.7
Better in some ways, worse in others	34	16.0
Sometimes better but at other times no change or worse	52	24.5

on heightened perceptions, time distortion, relaxation, and decreased inhibition.[1] A large survey of 8,656 Australians found that daily cannabis use was associated with having more sexual partners and sexually transmitted infections. Moreover, daily cannabis use was related to increased reports of difficulty reaching orgasm in men but was unrelated to sexual problems in women.[4]

Conversely, a more recent study showed that increases in both physiological and subjective indices of sexual arousal were significantly associated with decreased endocannabinoid concentrations.[5] In rodents, studies have shown that sexual motivation is decreased following cannabinoid administration and increased following cannabinoid receptor antagonism.[6,7]

Cannabis (or marijuana) is commonly used. The 2015 National Survey on Drug Use and Health in the United States reported that 22.2 million Americans had used cannabis in the previous month.[8] In many jurisdictions, including Canada, where this study was conducted, and in 13 US states, cannabis is legal for recreational use.[9,10] The leaves and flowering tops of cannabis plants contain at least 489 distinct compounds, distributed among 18 different chemical classes and harboring more than 70 different phytocannabinoids.[11] The main cannabinoids are delta-9-tetrahydrocannabinol and cannabidiol. Endogenous cannabinoids (or endocannabinoids) bind to the same receptors as those of tetrahydrocannabinol, the psychoactive component of cannabis. There are cannabinoid receptors in the ovary, endometrium, and myometrium,[12,13] and this may be relevant to sexual effects.

The purpose of this study was to explore what people experience when using cannabis with sex and whether they specifically use cannabis to enhance sexual experience. We hypothesized that cannabis use has both negative and positive effects on sexual experience and that the positive effects would be greater than the negative ones.

METHODS

This study consisted of an online questionnaire for people in the community who had experienced using cannabis during sex. The questionnaire included demographic questions plus questions regarding frequency of cannabis use, purposes for cannabis use, whether participants engaged in sexual activity while under the influence of cannabis, and whether cannabis use enhanced, interfered with, or made no difference in their sexual experience. We designed the survey with input from a sexologist colleague and pilot tested it before posting.

Men and women were recruited from various sites using various methods: word of mouth, posters in cannabis retail outlets, cannabis advocacy groups, women's groups, university bulletin boards, and a classified advertisement website (Craigslist). In the cannabis shops, we talked to the vendors (shop managers) and, if permitted, posted the study information with the URL link to the online questionnaire (using SurveyMonkey). When contacting people by e-mail (eg, through word of mouth, advocacy groups) the link was given. No identifying information was collected.

Table 3. Aspects of participant sexual experience that were enhanced by cannabis use

Aspect of sexual experience that was enhanced	Frequency	Percent of respondents
Desire for sex (n = 202)	119	58.9
Sexual satisfaction (n = 202)	149	73.8
Vaginal lubrication (n = 153)	44	28.8
Erectile function/hardness (n = 133)	49	36.8
Sensitivity to touch (n = 199)	144	74.3
Intensity of orgasm (n = 201)	132	65.7
Ability to orgasm (n = 195)	86	44.1
Ability to relax during sex (n = 199)	139	69.8
Ability to focus during sex (n = 198)	100	50.5
Sexual confidence (n = 198)	107	54.0
Emotional closeness to partner (n = 197)	117	59.4

Data from the questionnaires were entered into an SPSS Statistics 25 (IBM Corp; Armonk, NY) database by a research assistant, and descriptive statistics were prepared. We used *t*-tests for continuous variables and chi-square tests for categorical variables to compare men to women. For the open-ended questions on the questionnaire, thematic analysis was used. The 2 investigators began by looking at the whole, then use detailed coding to discover themes.[14–16] Investigators met several times to discuss and revise themes until a consensus was reached.

RESULTS

Out of the 373 respondents, 350 said they had previously used cannabis, and only responses from these respondents were analyzed (see Table 1 for demographic information). The ages of respondents ranged from 17 to 75 years, with a mean of 29.9 years and a median of 25 years. The majority of participants (96.8%) had experience using cannabis during sex, 52.3% of whom reported using cannabis specifically to alter their sexual experience. When asked how cannabis affected sex, 16.0% of the 212 respondents said sex was better, 16.0% said it was better in some ways and worse in others, 24.5% said it was sometimes better in some ways and worse in others, and 4.7% said it was worse (Table 2).

Participants were asked how specific aspects of their sexual experience were altered by cannabis use during sex (Table 3). Participants reported an increased desire for sex (n = 119 of 202), increased sexual satisfaction (n = 149 of 202), increased vaginal lubrication for women (n = 44 of 153), increased erectile function/hardness for men (n = 49 of 133), increased sensitivity to touch (n = 144 of 199), increased intensity of orgasms (n = 132 of 201), increased ability to orgasm (n = 86 of 195), increased ability to relax during sex (n = 139 of 199), increased ability to focus during sex (n = 100 of 198), increased sexual confidence (n = 107 of 198), and increased emotional closeness to their partner (n = 117 of 197). Only 2 aspects differed significantly between men and women; 62 out of 122 women (50.8%) said that it was easier to reach orgasm when using cannabis, but only 22 out of 70 men (31.4%) did ($P = .038$). Additionally, 37 out of 127 women (29.4%) said it was more

Table 4. Open-ended questions and participant responses

Theme	Participant response
Cannabis increases sensitivity and intensifies the experience.	The occasional night of stoned sex can be incredibly loving, intimate, and intense.
	More physically intense, emotionally intimate, rhythmic. I am able to last longer and am more interested in giving oral sex and extending foreplay.
	Be more present. More pleasure.
Relaxation improves the experience.	[I am] more relaxed and engaged in the act, more likely to let go = higher chance of orgasm.
	It's a lot easier to come, both because I get out of my own head a bit and because physically I'm just more in the moment and more sensitive.
Cannabis improves or worsens focus and that affects sexual pleasure.	It helps the mind focus on the pleasure of touch. Every sense is heightened, you feel light and warm and in the moment of bliss.
	Sex can be much better, but as a woman who has to focus to reach orgasm, doing so is more difficult. That being said, when it does happen it is more intense.
Cannabis can interfere with sexual pleasure; this interference is often related to using too much.	It depended. Sometimes it enhanced the experience, sometimes I became self-conscious and paranoid and it detracted from the experience.
	Sometimes when stoned and having sex I lose my concentration and stop for some reason.
	Too distracted to be completely present.
	I'm usually too tired from the marijuana to be in the mood.
	Too much makes it worse, but just a little bit makes it better.

difficult to focus during sex compared to 8 out of 70 men (11.4%) ($P < .03$).

We asked questions regarding sexual dysfunction to determine whether people used cannabis to treat this condition. Eight people (7 women and 1 man) reported that sex was often painful. Of these 8 people, all said they were better able to relax when using cannabis. Seven reported increased sexual satisfaction, 6 reported increased focus, 6 reported increased emotional closeness to their partner, and 5 said it was easier to have an orgasm when using cannabis. Twenty-eight people reported difficulty reaching orgasm; of these, 14 said it was easier to reach orgasm when using cannabis. Ten said that sex was better, 7 said that sex was better in some ways and worse in others, 6 said that sex was better sometimes and not others, 4 reported no changes, and 1 said that sex was worse when using cannabis.

In response to open-ended questions and comments, people expanded on their answers, and we were able to identify several themes (Table 4). The most important theme was that cannabis increased sensitivity and intensified the sexual experience. The next most important theme was about how relaxation improved the sexual experience. Many people commented on how cannabis could improve or worsen focus and how that affected sexual pleasure. The descriptions of how cannabis could interfere with sexual pleasure were varied but appeared to be mostly about using too much.

DISCUSSION

The general impression that sex is better with cannabis does not fit with what we know about the physiological responses to cannabinoids.[5–7] The results from this survey shed some light on this contradiction. The reports of increased sensitivity to touch and intensity of feelings, both of orgasms and emotional closeness, would logically improve sexual experience. The relaxation described would likely improve sexual experiences in stressful situations and in anxious people. Reports of enhanced focus or increased distraction may relate to the amount of cannabis used or individual reactions to cannabis. This is also true of reported sleepiness and paranoia. None of these reactions to cannabis is specifically related to physiological sexual response, but they do impact sexual experience. We found only a few differences between men and women, with women having more difficulty with focus and less difficulty achieving orgasm when using cannabis. This may be due to women needing more focus, and, as a result, women may have more difficulty achieving orgasm. This survey is limited by being a convenience sample of people who responded to the advertisements. As such, it may not represent the general population of people who use cannabis. Over one-third of our sample said they used cannabis daily and so represent heavier than average users. Further research is needed to delineate the different effects of cannabis on sexual experience and more specifically on sexual dysfunction.

CONCLUSION

In this survey of people who had used cannabis with sex, the majority found that cannabis helped them relax, heightened sensitivity to touch, and increased intensity of feelings, thus enhancing sexual experience. Others found that cannabis made them sleepy, less focused, and distracted, and some reported no change in their experience.

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ORIGINAL PAPER

A Qualitative Investigation Comparing Psychosocial and Physical Sexual Experiences Related to Alcohol and Marijuana Use among Adults

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Abstract Alcohol and marijuana are two of the most prevalent psychoactive substances and each may result in distinct psychosocial and physical sexual experiences and different sexual risk behaviors. With marijuana becoming more accepted in the US along with more liberal state-level policies, it is important to examine and compare users' psychosocial and physical sexual experiences and sexual risk behavior associated with these drugs. In this study, we interviewed 24 adults who recently used marijuana before sex. Participants were 50 % female and all self-identified as heterosexual and HIV-negative. Using thematic analysis, we compared self-reported psychosocial and physical sexual experiences of alcohol and marijuana. Participants described differences between drugs with regard to psychosocial (e.g., partner interactions and contexts before sex, partner choice, perceived attractiveness of self and others, disinhibition, and feelings of regret after sex) and physical sexual experiences (e.g., sexual dysfunction, dose effects, sensations of body/sex organs, length and intensity of sex, and orgasm). Alcohol use was commonly associated with social outgoingness and use facilitated connections with potential sexual partners; however, alcohol was more likely than marijuana to lead to atypical partner choice or post-sex regret. Both alcohol and marijuana had a variety of negative sexual effects, and the illegality of marijuana reportedly facilitated intimate encounters. While sexual experiences tended to be similar across males and females, we did find some variation by gender. Results can inform prevention and harm reduction programming that will allow us to design more realistic programs and to craft interventions, which guide potential users to make safer choices.

Keywords Marijuana · Alcohol · Risk behavior · Orgasm · Sexual dysfunction

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Introduction

Cannabis (marijuana) use and approval toward use have recently increased in the US (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2014). The majority of adults in the US now support marijuana legalization (Motel, 2014; Palamar, 2014; Palamar, Ompad, & Petkova, 2014b), four states and the District of Columbia have legalized recreational use, and at least 24 other states have legalized medical marijuana or decriminalized recreational use. Correlational studies have linked marijuana use to risky sexual behavior (e.g., Castilla, Barrio, Belza, & de la Fuente, 1999; Kingree & Betz, 2003; Smith et al., 2010), but richer data are needed to investigate these associations. Since the landscape is changing, and marijuana continues to increase in popularity; research is needed to continue to examine if and how marijuana use may influence risk for unsafe sexual behavior. A novel method is to compare the psychosocial and physical sexual experiences of marijuana to the experiences related to the most prevalent intoxicating substance—alcohol.

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Nationally, two-thirds of 18-year olds have consumed alcohol and half of 18-year olds report ever being drunk (Johnston et al., 2014; Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015). Risky drinking increases throughout young adulthood (age 19–28) with 64 % of young adults getting drunk in the last year. Likewise, in 2013, nearly half (44 %) of 18-year olds reported using marijuana in their lifetime and 35.1 % reported use in the last year. Roughly two-thirds of adults have used marijuana by age 30 (Johnston et al., 2014; Miech et al., 2015).

A robust literature suggests that drinking—particularly binge drinking—places individuals at risk for engaging in high-risk sexual behaviors (e.g., Pedrelli et al., 2011; Tran, Nehl, Sales, & Berg, 2014). Alcohol has been shown to diminish both social and sexual inhibitions (Coleman & Cater, 2005), and it is also commonly used to boost confidence and to cope with emotions such as fear of rejection by potential sexual partners (Lewis et al., 2008). Coleman and Cater conducted a qualitative study and found that alcohol consumption tends to alter perception of potential partner's attractiveness. They also found that alcohol is often used as an "excuse" for certain sexual behaviors; it impairs judgment (e.g., ability to detect a risky situation), and use can lead to a loss of control (e.g., blacking out). Alcohol consumption is often associated with high-risk sexual behaviors, such as unplanned sex, having casual sex, multiple partners, and a decrease in protective behaviors (e.g., condom use) (Cooper, 2002; Dermen & Cooper, 2000; Mutchler, McDavitt, & Gordon, 2013; Rehm, Shield, Joharchi, & Shuper, 2012; Townshend, Kambouropoulos, Griffin, Hunt, & Milani, 2014). Findings from an older national survey of more than 17,000 college-age students found that heavy drinkers were nearly three times as likely to engage in these types of behaviors (Wechsler, Dowdall, Davenport, & Castillo, 1995). Alarmingly, about half (46 %) of acquaintance rapes have occurred when one or both parties have been drinking alcohol (Lanutti & Monahan, 2002). Hingson, Zha, and Weitzman (2009) found that every year roughly 97,000 students between the ages of 18 and 24 are victims of alcohol-related assault or date rape.

While extensive research has been conducted on the sexual risks associated with alcohol use, less research has focused on how marijuana use impacts sexual behavior. Many studies link marijuana use to sexual risk behavior, but often in an indirect, correlational manner. For example, many studies suggest that individuals who have used marijuana (e.g., in the last year) tend to report having had more partners (Bedoya et al., 2012; Brodbeck, Matter, & Moggi, 2006; Castilla et al., 1999; Poulin & Graham, 2001; Tyurina et al., 2013), or report engaging in sex without a condom (Castilla et al., 1999). Some studies have even concluded that marijuana use may be riskier, sexually, than alcohol (Kingree & Betz, 2003; Kingree, Braithwaite, & Woodring, 2000). Few studies, however, have examined the psychosocial and physical sexual experiences related to marijuana use, and to our knowledge, no empirical studies have compared alcohol and marijuana with regard to potential psychosocial and physical sexual experiences, which in turn may affect (risky) sexual behavior. Likewise, to our knowledge, no qualitative studies of marijuana use have focused on the details of sexual effects or sexual interactions, or to the situations prior to sexual encounters, and this information is needed to help inform prevention and harm reduction. Despite increasing use and major policy changes, research on marijuana-related psychosocial and physical sexual experiences is limited. Continued research on the sexual effects of marijuana is warranted because more individuals may become at increased risk for potential adverse sexual outcomes in light of increasing popularity. Here we aim to compare psychosocial and physical sexual experiences (in a qualitative manner) to inform prevention in a time that marijuana use is gaining prevalence and acceptance.

Method

Participants

We interviewed 24 adults who were recruited online via CraigsList in New York City. Eligible participants (1) were ages 18–35, (2) spoke English; (3) must have engaged in sexual intercourse while high on marijuana within the last 3 months, and (4) must have engaged in sexual intercourse within the last 3 months while not high on marijuana. Reporting use of other illicit drugs in the last 3 months was exclusionary. Sex was defined as any sexual activity (involving some form of genital contact) with another individual that can result in orgasm in either individual. HIV serostatus and sexual orientation were not inclusion criteria.

Sample demographics are presented in Table 1. The sample was 50 % female, 10 (42 %) identified as White, 11 (46 %) Black, and 3 (12 %) identified as Hispanic. The mean age was 27.4 years ($SD = 5.8$) and marijuana had been used on average of 10.1 years ($SD = 6.7$). All participants self-reported being HIV-negative and heterosexual.

Measure and Procedure

The sample was stratified by sex and a male research assistant (RA) interviewed male participants and a female RA interviewed female participants. Data for this study were collected via in-depth interviews using a semi-structured interview guide. Following the conventions of Grounded Theory (Strauss & Corbin, 1990), we a priori set a number of predefined core questions, and the interview guided RAs to ask about additional topics that arose. When possible, the trained RAs probed for details and elaboration. This analysis focuses on a series of questions at the end of the structured interview, which focused on comparisons between marijuana- and alcohol-related psychosocial and physical sexual experiences. Specifically, participants were asked open-ended) to compare what sex is like on alcohol compared to sex on marijuana. The interviewers also used a series of probes to follow-up on factors of interest not discussed by the participant

Table 1 Sample characteristics ($N = 24$)

	Full sample *n* (%)	Males *n* (%)	Females *n* (%)
Age, years *M* (SD)	27.4 (5.8)	27.1 (6.3)	27.8 (5.6)
Gender			
Male	12 (50.0)	12 (100.0)	0 (0.0)
Female	12 (50.0)	0 (0.0)	12 (100.0)
Race/ethnicity			
White	10 (41.7)	5 (41.7)	5 (41.7)
Black	11 (45.8)	7 (58.30	4 (33.3)
Hispanic	3 (12.5)	0 (0.0)	3 (25.0)
Heterosexual sexual orientation	24 (100.0)	12 (100.0)	12 (100.0)
HIV-negative (self-report)	24 (100.0)	12 (100.0)	12 (100.0)
Years using marijuana *M* (SD)	10.1 (6.7)	10.9 (7.9)	9.3 (5.4)

There were no significant differences by gender

M mean, *SD* standard deviation

(probes listed in Table 2). Interviews were recorded and professionally transcribed.

Data Analysis

Analysis of transcripts focused on identifying patterns based on the entire sample using a multilevel process (Miles & Huberman, 1994). Two raters independently coded text into relevant topics/categories, which were largely predetermined by the structured interview questions. Dominant and repeated codes were then categorized into themes. Quotations that fit with specific topics and themes were then cataloged to form a comprehensive picture. After a consensus was reached regarding occurrences and classification of codes and themes, quotations in each domain were summarized. Data were analyzed utilizing Atlas.ti software. Since this was a relatively small sample, results are highly descriptive in nature (Sandelowski, 2000). Despite the relatively small sample size, when possible we examined whether there were potential differences by gender.

Results

We classified our codes into three themes—psychosocial experiences, physical experiences, and behavior. We first present and compare self-reported psychosocial experiences as the majority relate to situations prior to the physical sexual encounter(s).

Psychosocial Experiences

Self-Perception of Attractiveness

Participants often described themselves as feeling more attractive after use of alcohol or marijuana. Many participants—males and females—reported feeling sexier after use of marijuana, but this was more commonly related to use of alcohol. While many participants noted that they see others as being more attractive while they are on alcohol or marijuana (discussed below in the *Partner Choice* section), some mentioned that feeling more attractive or sexy after use (particularly of alcohol) increased the likelihood of having sex with individuals with whom they would not normally have sex. One female stated: she felt so attractive on alcohol that she feels she is the "diva of the party," yet another stated: she felt like the "sexiest woman on the planet" while high on marijuana. So both drugs appear to be potentially associated with increased feelings of self-attractiveness, but possibly more so for alcohol.

> When I'm drunk, I'm drunk, so I'm like, "I'm hot." Then with weed, I usually feel more sexy…and happy. You usually feel a little sexier, a little bit more turned on and ready to have sex, instead of being self-conscious. (Female, White, 32)

> When I'm drinking…I feel like I'm the prettiest person in the world, like no one has anything on me. I'm just so confident. (Female, Hispanic, 26)

While males also tended to suggest feeling more physically attractive, one male suggested that the confidence he feels from alcohol is what he feels makes him more attractive. Similarly, with regard to marijuana, one male mentioned that smoking marijuana makes him attractive because it makes him more relaxed, nonchalant, and less needy, and another mentioned females tell him he is sexy during the act of smoking marijuana. However, one male mentioned that while drinking helped numb his insecurities, smoking could actually increase his body image issues. Although the same male pointed out that "acting stupid" and blacking out on alcohol could make one appear unattractive, which he compared to the "less-unattractive" characteristic of having squinty eyes on marijuana.

Table 2 Questions and probes used to assess and compare sexual experiences of alcohol and marijuana

Questions and probes
Can you compare what it is like to have sex on marijuana compared to sex on alcohol?
Follow-up probes to initial question:
Do they prefer sex while high on either?
Compare how these drugs affect the kinds of partners they have
Compare how these drugs affect interactions leading to sex (and whether use of either drug is used for sex or to meet someone to have sex)
Compare whether either drug makes them feel more sexually (or socially) attractive
Compare whether they find partners more sexually (or socially) attractive on either drug
Compare how these drugs affect libido/sex drive
Compare how these drugs affect inhibitions (socially or sexually)
Compare how these drugs affect specific sexual acts
Compare potential sexual dysfunction (e.g., penile and vaginal) associated with each drug
Compare sensations (overall body and sexual organ-specific) and emotions experienced related to use of each drug
Compare length and intensity of sex and orgasm related to use of each drug
Compare how dose (amount used) of each drug affects sex
Probe for black-outs, physical effects (e.g., sensations/numbness, impotence, nausea, and dizziness), wakefulness, decision-making ability, superficial effects like smell)
Compare how participants normally feel after sex on these drugs
Probe for satisfaction
Compare potential regret after sexual experiences on these drugs
Probe for regret about partners, specific acts, and protection
Ask whether they feel one drug leads to riskier sexual situations
Probe for unprotected sex and riskier partners
Compare interactions after sex on each drug
Probe for embarrassment, "beer" goggle effect for either drug, attractiveness of partner, post-sex connection, and/or compatibility

Sociability and Loss of Social Inhibitions

When discussing situations that preceded potential sexual encounters, some participants compared the feelings of sociability associated with use of alcohol versus marijuana. For instance, although some participants reported feeling more talkative on marijuana, use was commonly discussed as actually leading users to feel quieter and less social than usual. Alcohol, however, tended to make participants—both males and females—more outgoing and social.

> I don't feel as outgoing (on marijuana). I don't want to hold a conversation and stuff like that. Whereas if I'm drunk, I talk to anybody. (Male, Black, 18)

> I'm quiet, but it (marijuana) makes me laugh more, and I guess when you laugh, it makes people want to socialize with you. I feel like when you're drunk, you're down for everything. (Female, White, 19)

Thus, in some respects, alcohol—particularly in larger doses—may serve as a more effective social lubricant than marijuana. Not only did some participants high on marijuana report not talking because they were "staring at the clouds" or not feeling social, but some noted being more selective in group situations.

> When I'm high I'm a people person, but I'm selective. When I drink, I don't mind being in a crowd of people. There's times I'd be high, and I go to a party, and I'll pick this guy or this girl. But when I'm drunk, I'm just going to mingle with everybody. (Male, Black, 35)

Most participants felt that alcohol made them more socially disinhibited than marijuana. In fact one male participant referred to alcohol as "liquid courage." A clear difference between alcohol and marijuana was that many participants stated that alcohol use can lead to more "aggressive" social behavior than marijuana, which reportedly tends to make users feel more laid-back, "chill," relaxed, mellow, and/or that they and everyone else feels happy. The "aggressive" behavior associated with alcohol use seems to apply more to males, however.

> When there's drinking involved, guys seem to get more belligerent and crazy, and get this weird aggressive energy…– Maybe I'm looking for it (sex) more if I were drunk, whereas when I'm high, I'm happy doing other things. Sex is great. Watching a movie is great. Resting's great. But when I'm drunk, fucking would be great. (Female, White, 31)

Some participants reported that on alcohol they have a willingness to "do anything," say things they normally would not say ("without a filter"), or "say yes to people" (regarding

sexual behavior). However, females were more likely to discuss this in terms of being more "adventurous," as compared to the boldness or confidence described by some males. Others reportedly feel rowdy and "all over the place" on alcohol, but this was often discussed with a negative connotation. But despite the confidence commonly associated with alcohol use, some participants implied that marijuana use is accompanied with a sense of wariness in unfamiliar situations that participants did not generally seem to experience after using alcohol. For example, one male user reported that while he felt "loose" on marijuana, he noted that users maintained a sense of intuition on it that they did not experience on alcohol.

> It feels like you get a lot more primal (on alcohol)...maybe you get horny or something. Like "I need this," and I'm just going to do whatever. But being high—it's not something like you're like, "Oh, I need to go out and get some girls." (Male, White, 27)

> When I'm drinking, I want to do anything. I'm up for anything. Not thinking, all right, this is probably not going to be good the next day. But at that moment, you're not worried about any of that stuff. (Female, Hispanic, 26)

Facilitation of Social Connection with Others

While these two substances reportedly affected social inhibitions, some participants also discussed how alcohol or marijuana were often used in different social situations in order to promote or facilitate sociability. In fact, both marijuana and alcohol were often reportedly available at gatherings and/or provided by others. In general, alcohol use was often provided in social situations to facilitate sociability, and some reportedly drank alcohol in order to loosen up to meet new people. Marijuana, however, was often discussed as being limited to more familiar situations or crowds—not gatherings full of strangers. In addition, not only do many attendees at gatherings drink alcohol to facilitate socialization, but there are also common social rituals or methods or social bonding involving the serving or consumption of alcohol such as buying someone a drink, toasting, and taking shots with others.

Although often used at different types of gatherings, some participants reported that sharing marijuana with someone who asked for a "hit" also tended to facilitate connections between users; thus, sharing the substance appears to influence the social effects associated with actual use of the substance. For example, some males reported smoking at concerts or parties and having women approach them asking to blow smoke in their faces. An intimate form of doing this is via "shot-gunning" in which someone places his or her mouth on another person's mouth and blows smoke in. Thus, both substances are sometimes used to facilitate social connections—with users taking advantage of direct pharmacological effects as well as social rituals—and results suggest that for both alcohol and marijuana—males appear to be more likely to initiate the sharing ritual with women.

> When you're drinking, and you know the other person is drinking, you can always be like, "Let's get another drink." There is always that connection. (Male, White, 23)

> Usually the way I meet people is I'm smoking, and they ask for a hit. There have been countless numbers of people that I have met just by, "Can I get a hit of that?" I think marijuana creates a common interest. (Male, Black, 23)

However, while some participants reported that marijuana was an effective "ice-breaker" for meeting others at certain parties, using with others in private (e.g., at a residence) was more common (as it is an illegal substance with a strong odor). In fact, the "taboo" or "forbiddenness" of use being illegal appeared to have facilitated sexual interactions when using marijuana with another individual in private—and both males and females reported asking someone of the opposite sex to come smoke marijuana in order to help facilitate a potential intimate encounter.

> When I'd go on a date, if it went well, I'd be like, "Want to come back to my place and smoke weed?" That's a great transition into the intimacy of being at my house. "Let's do something a little bit taboo together." And then it's like you're sharing a sensation that's a little bit forbidden. Also, maybe just the fact of it being illegal and you have to do it privately...it seems kind of exclusive. It feels more intimate. (Female, White, 31)

> I was probably thinking that this (marijuana) might increase the chances that we are going to have sex. This would be fun, and we're already sort of in this intimate experience anyway...in my room in college smoking weed. (Male, White, 27)

However, this method does not appear to be successful unless both individuals are users. For example, two participants (one male and one female) alluded to experiencing stigma when the other (non-using) individual found out that he or she was a marijuana user. So disclosing that one is a user may place one at risk of a stigmatizing situation, although if the other individual is a user it may facilitate a more intimate social encounter.

Partner Choice

While both substances were often noted to affect the types of potential partners participants approached, they overwhelmingly reported that alcohol use was more likely to (negatively) affect the partners they chose. Seeing partners "in the daylight" for the first time and waking up next to a "different person" was a common complaint of both males and females—for example, they felt attracted to the individual the night before, but not the morning after sex. Alcohol use commonly lowered participants' standards, possibly because as one male participant pointed out—he becomes more desperate or "less picky" on alcohol. Males were more likely than females to discuss lowered standards of partner choice in

terms of appearance, although some females also implied that they were not physically attracted to their partner the following day.

> There have been times where I've had alcohol and have hooked up with girls who I wouldn't normally have when I was sober. I think alcohol makes me give less of a fuck than marijuana, but marijuana—it makes me selective in who I choose to have sex with, or, pursue. (Male, Black, 20)

> Whoever comes your way…when I'm drinking, everybody looks fine to me. Everybody looks good, and then if you wake up with somebody in the morning, then you'll be like, "Am I bugging out?" With weed I know who I'm waking up with. With drinking, you don't know. Once you start drinking, everybody looks good. (Female, Black, 34)

> When you're drunk, you might be like, "Damn, he looks mad good." Then you wake up, you're like, "What the hell did I do? Why are we naked in my bed?" I think if it was weed only I would've been, "Maybe this is a good stopping point." (Female, White, 31)

In many cases, females' "bad" decisions seemed to transcend appearance. Females in particular were more likely to report false interpretations not only about appearance or attractiveness, but also about the partner's character (e.g., career choices). One female mentioned that she continued to perceive a connection with someone (after meeting while inebriated on alcohol); however, on their first (sober) date, she experienced feelings of awkwardness and lack of compatibility. Social awkwardness (e.g., the next day after meeting while inebriated) sometimes resulted from other social issues not experienced or acknowledged while drunk. For example, lack of more meaningful (e.g., sober) conversation during an initial meeting may not lead individuals to discuss (or perhaps recall) potentially sensitive topics such as political affiliation or plans to start a family. One female said she was not attracted to her partner in the morning—not because she found him unattractive—but because he did not remember a long conversation they had about her career. Another female reported that while she felt complimented by "cheesy pickup lines" when drunk, she did not appreciate them the following day when she was sober.

Although generally most participants did not report lowering their standards on marijuana (compared to alcohol), some did explain that they found their partners more attractive while high. A couple of participants articulated differences—for example, one male stated that marijuana can enhance a potential partner's attractiveness (e.g., highlighted facial features) as well as one's surroundings, but on alcohol, they felt one was more likely to settle for someone he or she was not normally attracted to. Another participant mentioned that he became more emotionally attracted to his girlfriend on marijuana and no participants reported such an "emotional" attraction with regard to alcohol. In addition, many participants discussed attraction or sex on marijuana as being with someone they already knew—or were dating (adding to the point discussed above that marijuana is most often used with familiar individuals). Alcohol was commonly discussed in terms of having sex with strangers (or someone new); thus, situations involving sex on marijuana tend to be much different than situations involving alcohol in which individuals commonly meet strangers in social settings such as bars. However, some marijuana users—male and female—were also more likely to lower their sexual standards when high on marijuana.

> I've come to realize that somebody that I wouldn't normally fuck while I was sober, I probably would fuck them while I was high. (Male, Black, 35)

> When I'm high…the people I'm attracted to, I'm not at all attracted to sober. My partners are hotter if I've been drinking [laughs]. [They] should be called "weed goggles" because it's much worse on marijuana than on alcohol. (Female, White, 22)

Although reports of lowering sexual standards varied, one participant noted a hierarchy—that marijuana lowers one's standards more than being sober, and alcohol lowers one's standards more than marijuana. In sum, it appears that many individuals were likely to be more attracted to certain potential partners on either drug, but this appeared to be more of a "risk" with alcohol.

Feelings After Sex

Many participants reportedly experienced impaired memory regarding sexual interactions when alcohol was involved, or having sex with partners they did not previously know. This often led to reclusiveness and some participants even reported being "cold" to their partner in the morning. One female noted awkwardness upon accidentally bumping into that partner in the future. However, some participants mentioned that they were more satisfied after interactions on marijuana compared to interactions on alcohol, and this could largely be due to different social interactions beforehand.

> I feel like when you're drunk you can't remember what happened the next day. But when I'm high, I remember everything. (Female, White, 19)

> I want to cook the person something to eat (after sex) when I'm high. When I'm drunk, it's like, "I'm out of here." Or get away from me. (Male, White, 33)

A male and a female both reported desire for more sex after the first sexual episode on marijuana—a desire that does not reportedly return as often after sex on alcohol. Some participants reported feeling more satisfied after their encounters high on marijuana (compared to alcohol), and more relaxed, "chill," emotionally at ease, and able to fall asleep.

Regret

The most commonly reported feeling after sex on alcohol was regret. Both male and female participants reported regret resulting from a range of behaviors including one-night stands, "hooking up with drunk chicks," the lowering of sexual standards, and specific risky sexual interactions such as using the withdrawal method instead of a condom. Participants discussed worry about pregnancy, and one participant mentioned disappointment that he could not remember a particular sexual episode. Both males and females commonly reported that regret, shame, and embarrassment were associated with alcohol use, but this was rarely reported for marijuana. One female added that she is more likely to regret the partners she chooses on marijuana; however, she said she is more likely to regret specific sexual acts on alcohol. For example:

> When you're drunk, it's more regrets or I-wish-I-didn't-do-that type of thing. Definitely had times where I didn't use a condom. Pulling-out method, one-night stands... Just didn't feel good about that at all. (Female, White, 32)

In addition, we found that females tended to report regret in the form of shame for allowing themselves to have sex with someone they feel they would not have had sex with while sober:

> You might wake up next to someone you never intended on doing anything with them, just because you didn't have control and you were drinking so much. I was actually, the next day, thinking, what did I do? (Female, Hispanic, 26)

> When you're drunk, you might see somebody and be like, damn, he looks mad good. Then you wake up, you're like, oh, what the hell did I just do? (Female, Black, 25)

However, males tended to report regretting the women they pursued and then had sex with:

> It's almost like a shameful experience (from alcohol). I don't think I've had that same kind of experience with marijuana. It's doesn't really lower inhibitions the same way, so I don't think I'm as likely to do something that I know I'm going to regret (Male, White, 27)

> Oh, so much regret for alcohol. Sometimes I hook up with girls I wouldn't normally have while sober. I feel like weed only enhances the attraction and the connection, but with alcohol, there's lots of regret. Lots of embarrassment. (Male, Black, 20)

> I never had no regret on marijuana. Yeah, sometimes alcohol. You like, "Why the fuck I even touch this bitch?" I mean, sometimes I wake up, and I'm just like, "Wow, I could've done better than that." With weed, I never had that experience. (Male, Black, 30)

So both males and females tended to report regret after having sex on alcohol. But as previously noted, some participants feel they remember more (or everything) from sex on marijuana, and adding to this point–one participant made an interesting comparison saying that you are more likely to want to remember sex on marijuana, unlike alcohol where you hope to forget if you have not forgotten already.

Physical Experiences

General Adverse Effects

Nausea, dizziness, feeling sick (and vomiting), and blacking out were commonly reported to be associated with alcohol use. One male reported accidentally falling asleep during intercourse and another male reported having to urinate due to alcohol consumption as interfering with sex (in part because it can be difficult for a male to urinate with an erection). It appears that reported adverse alcohol experiences tend to be more physical, but adverse marijuana experiences reported tend to be more psychosocial—as one participant summarized: "I feel like weed affects your motivation, and alcohol just affects your ability."

> I've had a couple of times in the middle of intercourse (on alcohol) where I've had to stop and go hurl. But I came back and whatever. Maybe it's taking a little while longer for me to get my erection again, but five times stronger than before I threw up. (Male, White, 33)

However, adverse non-sexual experiences were certainly not limited to alcohol. For example, one male noted feeling sluggish, lazy, and sleepy after smoking marijuana. Yet this depressant effect may be more extreme with alcohol. For example, one female stated that if she drinks too much she may fall asleep instead of having sex.

Dose Effects

Sexual experiences—especially adverse experiences—appear to depend on the dose used. Many adverse experiences reported thus far have been discussed in the context of somewhat high doses (e.g., being drunk). Low doses of alcohol (e.g., 1–2 drinks) reportedly allowed some participants to be able to function rather adequately. A few participants reported that higher alcohol consumption often led to erectile dysfunction and vaginal dryness.

> Or if you drink too much, it's like your body just shuts down. I don't get any lubrication. Then I think it might even affect guys more, because I've been in situations where they've drunk too much and they can't stay hard, or they can't get hard. (Female, White, 22)

Higher levels of alcohol consumption also reportedly led to more aggressive sex (e.g., regarding initiation), or "reckless"

or unprotected sex. In comparison, many participants—male and female—reported that using too much marijuana was associated with anxiety. While "sexual laziness," reluctance to change sex positions, and even "passing out" were mentioned, many males and females reported that marijuana has an adverse effect on their mindset during sex. Specifically, females were more likely to describe anxiety in the form of paranoia, yet males were more likely to discuss these effects in terms of having their minds drift and having an experience with less-paranoid intrusive thoughts or distraction.

> You're so high (on marijuana)...you start thinking sex is weird. "What is sex?" Sometimes you're so high that you get the smallest thing in your head, and you get lost in that...I've definitely blacked out (on alcohol), probably during sex. (Female, White, 32)

> I guess there maybe is a drop-off where you get too high (on marijuana), and things are a little too intense. Being really high can sort of interfere because then you just get a little too trapped in your head; you tend to get a little more anxious. (Male, White, 27)

However, the mental effects associated with higher doses or marijuana were not always described in a negative manner; for example, one male reported "spacing out" after smoking too much marijuana, but he stated he felt it ultimately led him to last longer during sex.

Sensations of Body and Sex Organs

Participants commonly described sexual experiences with these substances in terms of sensations. Generally, participants described their bodies as more sensitive on marijuana and numb or desensitized on alcohol. A few females noted that increased sensitivity (or being more "tuned-into" their sensations) on marijuana added to the sexual experience as touch felt better or they felt more (physically—which is why some said they preferred being caressed while high). Others mentioned that they felt more comfortable, mellow or at ease on marijuana, which may have allowed sensations to feel more intense.

> Alcohol tends to be a lot more numb. Everything is sort of blunted and muted, whereas with marijuana it's intensified. Any little touch is more arousing. The body sensations, particularly on sexual organs—it's more of an intense sensation. I'd say everything just feels more sensitive...it's more intense. Even just foreplay and touching and holding each other is more pleasurable. So they are opposites. (Male, White, 27)

Other females explained that they experienced a tingly sensation on marijuana, goose bumps, or warm sensations. One male also mentioned feeling tingly "on the inside" during sex on marijuana. While most participants discussed increased body sensitivity as a positive aspect of use, one female noted that increased sensations were not always comfortable. Regardless, alcohol tended to numb sensations and marijuana tended to enhance sensations, and the sensations described above appear to be related to length and intensity of intercourse, which is described below.

Length and Intensity of Sex

In many cases, the desensitization associated with alcohol reportedly resulted in prolonged intercourse—in both males and females, and this was often described in a positive manner. Some participants reportedly enjoyed aggressive and intense sex associated with alcohol use; however, one female (below) describes how lengthy sex on alcohol can become painful.

> When you're drinking, it's like the guy won't reach his climax. It was great because it lasted like an hour and a half. He wants to keep going, [but] to the point where I'm all swollen and sore. You're going to have to switch it up, or do some oral...it begins to get painful. I like the fact that he lasts longer, but he sometimes lasts too long. Compared to when you're high—it feels so great and it might be a little shorter. (Female, Hispanic, 26)

Likewise, it was mentioned that the feeling of time can slow down on marijuana, so sex feels as if it lasts longer. For example, one female noted that intercourse might feel like an hour on alcohol, but may only be 15 min. Regardless, some males said sex lasts longer on marijuana—possibly due to increased sensitivity, pleasure, and/or emotional intensity. On the other hand, however, a few participants also noted that since sex on marijuana can feel so intense, they orgasm much quicker (than on alcohol).

> It's better being high—the sex, but it's less time. I like it to be longer, but still feel great about it. (Female, Hispanic, 26)

Another added that the overall sex act did last longer on marijuana, but due to increased foreplay—not actual intercourse.

Sexual Dysfunction

Some participants compared alcohol and marijuana in terms of sexual dysfunction. The most common dysfunction discussed was that males commonly become impotent or "less erect" after too much alcohol ("whiskey-dick;" a complaint by both sexes).

> It's harder to get hard when I'm drunk. So, alcohol, too much, definitely makes you dysfunctional. Weed, I don't think so. It only affects your motivation. (Male, Black, 20)

Some females, on the other hand, reported that they sometimes experience lack of vaginal lubrication after using marijuana, and this dysfunction was also mentioned by a male in the sample.

> I think I don't get as naturally lubricated when I smoke...and I don't think I've ever orgasmed after smoking weed and having sex. (Female, White, 22)

> Sometimes when we've been smoking more marijuana, it's harder for her to get wet. It's like the same thing as getting dry mouth, but down there. (Male, White, 19)

Beyond dysfunction of sex organs, some participants (both male and female) mentioned that alcohol or marijuana use prevented orgasm (discussed more below).

Orgasm

As discussed above, alcohol and marijuana use were often perceived to affect the intensity of sex. Likewise, using these substances could also impact orgasm. Some males and females reported that their orgasms were "magnified," longer, or more intense (with one female noting hot and cold flashes) on marijuana.

> The orgasm's more intense (on marijuana). I can feel it more. I'm also not in my head thinking about anything else. So I'm able to be mindful of everything that's happening and nothing intrudes. (Female, White, 32)

> When I'm high, it seems like my orgasms are magnified at least by five times. Much more intense. Hot and cold flashes. (Female, Black, 34)

> With alcohol, it's more like, "Alright, let's do this. Let's get my orgasm." With marijuana it's like, "Okay, let's enjoy the moment. Let's live in the moment." (Male, Black, 20)

As aforementioned, some participants mentioned sexual dysfunction with regard to orgasm. While some male participants mentioned they may have delayed orgasms on alcohol, others said they could orgasm or orgasm even more frequently on alcohol. On the other hand, some participants mentioned that the drug affected orgasm in a negative manner.

> I feel like a lot of the things that can help lead to female orgasm are forgotten when you're high on marijuana. I feel like it requires a degree of focus for me to have an orgasm…I'm never going to have that focus on marijuana. Everything feels better, but I just can't orgasm. [But] it can be harder for me to orgasm when I've been drinking. And my boyfriend, too. Like, he can still get hard, but then it's harder for both of us to finish. (Female, White, 22)

Some females also reportedly could not orgasm on marijuana due to lack of focus. For others (of both sexes), it reportedly took longer to achieve an orgasm on marijuana, again, possibly due to mindset.

Sexual Behaviors

The last theme with respect to "physical" experiences is sexual behaviors. With regard to marijuana use, some participants mentioned that there was often more foreplay and that it tended to be more euphoric (although sometimes "silly"). Some noted that they tended to explore more, sexually, while high on marijuana, and try new behaviors, as they often felt more creative and/or felt more emotion. This led some participants to engage in more self-described "freaky" behavior (such as sucking toes or "licking ass") or "loss of control," while others simply preferred to just "lay on the bottom."

> I think the more you smoke, the more lazier you might be, too. Okay, let's just keep it in one position, because we're so high and we don't want to do so much work. (Female, Hispanic, 26)

Generally, marijuana use tended to be described as leading to more tender, slow, and compassionate sexual acts, and to involve more sensation and sensuality than alcohol.

> When I'm a seductress (on marijuana), I kiss. I stroke. I rub. I'm very sensual, as opposed to when I'm drunk–I'm just like, give it to me. Ripping close off. (Female, Black, 34)

While both drugs reportedly facilitated changes in specific sexual behaviors, alcohol was often more commonly cited in terms of loss of control or acting out of the ordinary, and one participant said alcohol use leads to more experimental or "kinkier" behavior than marijuana, sometimes described as "crossing the line" (e.g., one male says he is more likely to tell women to "sit on his face"). Sex on alcohol was often described as being more casual and less emotional than sex on marijuana. Likewise, many described sex on alcohol as being more primal, "sloppy," aggressive and "uncontrollable savage" compared to marijuana. One male compared and said that sex on alcohol was more "straight to the point" to achieve quick ejaculation.

> When I'm high off of marijuana, it's more about pleasing my partner and me. You want more out of it, but you also want to give the person more. You want to satisfy the person even more. I guess it's more gentle. Sex being drunk—it's more aggressive. Sex on alcohol is more like savage sex. I go in with the mind frame of I'm going to hurt this woman. She's going to go home and she's going to tell all her friends. Sex with marijuana, it's like you want to please the person more so you want to bring more to table. (Male, White, 33)

> When I'm high, I feel more like a seductress. But when I'm drunk, I feel slutty. When I'm a seductress…I'm very sensual, as opposed to when I'm drunk, I'm just like, give it to me. Ripping clothes off. You know when you're drunk, you're saying all kinds of things you wouldn't normally say? You're willing to try much more new things. (Female, Black, 34)

It also appears that type of alcohol or marijuana used can lead to different sexual experiences and behaviors. For example, when discussing alcohol-related sexual experiences some participants mentioned specific brands of alcohol and some discussed certain

strains of marijuana as having unique sexual effects. This participant discusses sexual experiences related to a particular strain of marijuana:

> I smoked some Blue Cheese, and...I was licking ass, doing all kinds of crazy stuff I had never even thought of—sucking toes...then I smoke some regular and I just do the regular. (Male, Black, 35)

With regard to sexual risk behavior, the majority of participants felt that alcohol was riskier, sexually, than marijuana. Participants noted that sometimes "anything goes" (sexually) when they drink and are not worried about potential consequences while in the moment. Perceived riskiness of sex was largely due to reported perception of impaired judgment and lack of control of decisions and actions. Use was reportedly often associated with hasty decisions; for example, not using a condom. One male participant said that when he was drunk he sometimes thought, "Who cares about protection?" However, unprotected interactions were not always intentional. One female mentioned that she was too drunk to notice that her partner removed the condom during sex. In some situations, drinking appears to have left participants more vulnerable; for example, one female discussed being subject to sexual assault (unwanted choking) that she described as being too drunk to prevent.

> I don't think being high has ever made me more likely to do anything I consider risky. Being drunk probably affected my experience with risky sexual behavior far more. I'd be more likely to forego using protection with someone I really didn't know all that well for gratifying that immediate impulse. With weed, I don't think it's really had much of a bearing on my choice of using protection. (Male, White, 27)

> Even when I smoke weed, if I'm high on weed, I'm still able to make good decisions. It doesn't impair my judgment. Alcohol impairs your judgment, so that's the difference. (Female, Black, 30)

> (Sex is) more riskier with the alcohol. "Who cares about protection" or whatever. You don't think about safety a lot when you're drunk. You just don't think about it sometimes until the next day. And then you're like, "Oh shit, did I have unprotected sex?" (Male, White, 33)

Blacking out was also commonly reported by both sexes, or memories of the interaction were jumbled or unclear, with participants unsure whether they used birth control. One female noted that she resorted to taking Plan B the next day due to what she felt was a poor sexual decision. One participant mentioned that she does not always have the autonomy to resist or speak out against a particular sexual act when high on marijuana. Although others reported delayed reactions and noted that reactions (e.g., to potentially unwelcome behaviors) were not as delayed on alcohol. However, participants often explained that they still felt in control of the situation. A false sense of perceived control, though, could in fact leave a user more vulnerable to unwanted sexual acts. But numerous participants felt that they were still able to make good decisions on marijuana and maintain self-control, more so than when intoxicated with alcohol. Additionally, some participants reported that marijuana did not adversely affect memory of the interaction compared to alcohol. One participant felt that marijuana use was no riskier—sexually—than when sober, and one participant interestingly pointed out that marijuana use decreased his likelihood of engaging in risk behavior because while high he was too paranoid to give in.

Discussion

With the popularity of marijuana increasing in the US, and with marijuana becoming legal in some jurisdictions, it is important to investigate the potential sexual effects associated with use, in order to inform prevention and safer choices among users and potential users. Correlational studies have linked marijuana use to risky sexual behavior, but richer data were needed to investigate these associations. Few studies have examined the psychosocial and physical sexual experiences related to marijuana use, and to our knowledge, no empirical studies have compared alcohol and marijuana with regard to potential psychosocial and physical sexual experiences, which in turn may affect sexual risk behavior. We compared psychosocial and physical sexual experiences to inform prevention in an era where prevalence of use and acceptance of marijuana are increasing. We categorized topics into two overall themes—psychosocial sexual experiences and physical sexual experiences. We were able to uncover differences between alcohol and marijuana through in-depth interviews that can inform future studies as well as prevention and harm reduction efforts.

With regard to psychosocial experiences, participants commonly reported self-perception of attractiveness or sexiness associated with use of alcohol and marijuana, but more so for alcohol. Parsons et al. (2004) also found that men who have sex with men tend to feel sexier after consuming alcohol and this may facilitate sexual expressiveness, but to our knowledge, this had not yet been investigated in a heterosexual population or with regard to marijuana use. It appears that both substances facilitate feelings of self-attractiveness, but more research is needed to examine whether this directly affects risky sexual behavior. Quantitative studies tend to examine odds or risk for sexual risk behaviors in relation to substance use (e.g., Kerr, Washburn, Morris, Lewis, & Tiberio 2015), but do not examine how psychosocial variables, such as feeling sexy or attractive, may mediate or moderate these associations. Such data could help guide messaging for harm reduction interventions.

While we discovered some variations with regard to gender, both alcohol and marijuana were generally associated with sociability, loss of inhibitions, and feelings of boldness. However,

alcohol use was more commonly used for pursuing potential sex partners. Participants often reported feeling a loss of control with alcohol, whereas with marijuana, they tended to feel they maintained control, but were reportedly often quieter and less social than usual. Alcohol is commonly used to boost confidence, decrease social inhibitions, and to cope with emotions such as fear of rejection by potential sexual partners (Lewis et al., 2008; Parsons et al., 2004); however, participants did not report these reasons with regard to marijuana use. Participants also tended to discuss disinhibition on alcohol in terms of being "sloppy," yet they felt more controlled while high on marijuana. Our results confirm that alcohol is an effective social lubricant and past research has found that it diminishes anxieties about how potential sexual partners might respond (Livingston, Bay-Cheng, Hequembourg, Testa, & Downs, 2013; Parsons et al., 2004). This disinhibition on alcohol helped facilitate a social connection with others, but again, alcohol reportedly served as a more effective social lubricant than marijuana in social settings. Participants—especially males—on alcohol reportedly felt more social, outgoing, and courageous in approaching others—facilitating a potential sexual encounter.

Although males were more likely to pursue women on alcohol, females were more likely to report "accepting" potential sexual partners when inebriated on alcohol. On marijuana, participants tended to feel quieter and less social; however, a major finding of this study was that the illegality of marijuana sometimes facilitated sexual interactions as participants felt they were engaging in "forbidden" or "taboo" behavior—among both males and females. While consumption of alcohol in public is legal (but regulated) with individuals able to drink in public or in private, marijuana is generally used in more private situations (due to illegality in most states). So since marijuana cannot generally be used in public, potential partners are often limited to more intimate settings, thus facilitating potential sexual encounters (while individuals who are drinking do not have to limit themselves to private places). More research will be needed to examine such associations in light of changing legality of marijuana throughout the US.

Participants also discussed alcohol and marijuana in terms of partner choice. While some participants reported that marijuana use made them more selective in choosing a partner, many participants—both male and female—felt that their standards for choosing a partner were lowered while under the influence of alcohol. Parsons et al. (2004) also found that alcohol often plays a large role in spontaneous sexual encounters as it reportedly lowers partner selection criteria. While we found that participants on alcohol often were no longer attracted to their partner following the encounter, this adds to previous research that has found that alcohol use is related to riskier partner choice (Cooper, 2002; Dunn, Bartee, & Perko, 2003).

Interestingly, some participants reported that marijuana use actually made them more selective in choosing partners. While some reported that they felt more attracted to their partner(s) on marijuana, this effect appears to be different from the alcohol "beer goggle" effect, but possibly because individuals who use marijuana together often already know each other and are in a more private setting together. Partner choice on alcohol appears to largely depend on the social context in which individuals initially meet one another; for example, on alcohol, individuals appear to be more likely to connect with unknown casual partners (Walsh, Fielder, Carey, & Carey, 2014). So if marijuana was legal and used and shared openly in public it is unknown whether there would be a "marijuana goggle" phenomenon associated with use.

Related to partner choice, it was not surprising that marijuana use reportedly led to more post-sex satisfaction than alcohol. Users generally did not feel they experienced memory impairment or poor judgment after using marijuana, but they did feel they commonly experienced this from alcohol. The most common reported feeling after sex on alcohol was regret and regret after sexual interactions on alcohol has been reported in other studies (Livingston et al., 2013). A recent epidemiology study of a nationally representative sample of adolescents found that compared to marijuana, alcohol was much more likely to lead to regretful behavior (e.g., having sex with someone they would not normally be attracted to), especially among females (Palamar et al., 2014a). Our results add to these findings in that compared to marijuana, alcohol use reportedly leads to more regret.

With regard to physical sexual experiences, participants reported adverse effects related to both alcohol and marijuana use. Participants reported nausea, dizziness, and falling asleep during sex on alcohol, but adverse experiences on marijuana were reportedly often more mental (e.g., paranoia and lack of motivation). We must keep in mind that drug dose is likely an important factor relevant to all findings. For example, many experiences on alcohol were discussed in terms of being drunk, so it is unknown whether participants would have had similar experiences on smaller doses. Drug dose likely played a role in other physical experiences participants discussed including body sensations, length and intensity of sex, sexual dysfunction, and specific sexual behaviors.

Alcohol and marijuana reportedly led to different sensations of the body and sexual organs. Participants commonly reported increased sensitivity on marijuana and numbness while on alcohol. These changes in sensation appear to have influenced length and intensity of sex as well as orgasm. While we must keep in mind that both drugs can affect one's perception of time, participants commonly reported that the numbness associated with alcohol was associated with more extended sexual activity. However, more aggressive sex on alcohol sometimes reportedly led to sex of shorter duration. Participants reported more intense sexual activity on marijuana and sometimes an increase in duration.

Sexual dysfunction was reportedly associated with use of both alcohol and marijuana. Alcohol use was sometimes associated with an inability to achieve or maintain an erection, and alcohol reportedly made it harder to achieve orgasm in both

sexes. Previous studies have found that chronic alcohol abuse leads to higher rates of sexual dysfunction in females including inability to orgasm, lack of vaginal lubrication, and painful intercourse (Covington & Kohen, 1984). While alcohol may increase libido, it does not necessarily increase or allow for optimal performance (Parsons et al., 2004). In fact, alcohol use reportedly made it more difficult to achieve an orgasm in both sexes (which relates to length of sexual encounters previously discussed). Marijuana appeared to have a (negative) effect more on motivation than orgasm; however, use was sometimes reported to lead to vaginal dryness. Consistent with previous studies, participants did not discuss instances of impotence related to marijuana use although some discussed inhibited sexual excitement possibly due to lack of motivation (Johnson, Phelps, & Cottler, 2004; Smith et al., 2010). Ability to achieve orgasm appears to be related to participants' described sexual dysfunction. As aforementioned, length of sex is often extended on alcohol (e.g., due to numbness), and length is often extended because orgasm is delayed. Orgasms were reportedly more intense on marijuana than on alcohol; however, some females reported an inability to achieve orgasm on marijuana due to lack of proper focus.

With regard to sexual behaviors, sex on alcohol was commonly reported as being more casual and less emotional. However, many participants also described sex on alcohol as being more "out of the ordinary" or even "freaky" or "kinky." On the contrary, sex while high on marijuana was commonly described as being more compassionate and it tended to include more foreplay, with many participants experiencing increased sensuality and sensation reportedly related to sex while high on marijuana. Although we were not able to acquire enough data to determine whether participants on marijuana were less likely to use condoms, condomless sex on alcohol was reported as being a somewhat common experience, consistent with Kerr et al.'s (2015) study among college students.

One female also discussed sexual assault (unwanted choking) during an encounter involving alcohol. Alarmingly, 2 % of college students in the US report being victims of alcohol-related sexual assault or date rape (Hingson et al., 2009). Although few studies document marijuana use in cases of sexual assault, alcohol appears to be particularly problematic (Hall & Moore, 2008; Kerrigan, 2010). Research on both alcohol and marijuana needs to continue in order to inform prevention of sexual assault.

We must also keep in mind that many of the sexual situations related to use of each of these drugs likely depends on contexts of use. For example, a lot of risky or "regretful" behavior occurred with strangers or new partners while participants were inebriated on alcohol, but sex on marijuana was more common with individuals participants already knew.

Limitations

This was a small study so not enough interviews were conducted to formally compare by race/ethnicity, age, or amount used. This study's inclusion criteria were based only on marijuana use so participants were not required to have had sex on alcohol in the last 12 months. Likewise, since sex while high on marijuana while engaging in any sexual activity (not strictly vaginal or anal sex) that could result in orgasm was an inclusion criterion, eligible participants in this sample may have engaged in varying sexual acts and different acts may have varying degrees of sexual risk. Different inclusion criteria might have led to a different sample with different experience. While participants all identified as heterosexual, it is important to keep in mind that sexual orientation does not in fact limit one's sexual behaviors to the opposite sex. A larger, more systematic study should consider multiple other factors including relationship status, and as findings suggests, dose appears to be an important factor, so amount used needs to be examined in relation to specific sexual experiences in more detail. For example, adverse sexual experiences on alcohol tended to be described in terms of drunkenness, but research needs to further examine and compare dose-responses. Likewise, larger studies would benefit from directly comparing "critical incidents" involving marijuana and alcohol to truly compare drug effects as well as specific risk behavior (e.g., whether a condom is used) within the same individuals. Many participants were experienced users and extensive experience could have affected sexual effects or expectations of sexual effects. This study is also limited because type or brand of alcohol and strain and strength of marijuana may also lead to different perceived sexual effects. Finally, we realize that this is a relatively small sample, but we hope that this rich data inform large-scale future studies.

Conclusions

As marijuana use continues to become more normalized in the US, research is needed to inform prevention to ensure that users and potential users of these substances are aware of sexual experiences associated with use. Marijuana and alcohol are associated with unique psychosocial and physical experiences. While alcohol reportedly led to risker sexual behavior, both drugs appear to potentially increase risk for unsafe sex. Research is needed continue to study sexual effects and to inform prevention to ensure that users and potential users of these drugs are aware of sexual effects associated with use. Results can inform prevention and harm reduction programming that will allow us to design more realistic programs and to craft interventions, which guide users to make safer choices.

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ORIGINAL RESEARCH—SEXUAL DYSFUNCTION

Cannabis Use and Sexual Health

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ABSTRACT

Introduction. Cannabis is the most commonly used illicit substance worldwide. Despite this, its impact on sexual health is largely unknown.

Aim. The aim of this article is to examine the association between cannabis use and a range of sexual health outcomes.

Main Outcome Measures. The main outcome measures include the number of sexual partners in the past year, condom use at most recent vaginal or anal intercourse, diagnosis with a sexually transmissible infection in the previous year, and the occurrence of sexual problems.

Methods. Method used in this article includes a computer-assisted telephone survey of 8,656 Australians aged 16–64 years resident in Australian households with a fixed telephone line.

Results. Of the 8,650 who answered the questions about cannabis use, 754 (8.7%) reported cannabis use in the previous year with 126 (1.5%) reporting daily use, 126 reported (1.5%) weekly use, and 502 (5.8%) reported use less often than weekly. After adjusting for demographic factors, daily cannabis use compared with no use was associated with an increased likelihood of reporting two or more sexual partners in the previous year in both men (adjusted odds ratio 2.08, 95% confidence interval 1.11–3.89; $P = 0.02$) and women (2.58, 1.08–6.18; $P = 0.03$). Daily cannabis use was associated with reporting a diagnosis of a sexually transmissible infection in women but not men (7.19, 1.28–40.31; $P = 0.02$ and 1.45, 0.17–12.42; $P = 0.74$, respectively). Frequency of cannabis use was unrelated to sexual problems in women but daily use vs. no use was associated with increased reporting among men of an inability to reach orgasm (3.94, 1.71–9.07; $P < 0.01$), reaching orgasm too quickly (2.68, 1.41–5.08; $P < 0.01$), and too slowly (2.05, 1.02–4.12; $P = 0.04$).

Conclusions. Frequent cannabis use is associated with higher numbers of sexual partners for both men and women, and difficulties in men's ability to orgasm as desired. **Smith AMA, Ferris JA, Simpson JM, Shelley J, Pitts M, and Richters J. Cannabis use and sexual health. J Sex Med 2010;7:787–793.**

Key Words. Cannabis; Sexual Behavior; Sexual Health; Sexual Dysfunction

Introduction

Cannabis is the most widely cultivated and used illicit drug with an estimated 147 million people or 2.5% of the world population using it annually [1]. Its use has been linked to earlier and more frequent sexual activity, having multiple sexual partners, having casual sexual partners while traveling, inconsistent contraceptive use, and being diagnosed with a sexually transmissible infection [2–7].

Despite the prevalence of cannabis use and its apparent association with adverse sexual health outcomes, the link between cannabis use and sexual health has been the subject of remarkably few population-based studies. Those studies that have been done have focused on adolescents and young adults [8–15]. It is a criminal offence to possess, cultivate or sell cannabis in all states of Australia. However, possessors of small amounts of cannabis for personal use are generally issued an infringement fine rather than being prosecuted.

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The person may also be required to attend a cannabis education session. One in three Australians has ever used cannabis [16], and in many social circles it is little stigmatized [17]. As it grows easily in Australian conditions, it can be obtained cheaply and without recourse to dealers of other illicit drugs, though many users do buy from dealers [18]. Its use widened from a small counterculture minority in the 1970s to broader but not completely mainstream social groups in the 2000s. Many of the correlations found between cannabis use (lifetime or recent) and health outcomes are related to socio-demographic factors or social location (rates of use are higher among gay men and lesbians [19,20], prisoners [21], injecting drug users [18], and young people attending music festivals [19]), and to psychological factors among users such as risk-taking and psychological distress [16].

Public perception of the risks associated with cannabis use is not well understood. In one study, 27% of people aged 14 and older indicated that they were uncertain about whether there was any health problems associated with cannabis use. The health risks identified included respiratory problems, addiction and the escalation of drug use, and the risk of driving accidents [22]. Sexual health was not identified as being among the domains of cannabis-related health risk.

The present study examines the socio-demographic correlates of cannabis use in a large, population-based study of adults aged 16–64 years, and the relationship between the frequency of cannabis use and the number of sexual partners in the past year, condom use at the most recent sexual encounter, and the reporting of sexually transmissible infection and sexual difficulties.

Methods

Data came from the 2005 intake interview of the Australian Longitudinal Study of Health and Relationships [23]. This is a computer-assisted telephone interview study of Australians aged 16–64 years.

The interview covered a broad range of socio-demographic and health topics with a focus on sexual and reproductive health issues. Cannabis use was assessed with three questions: whether the participant had used cannabis at least 10 times in their life; whether they had used it in the 12 months prior to interview; and if so, whether they had used it daily, weekly, or less often.

Outcomes of interest were the number of sexual partners in the year prior to interview (none, one, two, or more), condom use at most recent vaginal intercourse (no, yes), or anal intercourse (no, yes; asked only of men who had reported having sex with other men), diagnosis with a sexually transmissible infection in the year prior to interview (no or yes to any of: chlamydia, syphilis, gonorrhea, and genital herpes), and the presence for 1 month or more of the following sexual problems: lacking interest in sex, inability to orgasm, reaching orgasm too quickly, reaching orgasm too slowly, experiencing pain during intercourse, not finding sex pleasurable, anxiety about one's ability to perform sexually, vaginal dryness (women), and trouble keeping an erection (men) [24]. Where a sexual problem was reported, the extent to which it was experienced as problematic was ascertained: not a problem, a minor problem, somewhat of a problem, or a major problem [25].

Socio-demographic factors controlled for included: age group (16–25, 26–35, 36–45, 46–55, 56–64), language spoken at home (English, other), sexual identity (heterosexual, homosexual, bisexual), educational attainment (lower secondary, secondary, post-secondary), occupation (professional, associate professional, trades, unskilled), and legal marital status (married, never married, separated, divorced, or widowed). All these factors have been identified as associated with one or more of the outcomes of interest, and analyses were conducted separately of men and women [26–30].

Statistical analysis included contingency table analysis and logistic and multinomial logistic regression and was conducted using Stata [31]. Given the survey design methodology, design-based F statistics are reported. The study was approved by the Human Ethics Committees of La Trobe University, Deakin University, and the University of New South Wales.

Results

A total of 8,656 people completed the interview with an overall response rate of 56% [23]. Of the 8,650 who answered the questions about cannabis use, 754 (8.7%) reported cannabis use in the previous year with 126 (1.5%) reporting daily use, 126 (1.5%) reporting weekly use, and 502 (5.8%) reporting use less often than weekly. Cannabis use was more commonly reported by men than by women (11.2% vs. 6.1%, $P < 0.001$), and in both men and women was more commonly reported by participants younger than 36 years (Table 1).

Table 1 Demographic correlates of the frequency of cannabis use (N)

	Women's frequency of cannabis use						
	None	Less than weekly		Weekly		Daily	
Age (4,299)	%	%	OR*	%	OR†	%	OR‡
16–25 (721)	89.71	7.05	1.35 (0.86, 2.11)	2.43	2.29 (1.03, 5.07)	0.81	0.71 (0.25, 2.01)
26–35 (829)	90.44	7.55	1.43 (0.99, 2.07)	0.70	0.66 (0.26, 1.67)	1.31	1.14 (0.50, 2.58)
36–45 (1,068)	92.35	5.39	1.00	1.09	1.00	1.17	1.00
46–55 (1,050)	97.78	1.67	0.29 (0.18, 0.48)	0.48	0.41 (0.14, 1.22)	0.08	0.06 (0.01, 0.50)
56–64 (631)	99.08	0.92	0.16 (0.07, 0.35)	0.00	—	0.00	—
Language (4,300)							
Other (183)	97.72	1.37	0.28 (0.06, 1.24)	0.91	0.94 (0.13, 6.92)	0.00	—
English (4,117)	93.68	4.66	1.00	0.93	1.00	0.73	1.00
Sexual identity (4,298)							
Heterosexual (4,192)	94.27	4.14	1.00	0.93	1.00	0.66	1.00
Homosexual (43)	82.69	17.31	4.77 (1.76, 12.94)	0.00	—	0.00	—
Bisexual (63)	73.33	21.33	6.63 (3.25, 13.53)	1.33	1.83 (0.24, 13.83)	4.00	7.83 (1.67, 36.85)
Education (4,298)							
Lower secondary (1,193)	94.48	3.35	0.75 (0.50, 1.12)	0.84	0.76 (0.35, 1.65)	1.33	2.32 (1.08, 4.99)
Secondary (2,052)	93.86	4.47	1.00	1.10	1.00	0.57	1.00
Post-secondary (1,053)	93.11	5.94	1.34 (0.94, 1.90)	0.71	0.65 (0.29, 1.48)	0.24	0.42 (0.12, 1.49)
Occupation (4,188)							
Professional (1,432)	95.40	3.67	1.00	0.52	1.00	0.41	1.00
Assoc. professional (1,630)	93.09	5.12	1.43 (0.99, 2.05)	0.97	1.90 (0.82, 4.38)	0.82	2.06 (0.83, 5.10)
Tradesperson (179)	91.63	6.51	1.85 (0.97, 3.51)	0.93	1.85 (0.40, 8.64)	0.93	2.38 (0.29, 19.46)
Unskilled (947)	92.86	4.67	1.31 (0.85, 2.01)	1.59	3.11 (1.28, 7.57)	0.88	2.22 (0.78, 6.32)
Marital status (4,300)							
Married (2,414)	97.03	2.31	1.00	0.35	1.00	0.31	1.00
Never married (1,198)	87.60	8.84	4.23 (3.00, 5.96)	2.09	6.70 (3.11, 14.42)	1.46	5.21 (2.20, 12.37)
Other (688)	93.58	4.73	2.12 (1.38, 3.25)	0.97	2.91 (1.07, 7.89)	0.73	2.43 (0.75, 7.87)
Current tobacco use (4,300)							
None (3,336)	96.93	2.48	1.00	0.35	1.00	0.25	1.00
Less than weekly (63)	73.33	26.67	14.24 (7.42, 27.32)	—	—	—	—
Weekly (65)	74.36	20.51	10.80 (5.19, 22.49)	3.85	14.32 (3.84, 53.41)	1.28	6.68 (0.79, 56.51)
Daily (836)	84.65	9.77	4.52 (3.24, 6.31)	3.09	10.11 (4.85, 21.09)	2.49	11.42 (4.70, 27.75)
Current alcohol use (4,300)							
None (1,118)	96.42	1.94	1.00	0.82	1.00	0.82	1.00
Less than weekly (1,487)	94.90	3.93	2.06 (1.23, 3.44)	0.67	0.83 (0.31, 2.26)	0.50	0.62 (0.24, 1.65)
Weekly (1,171)	90.46	7.62	4.19 (2.56, 6.85)	1.14	1.48 (0.55, 3.97)	0.78	1.02 (0.39, 2.62)
Daily (524)	92.99	4.78	2.55 (1.43, 4.57)	1.43	1.81 (0.58, 5.65)	0.80	1.01 (0.34, 3.00)
	Men's frequency of cannabis use						
	None	Less than weekly		Weekly		Daily	
Age (4,350)	%	%	OR*	%	OR†	%	OR‡
16–25 (844)	84.19	9.39	1.04 (0.72, 1.48)	3.36	2.33 (1.18, 4.62)	3.06	1.10 (0.58, 2.07)
26–35 (737)	80.88	13.01	1.49 (1.09, 2.05)	3.73	2.70 (1.43, 5.09)	2.38	0.88 (0.47, 1.66)
36–45 (960)	86.36	9.30	1.00	1.48	1.00	2.87	1.00
46–55 (1,082)	93.60	3.47	0.34 (0.23, 0.51)	1.08	0.67 (0.33, 1.38)	1.85	0.60 (0.32, 1.10)
56–64 (727)	97.94	0.80	0.08 (0.04, 0.17)	0.57	0.34 (0.13, 0.93)	0.69	0.21 (0.09, 0.52)
Language (4,351)							
Other (244)	97.26	2.74	0.34 (0.15, 0.75)	0.00	—	0.00	—
English (4,107)	88.24	7.33	1.00	2.09	1.00	2.34	1.00
Sexual identity (4,345)							
Heterosexual (4,248)	89.04	6.91	1.00	1.83	1.00	2.22	1.00
Homosexual (46)	72.73	18.18	3.22 (1.33, 7.79)	7.27	4.88 (1.65, 14.39)	1.82	1.00 (0.13, 7.50)
Bisexual (51)	77.05	11.48	1.92 (0.85, 4.36)	9.84	6.23 (1.72, 22.59)	1.64	0.85 (0.12, 6.31)
Education (4,349)							
Lower secondary (1,072)	87.78	6.30	0.83 (0.61, 1.13)	2.88	1.49 (0.88, 2.52)	3.04	1.24 (0.76, 2.00)
Secondary (2,235)	87.99	7.61	1.00	1.94	1.00	2.46	1.00
Post-secondary (1,042)	91.36	6.72	0.85 (0.62, 1.16)	1.12	0.56 (0.28, 1.10)	0.80	0.31 (0.16, 0.63)
Occupation (4,262)							
Professional (1,615)	91.48	6.66	1.00	0.88	1.00	0.98	1.00
Assoc. professional (835)	86.11	8.59	1.37 (0.96, 1.94)	2.80	3.38 (1.68, 6.82)	2.50	2.70 (1.37, 5.34)
Tradesperson (1,168)	87.01	6.92	1.09 (0.80, 1.49)	2.71	3.25 (1.77, 5.95)	3.35	3.59 (2.01, 6.44)
Unskilled (644)	86.92	7.38	1.17 (0.80, 1.70)	2.59	3.11 (1.48, 6.51)	3.11	3.33 (1.73, 6.42)
Marital status (4,348)							
Married (2,409)	93.98	4.29	1.00	0.83	1.00	0.90	1.00
Never married (1,457)	80.02	12.36	3.38 (2.60, 4.41)	3.72	5.26 (3.13, 8.84)	3.89	5.08 (2.92, 8.85)
Other (482)	88.93	5.02	1.24 (0.79, 1.92)	2.42	3.08 (1.58, 6.01)	3.63	4.27 (2.16, 8.42)
Current tobacco use (4,350)							
None (3,272)	93.30	4.97	1.00	0.97	1.00	0.76	1.00
Less than weekly (73)	75.00	20.45	5.12 (2.61, 10.05)	1.14	1.46 (0.20, 10.89)	3.41	5.55 (1.63, 18.84)
Weekly (93)	67.57	17.12	4.75 (2.66, 8.50)	13.51	19.26 (8.31, 44.67)	1.80	3.25 (0.43, 24.49)
Daily (912)	75.69	12.52	3.11 (2.38, 4.06)	4.48	5.70 (3.45, 9.42)	7.31	11.79 (7.31, 19.02)
Current alcohol use (3,451)							
None (639)	95.30	3.00	1.00	0.26	1.00	1.44	1.00
Less than weekly (1,166)	90.99	4.72	1.65 (0.92, 2.95)	1.72	6.89 (1.57, 30.24)	2.58	1.88 (0.91, 3.87)
Weekly (1,640)	85.55	9.82	3.64 (2.11, 6.28)	2.59	11.07 (2.64, 46.44)	2.03	1.58 (0.76, 3.26)
Daily (906)	87.02	8.01	2.92 (1.66, 5.14)	2.39	10.04 (2.36, 42.70)	2.58	1.97 (0.95, 4.07)

*Unadjusted odds ratio (OR) and 95% confidence interval of less than weekly use vs. no use.
†Unadjusted odds ratio and 95% confidence interval of weekly use vs. no use.
‡Unadjusted odds ratio and 95% confidence interval of daily use vs. no use.

Table 2 Adjusted odds ratios for the relationship between frequency of cannabis use and the number of sexual partners in the past year

	No partners vs. one OR* (95% CI)*	Two or more partners vs. one OR* (95% CI)*
Cannabis use		
	Women	
None	1.00	1.00
Less often than weekly	0.56 (0.31, 1.03)	2.05 (1.20, 3.49)
Weekly	0.06 (0.01, 0.47)	1.00 (0.41, 2.41)
Daily	—	2.58 (1.08, 6.18)
	$F(2, 4,269) = 5.30$; $P = 0.005$	$F(3, 4,268) = 3.47$; $P = 0.015$
	Men	
None	1.00	1.00
Less often than weekly	0.53 (0.31, 0.90)	1.95 (1.36, 2.81)
Weekly	1.04 (0.46, 2.32)	1.83 (1.01, 3.31)
Daily	1.26 (0.60, 2.65)	2.08 (1.11, 3.89)
	$F(3, 4,223) = 2.07$; $P = 0.102$	$F(3, 4,223) = 5.98$; $P < 0.001$

*Odds ratio adjusted for age group, language spoken at home, sexual identity, educational attainment, occupation, marital status, current tobacco use, and current alcohol use.
CI = confidence interval; OR = odds ratio.

However, cannabis use was reported in all age groups with daily use reported by all age groups of men and all but the oldest age group among women. There was a strong association between frequency of cannabis use and frequency of tobacco use in both men and women (Table 1). Among male daily cannabis users, 70% were daily tobacco users compared with 18% for male cannabis non-users. Among female daily cannabis users, 69% were daily tobacco users compared with 18% for female cannabis non-users. Cannabis use was also associated with a non-heterosexual identity, lower educational attainment, lower status occupation, and not being married (Table 1).

The number of sexual partners in the year prior to interview was strongly associated with the frequency of cannabis use (Table 2). Adjusted odds ratios (OR) indicate that frequent cannabis use by women was associated with an increased likelihood of reporting more than two sexual partners and a markedly reduced likelihood of reporting no partners rather than one. Among men, the relationship between frequency of cannabis use and reporting no partners rather than one was less clear, although any cannabis use was associated with a doubling of the likelihood of reporting two or more partners in the previous year compared with one partner. Among both men and women, the adjusted OR indicated no association between frequency of cannabis use and the likelihood of

Table 3 Adjusted odds ratio for the association between frequency of cannabis use and condom use at the most recent experience of vaginal or anal intercourse*

	Women OR (95% CI)†	Men OR (95% CI)†
Cannabis use		
None	1.00	1.00
Less often than weekly	1.11 (0.69, 1.79)	0.85 (0.58, 1.25)
Weekly	0.53 (0.19, 1.46)	0.90 (0.45, 1.78)
Daily	0.80 (0.23, 2.72)	0.48 (0.21, 1.11)
	$F(3, 3,994) = 0.64$; $P = 0.592$	$F(3, 4,045) = 1.14$; $P = 0.330$

*Only asked of men who reported having sex with men.
†Odds ratio and 95% confidence interval adjusted for age group, language spoken at home, sexual identity, educational attainment, occupation, marital status, number of sexual partners in the previous year (one vs. two or more), relationship to sexual partner (cohabiting regular partner, no-cohabiting regular partner, casual partner), current tobacco use, and current alcohol use.
CI = confidence interval; OR = odds ratio.

condom use at their most recent intercourse (Table 3). Frequency of cannabis use among men was not associated with reporting a diagnosis of a sexually transmissible infection in the previous year, but daily cannabis use among women was associated with a marked increase in the likelihood of reporting such a diagnosis (Table 4).

Among women, there was no association between any of the sexual problems and frequency of cannabis use in the adjusted analyses (Table 5). For men, however, there were significant associations between daily cannabis use and reporting an inability to reach orgasm (OR 3.94, confidence interval [CI] 1.71–9.07; $P < 0.01$), reaching orgasm too quickly (OR 2.68, CI 1.41–5.08; $P < 0.01$), and reaching orgasm too slowly (OR. 2.05, CI 1.02–4.12; $P = 0.04$). Among the 144 men who reported an inability to orgasm,

Table 4 Adjusted odds ratio for the association between frequency of cannabis use and the diagnosis of a sexually transmissible infection in the previous year

	Women OR (95% CI)*	Men OR (95% CI)*
Cannabis use		
None	1.00	1.00
Less often than weekly	1.61 (0.33, 7.96)	1.49 (0.37, 6.00)
Weekly	—	0.83 (0.07, 9.84)
Daily	7.19 (1.28, 40.31)	1.45 (0.17, 12.42)
	$F(2, 3,005) = 2.55$; $P = 0.078$	$F(3, 3,618) = 0.15$; $P = 0.930$

*Odds ratio and 95% confidence interval adjusted for age group, language spoken at home, sexual identity, educational attainment, occupation, marital status, number of sexual partners in the previous year (one vs. two or more), current tobacco use, and current alcohol use.
CI = confidence interval; OR = odds ratio.

Table 5 Adjusted odds ratio for the association between frequency of cannabis use and sexual problems for one month or more in the previous year

	Women OR (95% CI)*	Men OR (95% CI)*
Lacked interest in sex		
Cannabis use		
None	1.00	1.00
Less often than weekly	1.18 (0.84, 1.66)	0.95 (0.68, 1.34)
Weekly	0.64 (0.32, 1.25)	1.99 (1.14, 3.47)
Daily	1.03 (0.48, 2.19)	1.05 (0.60, 1.85)
	$F(3, 4,251) = 0.94$; $P = 0.420$	$F(3, 4,248) = 2.06$; $P = 0.104$
Inability to reach orgasm		
Cannabis use		
None	1.00	1.00
Less often than weekly	0.97 (0.62, 1.53)	1.13 (0.51, 2.51)
Weekly	0.82 (0.37, 1.85)	0.70 (0.17, 2.85)
Daily	1.50 (0.63, 3.61)	3.94 (1.71, 9.07)
	$F(3, 4,240) = 0.38$; $P = 0.770$	$F(3, 4,242) = 3.69$; $P = 0.011$
Reached orgasm too quickly		
Cannabis use		
None	1.00	1.00
Less often than weekly	1.21 (0.59, 2.47)	0.87 (0.57, 1.34)
Weekly	0.33 (0.04, 2.60)	1.53 (0.67, 3.48)
Daily	1.37 (0.28, 6.68)	2.68 (1.41, 5.08)
	$F(3, 4,133) = 0.54$; $P = 0.653$	$F(3, 4,230) = 3.62$; $P = 0.012$
Reached orgasm too slowly		
Cannabis use		
None	1.00	1.00
Less often than weekly	1.30 (0.88, 1.92)	1.20 (0.71, 2.04)
Weekly	0.74 (0.32, 1.70)	1.10 (0.46, 2.65)
Daily	1.55 (0.70, 3.45)	2.05 (1.02, 4.12)
	$F(3, 4,183) = 1.16$; $P = 0.324$	$F(3, 4,229) = 1.41$; $P = 0.239$
Pain during intercourse		
Cannabis use		
None	1.00	1.00
Less often than weekly	0.93 (0.51, 1.69)	1.66 (0.70, 3.94)
Weekly	0.58 (0.12, 2.88)	3.86 (1.15, 12.98)
Daily	2.14 (0.90, 5.09)	2.17 (0.63, 7.48)
	$F(3, 4,246) = 1.20$; $P = 0.309$	$F(3, 4,089) = 2.28$; $P = 0.077$
Not finding sex pleasurable		
Cannabis use		
None	1.00	1.00
Less often than weekly	1.21 (0.77, 1.89)	0.65 (0.29, 1.45)
Weekly	0.73 (0.30, 1.81)	0.74 (0.18, 3.16)
Daily	1.79 (0.68, 4.68)	1.50 (0.61, 3.69)
	$F(3, 4,221) = 0.87$; $P = 0.456$	$F(3, 4,242) = 0.81$; $P = 0.489$
Anxiety about ability to perform		
Cannabis use		
None	1.00	1.00
Less often than weekly	1.01 (0.61, 1.68)	1.08 (0.69, 1.69)
Weekly	0.39 (0.11, 1.34)	1.45 (0.71, 2.97)
Daily	1.81 (0.73, 4.49)	1.48 (0.74, 2.96)
	$F(3, 4,248) = 1.37$; $P = 0.251$	$F(3, 4,241) = 0.71$; $P = 0.548$
Vaginal dryness		
Cannabis use		
None	1.00	
Less often than weekly	1.57 (0.96, 2.58)	
Weekly	0.61 (0.18, 2.09)	
Daily	0.85 (0.25, 2.86)	
	$F(3, 4,255) = 1.35$; $P = 0.258$	
Trouble keeping an erection		
Cannabis use		
None		1.00
Less often than weekly		1.00 (0.55, 1.83)
Weekly		1.34 (0.59, 3.06)
Daily		1.64 (0.77, 3.48)
		$F(3, 4,240) = 0.67$; $P = 0.571$

*Odds ratio and 95% confidence interval adjusted for age group, language spoken at home, sexual identity, educational attainment, occupation, marital status, number of sexual partners in the previous year (one vs. two or more), current tobacco use, and current alcohol use.
CI = confidence interval; OR = odds ratio.

there was no association between frequency of cannabis use and the extent to which inability to orgasm was experienced as problematic ($F[8.78, 1,299.10] = 1.65$, $P = 0.10$). However, among the 424 men who reported reaching orgasm too quickly, there was an association between frequency of cannabis use and the extent to which reaching orgasm too quickly was experienced as problematic such that more frequent cannabis use was associated with experiencing reaching orgasm too quickly as more problematic ($F[8.45, 3,692.91] = 2.85$, $P < 0.01$).

Discussion

Frequent cannabis use, particularly daily use, is associated with a range of health and behavioral outcomes. For example, frequent users are more likely than others to report two or more sexual partners in the previous year, as has been found in other studies [9].

Female daily cannabis users are significantly more likely than non-users to report the diagnosis of a sexually transmissible infection in the previous year. Although frequent cannabis use appears unrelated to sexual problems in women, it clearly interferes with orgasm in men and its use is associated with the delay or prevention of orgasm in some men and with orgasm too soon in others. That there is an association between frequency of cannabis use and the extent to which reaching orgasm too quickly is problematic raises the possibility that men are self-medicating with cannabis to delay orgasm.

We failed to find any association between frequency of cannabis use and trouble keeping an erection. This is consistent with the finding of Johnson and colleagues who also failed to find an association between lifetime cannabis use and "inhibited sexual excitement (i.e., lack of erection in men, lack of arousal for women)" [7] (p. 57). However, there have been reports that very high doses of cannabis have been associated with an "inability to perform" [32] (p. 23), and that this may be related to changes in plasma testosterone such that modest doses increase plasma testosterone but that high doses lower testosterone below baseline [32].

Consistent with the present article, Johnson and colleagues found an association between cannabis use and inhibited orgasm, such that a history of cannabis use was associated with being more likely to report a recent history of an inability to orgasm [7]. Halikas and colleagues also found that

cannabis use was associated with an increased duration of intercourse and a decreased number of orgasms [33].

The present study has a number of strengths and weaknesses. Its strengths include the large sample, wide age range of participants, and high response rate. Weaknesses include a reliance on self-report and the attendant possibility of a social desirability bias.

Given the high prevalence of cannabis use and the associations reported between frequent cannabis use and a range of sexual health issues, clinicians should routinely enquire about patients' cannabis use and, if frequent use is reported, take a detailed sexual history and manage the patient accordingly.

These findings could also provide useful input to health promotion and/or health education campaigns aiming to reduce frequent cannabis use.

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Marijuana use and sexual behavior

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BRIEF REPORTS

MARIJUANA USE AND SEXUAL BEHAVIOR

Ronald A. Weller and James A. Halikas

In several anonymous questionnaire studies of college students, marijuana use has been reported to affect sexual behavior. In general, these studies show that marijuana smoking enhances sexual pleasure and increases sexual desire. Marijuana use has also been associated with more frequent sexual activity and an increased number of sexual partners. The purpose of this study was to determine the perceived effects of marijuana use on the sexual behavior and sexual practices of a sample of regular marijuana users. In contrast to other studies, subjects were not drawn exclusively from college student populations and were interviewed rather than given a questionnaire. Results, in general, confirm results of previous studies. Subjects were primarily heterosexual and sexually active. Men were more likely than women to have had multiple sexual partners. Over two thirds reported increased sexual pleasure and satisfaction with marijuana. Increased desire for a familiar sexual partner was reported by about one half. The sensations of touch and taste were particularly enhanced by marijuana. Many felt marijuana was an aphrodisiac. Marijuana use in relation to initiation of sexual activity was also assessed. Although drug use occurred prior to first intercourse for about one third of the men and women, alcohol, not marijuana, was most frequently used in this context. Most had used marijuana as a preparation for intercourse on occasion, and 20% did this on a regular basis. Possible explanations for these effects are briefly discussed.

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Marijuana has the reputation of being an aphrodisiac. Jarvik and Brecher (1977) identified several possible explanations for marijuana's aphrodisiac-like effect: it (a) loosens inhibition, (b) enhances sensate focus, (c) causes a generalized increase in enjoyment (hedonism), (d) slows perception of time thus causing an enjoyable activity seemingly to last longer, (e) has a reputation for sexual enhancement (placebo effect), and (f) its use occurs under relaxed circumstances conducive to sexual activity.

Results of many studies tend to support the belief that marijuana has aphrodisiac-like effects. In one experiment, cannabis administration caused

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sexual arousal of subjects (Mayor's Committee, 1944). In another study, THC (delta-9-tetrahydrocannabinol) given under experimental conditions caused sexual thoughts to occur (Hollister, Richards, & Gillespie, 1968). North Africans believed marijuana stimulates the sexual faculties (Bouquet, 1951) and, of 1200 Indian marijuana users studied, 10% believed cannabis increases sexual excitement during intercourse (Chopra, 1969).

More recent survey studies of U.S. college students also reported a positive relationship between marijuana use and sexual behavior. For example, Robbins and Tanck (1973) found sexual desire to be more frequent among a sample of graduate psychology students on days when they used marijuana than on days they did not. Goode (1972) reported marijuana users were more likely than nonusers to engage in intercourse, engage in it earlier in life, engage in it more regularly, and have a greater variety of partners. Sensations were intensified and sex was desired more during marijuana intoxication (Tart, 1971). Sex was more pleasurable when smoking marijuana (Traub, 1977). Sexual desire and sexual enjoyment or pleasure with marijuana use were also reported by Arafat and Yorburg (1973); Dawley, Winstead, Baxter, and Kay (1974); and Koff (1974). Other researchers reporting similar findings include Brill and Christie (1974), Chopra and Jandu (1976), and Fisher and Steckler (1974).

However, most of these studies have used samples drawn only from college student populations. Moreover, respondents were not interviewed but filled out questionnaires anonymously, making the reliability and validity of responses difficult to assess. These factors limit the ability to generalize to larger populations. This investigation was conducted in an attempt to replicate the results of previous studies, with a sample not drawn exclusively from college students. In addition an interview format was used instead of an anonymous questionnaire. Different aspects of sexual behavior were also studied to give a more complete picture of sexual functioning. Effects of marijuana use on sexual performance, sexual pleasure, and sensations during sexual activity were assessed in detail. More general areas such as sexual preference, sexual practices, and sexual partners were also evaluated.

Method

Subjects

Subjects were 97 of an original sample of 100 adults from a large midwestern city, initially interviewed in 1969-1970 and reinterviewed in 1976-1977 as a part of clinical study of marijuana use. These individuals were "regular" marijuana users by self-report, not experimenters or casual users, had averaged over 2 years of marijuana use, and had used marijuana at least 50 times in a 6-month period preceding the initial study. All subjects were white and came mainly from middle-class backgrounds. Sixty (62%) were male; 37 (38%) were female. At follow-up, average age was 27.5 years. Virtually all had completed high school, and many had attended college. Over 80% were working full-time in occupations ranging from physicians to ditch-diggers. All but one (who had had discontinued use after joining a religious group that forbade its use) continued to regard themselves as marijuana users.

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During the 12 months prior to follow-up, 86% had used marijuana. All but one had intentions of using it in the future. Although 14% had not used it in the past year, all had used it extensively in the past and were knowledgeable about marijuana's effect on their sexual activity. Since the responses of this group of 14% showed no significant differences from remaining subjects, they were included in the analysis. None of the subjects had gone longer than 24 months without using marijuana. Overall, these 97 users averaged 6-8 years of use. Marijuana use for the most part continued to be frequent—23% were daily users and about half were using marijuana weekly.

At the time of the original data collection, marijuana use was less common than now, and laws restricting its use were more strictly enforced. As a result some effort was required to locate subjects who were willing to be interviewed. To obtain as broad-based a sample as possible, three source individuals with access to different groups of marijuana users were asked to refer subjects. When interviewed, subjects were asked to refer additional subjects. Although not ideal, this sample was broader-based than a sample consisting only of college students. Results and detailed description of the methodology of this initial study have been published (Halikas, Goodwin, & Guze, 1971, 1972).

Interview Schedule

A structured interview was used, composed of closed-ended questions. Some answers required a yes or no response, whereas others required the subject to quantify or rate a particular phenomenon which was coded by the interviewer. Thus, interviewer interpretation was minimized, resulting in more standardized responses. The interview contained questions to allow cross-validation and to assess the reliability of the interview. Questions addressed the effect of marijuana on sexual performance, sexual enjoyment, and the senses; sexual orientation, sexual practice, and sexual partners; the role of marijuana, alcohol, and other drugs in initiation of sexual activity and in preparation for sexual activity. After the study was about one third completed, additional questions on sexual matters were added. Thus, for these variables, information was available from only 65 subjects. In addition to information on marijuana use and sexuality, general demographic information was elicited from all subjects. Preliminary work indicated interview questions were understandable to subjects. Response consistency was excellent in trial interviews.[1]

Procedure

All subjects gave informed consent and were paid $20.00 for participation. Interviews were conducted using the interview schedule described above. Interview format allowed for the establishment of rapport, clarification of study objectives, and explanation of questions as they arose, thus minimizing ambiguous or invalid results. In general rapport was good, and subjects cooperated well with the interviewer. Cross-validation of certain interview items indicated that reliable responses were obtained. Responses corresponded well with information obtained in a previous interview study of these

[1]A copy of the interview schedule is available from the first author.

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subjects. These facts also indicate that the information obtained in this study was valid.

Results

A summary of marital and several sexual behavior characteristics is contained in Table 1. These marijuana users were sexually active, with 70% reporting more than one sexual partner in the past year. Sexual orientation was primarily heterosexual. A number of users reported postpubertal homosexual experiences, but most did not consider these of consequence. Only 12% considered themselves homosexual or bisexual. There was only one significant difference between males and females: Men were significantly more likely to have had more than five sexual partners in the past year (49% vs. 25%).

Table 1

Sexual Background of Subjects

	User Males ($n = 60$) %	User Females ($n = 37$) %	Users Total ($N = 97$) %
Ever married	48	56	52
Currently married	32	35	33
Extramarital sexual experience	11	23	17
First heterosexual intercourse prior to age 18	50	46	49
More than one sexual partner in past year	78	75	77
Five or more sexual partners in past year	49	25[a]	40
Partner swapping or group sex ever	5	5	5
Post-pubertal homosexual experience	22	32	26
Bisexual or homosexual preference	12	13	12

[a] $\chi^2(1\ N = 97) = 4.4, p < .05$.

In Table 2 marijuana's reported enhancement of sexual activities is summarized. Over two thirds reported increased sexual pleasure and satisfaction with marijuana use. Other parameters of sexual enjoyment, such as emotional closeness, physical closeness, and increased enjoyment of snuggling were all enhanced. Quality of orgasm and duration of intercourse were also enhanced by marijuana, with men significantly more likely than women to report this. Increased number of orgasms and ability to repeat orgasms were reported, but not frequently. Approximately one half felt marijuana had an aphrodisiac effect on them.

About half of both sexes reported increased desire for sexual relations with a familiar partner while using marijuana. However, 43% of the men reported an increased desire for an unfamiliar partner, whereas only 13% of the women reported such a desire while using marijuana, $p < .001$. Desire for multiple partners or homosexual partners as an effect of marijuana was not reported by most users. All those reporting a desire for partners of the same sex while using marijuana were homosexuals or bisexuals. Marijuana also affected the

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Table 2

Reported Marijuana Enhancement of Sexual Activities

	Men (n = 60) %	Women (n = 37) %
Physiologic		
Quality of orgasm	58	32[a]
Duration of intercourse	27	8[b]
Number or orgasms	12	16
Ability to repeat	14	3
Partner Preference		
Desire for familiar partner	50	60
Desire for unfamiliar partner	43	13[c]
Desire for multiple partners	12	3
Desire for homosexual partner[d]	7	3
Sexual Enjoyment	(n = 40)	(n = 25)
Sexual pleasure and satisfaction	70	76
Emotional closeness and intimacy	46	63
Feeling of physical closeness	51	56
More snuggling	34	56
Marijuana is an aphrodisiac	44	50
Sensual Effects		
Touching	59	57
Taste	23	33
Smell	23	7
Hearing	17	11
Sight	11	7

[a] $\chi^2(1\ N = 97) = 6.1; p$ .025.
[b] $\chi^2(1\ N = 97) = 5.0; p$ .05.
[c] $\chi^2(1\ N = 97) = 9.4; p$ .001.
[d] All those reporting increased desire for partner of same sex were either homosexual or bisexual.

senses during sexual activity, with touch and taste being most often reported as enhanced.

The effects of alcohol, marijuana, and other drugs (a category that combined stimulants, sedatives, hallucinogens, and narcotics) on the initiation of sexual activity were compared and are summarized in Table 3. One third had used some drug immediately prior to their first sexual experience. Alcohol was more frequently used than both marijuana and other drugs. One half felt drug use had made them more willing to have intercourse the first time. About one half of both men and women had had unwanted intercourse (intercourse they did not seek and later regretted) at some time following drug use. Other drugs—not alcohol or marijuana—preceded unwanted intercourse most frequently. Many (32%) had never used drugs prior to intercourse other than alcohol and marijuana. Currently, they were more likely to use marijuana before intercourse than alcohol or other drugs. In fact, 76% had used marijuana as a preparation for intercourse, and 20% used it regularly for this purpose.

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Table 3

Reported Effect of Marijuana, Alcohol, and Other Drugs on Initiation of Sexual Activity

	Male Users ($n = 60$) %	Female Users ($n = 37$) %	Total Users ($N = 97$) %
Marijuana prior to first intercourse	7	8	7
Alcohol prior to first intercourse	22	24	23
Other drugs prior to first intercourse	3	3	3
Any drug prior to first intercourse	32	35	33
Intoxicant made more willing on first intercourse[a]	50	50	50
Marijuana led to unwanted intercourse	11	5	9
Alcohol led to unwanted intercourse	13	16	14
Other drugs led to unwanted intercourse	22	27	24
Unwanted intercourse secondary to drugs	46	48	47
Never marijuana prior to intercourse	3	0	2
Never alcohol prior to intercourse	7	3	5
Never other drugs prior to intercourse	29	38	32
Alcohol prior to intercourse > 25%	9	17	12
Marijuana prior to intercourse > 25%	24	24	24
Other drugs prior to intercourse > 25%	0	3	1
Marijuana part of preparation for intercourse ever[b]	80	71	76
Marijuana as part of preparation for intercourse > 25%[b]	20	21	20

[a]Includes only those using intoxicants before first intercourse, $n = 32$.
[b]Includes reduced number of users answering question, $n = 65$.

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Discussion

In general, these regular marijuana users report that marijuana use enhanced their sexual lives. Almost all had used marijuana prior to intercourse, and many had incorporated marijuana use into part of their preparation for intercourse on a routine basis. There were some significant sex-related differences in the extent various parameters were enhanced. This may correspond to underlying male/female differences in sexual response or differences in sexual expectations between the sexes. There was not a significant increase in the reported number of orgasms experienced or ability to repeat intercourse. Despite reported enhancement of sexual experience and early use of marijuana by many of these subjects, marijuana did not play a large role in initiating first sexual activity.

Explanations for the apparent aphrodisiac-like effects of marijuana have been previously discussed. However, there may be other explanations as well. For example, some constituent of marijuana may have a direct stimulating effect on centers in the brain that control sexual activity. Marijuana has been shown to alter plasma testosterone in mice (Dalterio, Bartke, & Mayfield, 1981) and men (Kolodny, Masters, Kolodner, & Toro, 1974). Further research

is needed to determine what effects such altered testosterone levels may have on sexual pleasure and behavior in humans.

The sample for this study consisted of young, white, middle-class adults who had used marijuana regularly. Results should be generalizable to similar groups. This study is not directly comparable to previous studies because of design differences. In this study, subjects were not exclusively college students. Also an interview format was used instead of anonymous questionnaires. However, results of questionnaire studies of college students are compatible with the current study; that is, individuals who use marijuana report a positive effect on sexual activity. However, to date there has been little work studying marijuana's effect on the sexual behavior of other groups, such as older marijuana users, lower-class marijuana users, or marijuana users in various minority groups. The results of this study may not be generalizable to such groups. Further work is needed to determine if the effects of marijuana on sexual behavior reported here are seen in broader populations.

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Issue Consultants

The following individuals, in addition to members of the Editorial Board, have recently served as reviewers. Their advice is greatly appreciated.

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Editor's Comment

I also want to thank Rebecca L. Sargent for her many contributions to the *Journal* during the past 4 years. She was hired as a part-time typist at the beginning of her freshman year at Syracuse University. Although her title never changed (and the remuneration improved very little), she became an errand runner, proofreader, copy editor, editorial assistant, co-worker, and friend, not to mention a student member of SSSS. Her independence, initiative, and sense of responsibility have been of inestimable value to me over the years. I shall miss her greatly as she moves on to graduate school next year. I, personally and on behalf of SSSS, wish her happiness and success in her endeavors.

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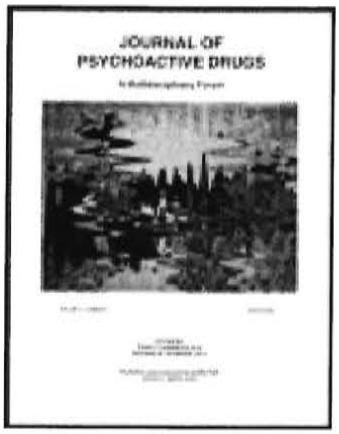

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Effects of Regular Marijuana Use on Sexual Performance

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Effects of Regular Marijuana Use on Sexual Performance

JAMES HALIKAS, M.D.*; RONALD WELLER, M.D.** & CAROLYN MORSE, M.A.***

During the last 15 years, the use of marijuana as a social intoxicant has become almost as commonplace as the use of alcohol among individuals under the age of 35. Throughout this era of marijuana use, it has been alleged that marijuana is a sexual stimulant; an aphrodisiac, an enhancer of sexual performance (Lewis 1970). Yet, virtually no systematic work has explored this reported effect of marijuana. Eric Goode (1972) found that for most of his surveyed group of marijuana users, marijuana indeed enhanced sexual desire and performance, and was subjectively perceived as a sexual stimulant. In response, Peterson (1972) maintained that these effects were dose- and setting-dependent. Koff (1974) also found that mood, expectation and setting were the sexually stimulating elements.

In 1975, Robert Kolodny and his colleagues presented the results of two endocrinologic studies of adult male marijuana users (Kolodny et al. 1975, 1974). They found that after more than six months of regular marijuana use, serum testosterone levels were significantly lower. Although these levels were not lowered beyond the range of normal, the uniformity of the trend was worrisome. In addition, at least one of the subjects noted potency problems, which disappeared after cessation of marijuana use, and 35% of the subjects were noted to have had lower sperm counts during the course of the study. Thus, although the current folklore indicates that marijuana is a sexual stimulant, there is at least some evidence that this may not be a universally achieved effect.

METHODOLOGY

In 1969-70, 100 regular marijuana users and 50 nonusers were systematically interviewed as part of a large descriptive study of marijuana use and its effects (Halikas 1974; Halikas & Rimmer 1974; Halikas, Goodwin & Guze 1972a, 1972b, 1971). As part of the criteria for admission to that study, all subjects were at least 18 years of age and White. The user group viewed themselves as regular marijuana users, and had used marijuana on more than 50 separate occasions during a time period lasting more than six months. In fact, the average duration of marijuana use at that time was more than two years, with an average frequency of two to three times per week. All subjects were paid volunteers. In addition to a thorough review of marijuana use and its effects on subjects' lives, the original interview collected descriptive information in a wide variety of psychosocial areas for each subject, including growth and development, education, a systematic psychiatric symptom review, developmental landmarks, family history and rearing practices, and current and past drug and alcohol use patterns.

Between 1975 and 1977, a study was undertaken to find and reinterview all of the subjects. Of the 150 index

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TABLE I

SEXUAL DEMOGRAPHIC CHARACTERISTICS

	Population		User Gender		Recent Usage		Abuse Status	
	Users (N = 97) %	Nonusers (N = 35) %	Males (N = 60) %	Females (N = 37) %	Less Frequent (N = 75) %	Frequent Users (N = 22) %	Male Nonabusers (N = 52) %	Male Abusers (N = 8) %
Ever married	52	74	48	56	52	50	54	13
	p = .057		Not significant		Not significant		p = .08	
Currently married	33	60	32	35	36	23	35	13
	p = .006		Not significant		Not significant		Not significant	
Age of first heterosexual intercourse less than 18	49	14	50	46	41	73	44	88
	p = .0008		Not significant		p = .02		p = .057	
More than one meaningful sexual relationship ever	68	49	68	69	67	73	63	100
	p = .07		Not significant		Not significant		Not significant	
Currently married, subjects unfaithful	17	19	11	23	19	0	6	100
	Not significant		Not significant		Not significant		No chi-square	
Unmarried subjects, number of sex partners in prior 12 months								
None	3	0	2	4	4	0	3	0
One	20	36	20	21	19	24	21	14
Two-Four	37	36	29	50	42	24	32	14
Five +	40	29	49	25	35	53	44	71
	Not significant		Not significant		Not significant		Not significant	
Partner swapping or group sex (all subjects)	5	6	5	5	4	9	4	13
	Not significant		Not significant		Not significant		Not significant	
Sexual orientation								
Heterosexual	88	97	88	87	87	91	86	100
Bisexual	6	0	5	8	8	0	6	0
Homosexual	6	3	7	5	5	9	8	0
	Not significant		Not significant		Not significant		Not significant	
Postpubertal homosexual experiences	26	6	22	32	24	32	23	13
	p = .02		Not significant		Not significant		Not significant	

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subjects, one was known to have died. Of the 149 living subjects, 148 were found and 147 agreed to be reinterviewed. The subjects were found in 40 cities, in 25 states and three foreign countries. With the exception of the three subjects overseas, all subjects were interviewed in person by a social science professional, specially trained in the administration of the follow-up interview. Again, all the subjects were paid.

The follow-up interview collected descriptive information concerning the time interval between the index interview and the follow-up interview (approximately six years), in the areas of educational progress, legal problems, vocational experiences, social relationships, family events, intercurrent psychiatric problems and psychosocial adjustment, and a complete drug- and alcohol-interval history. Patterns of marijuana use during the interval and consequences in their lives, in a variety of areas, were canvassed.

One of the areas explored with the subjects was the effect of marijuana intoxication and regular marijuana use on sexual interest and performance. In this regard, eight global questions were asked of all the subjects interviewed, regarding the effect of marijuana intoxication on various aspects of intercourse, duration, ability to repeat, and interest in familiar partner. Approximately one-third of the way through the data collection phase of the project, an additional set of questions was added to the interview regarding the specific effects of marijuana intoxication on various sensory or sensual modalities involved in sexual activity. These included sight, hearing, tasting, snuggling and intimacy. Thus, information was obtained on these questions from about two-thirds of the total user population. All questions were asked for the time interval of the 12 months prior to the follow-up interview or for the most recent 12 months of marijuana use.

This report will present data dealing with the effects of marijuana use on sexual activity among the users with respect to gender differences, differences associated with differential frequency of use, and abuse-nonabuse characteristics of these users. Comparisons between the user group and the control group will be made relating to their patterns of sexual activity.

The mean age of the users at follow-up was 27.5, with a range of 23-38; mean age of the index nonusers was 28.3, ranging from 23-39. The population was well-educated: by the time of follow-up, 95% of the users and all of the nonusers had had some college experience. Also at the time of follow-up, 80% of both groups were employed in occupations that ranged from physician to ditch digger. The index users had now been using marijuana for approximately eight years. During the 12 months prior to the follow-up interview, 86% of the users had used marijuana. Nearly one-quarter were using marijuana five or more times per week during the prior 12 months. Another 30% were using marijuana one to four times per week.

Between the index and follow-up interviews, the distinction between the user and nonuser groups had blurred somewhat. At follow-up, 30% of the index nonusers reported that they either had been or were currently marijuana users. Sixty-two percent had used marijuana at some time in the preceding year, but only four percent had used it five or more times a week during that year. It seems that both groups could now be better described as user groups differing mainly in the length and frequency of their marijuana use, but both having marijuana use rates considerably above the national norm. This is not surprising, considering that the controls were originally obtained by word-of-mouth referral as nondrug using friends of the users. The nonusing peers of the users would naturally be expected to have had a greater opportunity to try marijuana and to develop more liberal attitudes toward the drug than a control group drawn from a different social milieu. That the users and controls exhibit considerable interchange and overlap in their marijuana usage patterns illustrates the comparability of the groups. Nevertheless, in order to maximize the contrast between users and nonusers, the "nonusers" who reported having been regular users (30%) at some time were excluded from the analyses reported here.

RESULTS

Sexual Demographics

A series of chi-square analyses were performed to compare subjects on a number of areas relevant to their sex lives, including marital status, living arrangements, infidelity rates and homosexual experiences (see Table I). The users were compared with the nonusers in one series of analyses. Differences among users were pursued by partitioning them according to gender, frequency of recent usage, and abuse-nonabuse characteristics in subsequent analyses.

Comparisons of users with comparison group: Among the users, 52% had been married at some time, compared with 74% of the nonusers ($p = .057$). Sixty percent of the nonusers and 33% of the users were currently married ($p = .006$). At the time of the follow-up interview, 30% of the users versus 63% of the nonusers were living with their spouse; 22% of the users were living with lovers compared with six percent of the nonusers; and 49% of the users were living alone, with friends or family versus 32% of the nonusers. Thus at

follow-up, approximately 52% of the users versus 69% of the nonusers were living with a sexual partner.

The two groups did not differ significantly in the number of divorces or separations, the age they were first married or the age they were first divorced. Of those currently married, 80% of both groups described their marriage as good, and over 80% of both groups had never been unfaithful. About five percent of each group had engaged in partner swapping, group sex or both. The currently unmarried users did not differ significantly from the unmarried nonusers in the number of sexual partners they had had in the year preceding follow-up.

Forty nine percent of the users and 14% of the nonusers had experienced their first heterosexual intercourse before the age of 18 ($p = .0008$). Since puberty, 26% of the users had had homosexual relations compared with only six percent of the nonusers ($p = .02$). About six percent of the users reported they were bisexual and another six percent claimed homosexuality as their primary sexual orientation. This compares with three percent homosexuality and no bisexuality among nonusers. This difference between groups was not statistically significant.

The users did not differ from the nonusers in the number of sexual problems reported or the number of times they sought treatment for such problems. About 10% of each group reported problems and/or treatment.

Comparisons of selected groupings of users:

1. Males and females: There were no significant differences between males and females on sexual demographic characteristics.
2. Frequent and less frequent users: Subjects ($N = 22$) who reported using marijuana at least five times per week in the year preceding follow-up were compared to those reporting less frequent usage ($N = 75$). More of the frequent users had had their first heterosexual intercourse before age 18 than had the less frequent users ($p = .02$). No other significant differences between the groups were found.
3. Male abusers and nonabusers: Nine percent of the user group were classified as marijuana abusers according to criteria established by Weller and Halikas (1980). Abusers manifested problems in three or four of the following areas: (a) adverse physiological and psychological drug effects; (b) control problems; (c) social and interpersonal problems; and (d) adverse subjective opinions of others. All but one of the abusers identified were male, so only the eight male abusers and 52 male nonabusers were included in these comparisons. Only one abuser had been married (13%) compared with 54% of the nonabusers ($p = .08$). The abusers had experienced heterosexual intercourse at an earlier age, with 88% before 18 years of age compared with 44% of the nonabusers ($p = .057$). These were the only sexual demographic variables that approached significance in this breakdown of subjects.

Summary of sexual demographics: The users differed from the controls in three main respects: (1) more users remained single; (2) the users first sexual relations occurred earlier; and (3) more users had engaged in homosexual activity. Among the users, females and males shared very similar sexual demographics. When frequent and less frequent users were compared, more frequent users had early (pre-18) heterosexual intercourse. The male marijuana abusers had sexual demographics similar to the frequent users. Table I presents the complete sexual demographic statistics of this population.

Sexual Activity and Substance Abuse Patterns

Subjects reported what role marijuana, alcohol and other drugs played in their first heterosexual experience and the proportion of the time they used these drugs in conjunction with their current sexual activity.

Users versus comparison group: No nonuser reported having used alcohol, marijuana or other drugs before their first sexual intercourse, compared with 33% of the users who had used an intoxicant ($p = .0015$) (see Table II). All of the subjects were asked if they had ever engaged in intercourse when intoxicated and, if so, would they have, had the intoxicant not been a factor. Forty six percent of the marijuana users had had this experience, and of these, 30% implicated alcohol, 17% cited marijuana and 52% blamed other drugs or a combination of intoxicants. By contrast, 33% of the nonusers had experienced undesired intercourse when intoxicated, with 76% of these citing alcohol and 12% implicating marijuana and another 12% indicating other drugs or a combination of drugs. The patterns of group differences were significantly different ($p = .05$) (see Table III).

With respect to ongoing sexual activity, about 65% of both groups used alcohol one percent to 10% of the time they had sex, but more nonusers than users had never used alcohol before sex and fewer nonusers reported using it at high levels of frequency ($p = .06$). None of the nonusers had used marijuana or other drugs more than 10% of the time they engaged in sexual activity. By contrast, 45% of the users had used marijuana more than 10% of the time they engaged in

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TABLE II

INTOXICATION AND INITIAL INTERCOURSE

	Population		User Gender		Recent Usage		Abuse Status	
	Users (N = 97)	Nonusers (N = 35)	Males (N = 60)	Females (N = 37)	Less Frequent (N = 75)	Frequent Users (N = 22)	Male Nonabusers (N = 52)	Male Abusers (N = 8)
	%	%	%	%	%	%	%	%
First intercourse after intoxicant?								
No	67	100	68	65	69	59	67	75
Yes, alcohol	23	0	22	24	23	23	24	13
Yes, marijuana	7	0	7	8	7	9	6	13
Yes, other drugs/combination of drugs	3	0	3	3	1	9	4	0
Group differences	p = .0015		Not significant		Not significant		Not significant	
Intoxicant influence first intercourse? (of those using intoxicant)	(N = 36)	(N = 0)	(N = 22)	(N = 14)	(N = 28)	(N = 8)	(N = 19)	(N = 3)
	%	%	%	%	%	%	%	%
No effect	50	0	50	50	54	38	53	33
Made more willing	50	0	50	50	46	63	47	67
Group differences	No chi-square		Not significant		Not significant		Not significant	

sexual activity ($p < .0001$), and 67% of users versus 21% of nonusers had at some time used other drugs or combinations of drugs preceding intercourse ($p < .01$) (see Table IV).

Sexual activity and substance use patterns of selected groupings of users:

1. Males and females: The male and female users did not differ significantly on any of the substance use variables (see Tables II-V).
2. Frequent and less frequent users: The frequent users differed from the less frequent users only in terms of their current usage patterns. The frequent users more often used alcohol ($p = .10$), marijuana ($p = .004$) and other drugs ($p = .02$) in conjunction with their sexual activity than did the less frequent users (see Table IV). Moreover, their use of marijuana was more likely to be by design in preparation for sexual activity than was the use of the less frequent users ($p = .004$) (see Table V).
3. Male abusers and nonabusers: The abusers differed from the nonabusers marginally in one category, the use of other drugs before intercourse ($p = .07$) (see Table IV).

TABLE III

INTOXICANT EVER LEAD TO UNDESIRED INTERCOURSE?

	Population		User Gender		Recent Usage		Abuse Status	
	Users (N = 97)	Nonusers (N = 35)	Males (N = 60)	Females (N = 37)	Less Frequent (N = 75)	Frequent Users (N = 22)	Male Nonabusers (N = 52)	Male Abusers (N = 8)
	%	%	%	%	%	%	%	%
"Yes," any intoxication	46	33	45	49	44	55	46	43
Of those answering "yes":								
Alcohol	30	76	28	34	29	33	27	33
Marijuana	17	12	24	12	17	25	27	0
Other drugs/combination of drugs	52	12	48	56	54	42	46	66
Group differences	p = .05		Not significant		Not significant		Not significant	

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TABLE IV

PERCENT OF TIME DRUGS USED BEFORE INTERCOURSE

	Population		User Gender		Recent Usage		Abuser Status	
	Users (N = 97) %	Nonusers (N = 35) %	Male (N = 60) %	Female (N = 37) %	Less Frequent (N = 79) %	Frequent Usage (N = 22) %	Male Nonabusers (N = 52) %	Male Abusers (N = 8) %
Alcohol:								
0%	5	18	7	3	7	0	8	0
1%-10%	64	67	64	64	63	67	60	88
11%-25%	19	12	21	17	23	10	22	13
25% +	12	3	9	17	8	24	10	0
Group differences	p = .06		Not significant		p = .10		Not significant	
Marijuana:								
0%	2	41	3	0	3	0	4	0
1%-10%	53	59	52	54	60	29	50	63
11%-25%	22	0	21	23	22	19	22	13
25% +	24	0	24	23	15	53	24	25
Group differences	p < .00001		Not significant		p = .004		Not significant	
Other drugs/combination of drugs:								
0%	32	79	29	38	40	5	34	0
1%-10%	64	21	67	59	57	90	64	88
11%-25%	2	0	4	0	2	5	2	13
25% +	1	0	0	3	2	0	0	0
Group differences	p = .01		Not significant		p = .02		p = .07	

Summary of sexual activity and substance use patterns: The users as a group were more likely than nonusers to utilize intoxicating substances before sexual activity. Marijuana was consumed by the users more often than alcohol or other drugs in conjunction with sexual activity. However, it was less likely than alcohol to have been used before sexual initiation or undesired intercourse. Other drugs or combinations of intoxicants were most often linked to undesired intercourse. Frequent users were more likely to use marijuana by design in preparation for sex than were less frequent users.

General Marijuana-Induced Effects on Sexual Performance

The users were asked whether or not marijuana affected them with regard to the duration of intercourse, the quality of orgasm, the number of orgasms and their ability to repeat intercourse. Specifically, they reported whether marijuana increased, decreased, variably affected (i.e., was setting-dependent) or had no effect on each of these aspects of sexual performance.

Comparisons of selected groupings of users:

1. Males and females: In general, the majority of females reported no effect in any of these categories. A larger minority of males (39%) reported that marijuana increased or variably increased the duration of intercourse. This compares with 26% of the women reporting an increase or variable increase in duration (p = .05). More males (68%) than females (50%) reported that marijuana enhanced or variably enhanced the quality of their orgasm (p = .02).

   The number of orgasms increased or variably increased for 27% of the women and 19% of the men (not significant) and decreased for two percent of the men. The ability to repeat increased or variably increased for eight percent of the women and 17% of the men (not significant), and decreased for two percent of the men (see Table VI).
2. Frequent and less frequent users: When those who had used marijuana at least five times per

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TABLE V

PERCENT OF TIME MARIJUANA USED BY DESIGN IN PREPARATION FOR SEXUAL ACTIVITY

	Gender		Recent Usage		Abuser Status	
	Males (N = 60)	Females (N = 37)	Less Frequent (N = 75)	Frequent Users (N = 22)	Male Nonabusers (N = 52)	Male Abusers (N = 8)
	%	%	%	%	%	%
Coincidental use only	20	29	28	8	19	25
1%-10%	43	36	45	17	45	25
11%-25%	17	14	16	17	16	25
25% +	20	21	12	58	19	25
Group differences	Not significant		p = .004		Not significant	

TABLE VI

MARIJUANA-INDUCED EFFECTS ON SEXUAL PERFORMANCE

	Gender		Recent Usage		Abuser Status	
	Males (N = 60)	Females (N = 37)	Less Frequent (N = 75)	Frequent Users (N = 22)	Male Nonabusers (N = 52)	Male Abusers (N = 8)
	%	%	%	%	%	%
Duration of intercourse:						
Increased	27	8	22	14	28	25
Decreased	0	0	0	0	0	0
Variable	12	8	10	14	10	25
No Effect	61	84	68	72	62	50
Group differences	p = .05		Not significant		Not significant	
Quality of orgasm:						
Enhanced	58	32	51	36	57	63
Decreased	0	0	0	0	0	0
Variable	10	8	8	14	8	25
No Effect	32	60	41	50	35	12
Group differences	p = .02		Not significant		Not significant	
Number of orgasms:						
Increased	12	16	16	5	12	13
Decreased	2	0	1	0	2	0
Variable	7	11	5	18	6	13
No Effect	80	73	78	77	80	75
Group differences	Not significant		Not significant		Not significant	
Ability to repeat:						
Increased	14	3	11	5	12	25
Decreased	3	0	3	0	4	0
Variable	3	5	4	5	4	0
No Effect	80	92	82	90	80	75
Group differences	Not significant		Not significant		Not significant	

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week were compared with the others, there were no statistically significant differences (see Table IV).

3. Male abusers and nonabusers: Male abusers and nonabusers reported very similar effects of marijuana on their sexual performance and there were no statistically significant differences. It is interesting to note that the males reporting negative effects (i.e., a decrease in number of orgasms and a decrease in ability to repeat) were not among the abusers or the frequent users (see Table VI).

Summary of marijuana-induced effects on sexual performance: Over half of the males and less frequent users reported an enhancement of quality of orgasm. The majority of subjects reported no effect of marijuana on duration of intercourse, number of orgasms or ability to repeat. When effects were reported they were almost always positive. A very small percentage of males – not marijuana abusers or frequent users – reported negative effects on their performance. (See Table VI for a complete presentation of these data.)

TABLE VII

MARIJUANA-INDUCED EFFECTS ON SEXUAL PARTNER PREFERENCE

	Gender		Recent Usage		Abuser Status	
	Males (N = 60) %	Females (N = 37) %	Less Frequent (N = 75) %	Frequent Users (N = 22) %	Male Nonabusers (N = 52) %	Male Abusers (N = 8) %
Desire familiar partner:						
Increased	50	60	52	59	54	25
Decreased	3	3	4	0	2	13
Variable	12	11	11	14	10	25
No Effect	35	27	33	27	34	38
Group differences	Not significant		Not significant		Not significant	
Desire unfamiliar partner:						
Increased	43	14	28	41	39	63
Decreased	5	3	3	9	4	13
Variable	3	5	4	5	4	0
No Effect	49	78	65	46	53	25
Group differences	$p < .01$		Not significant		Not significant	
Desire multiple partners:						
Increased	12	3	8	9	14	0
Decreased	3	0	3	0	2	13
Variable	0	0	0	0	0	0
No Effect	85	97	89	91	84	88
Group differences	Not significant		Not significant		Not significant	
Desire homosexual partner:						
Increased	7	3	4	9	8	0
Decreased	2	0	1	0	2	0
Variable	0	3	0	5	0	0
No Effect	91	94	95	86	90	100
Group differences	Not significant		Not significant		Not significant	

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TABLE VIII

MARIJUANA-INDUCED EFFECTS ON SPECIFIC SENSES DURING SEXUAL ACTIVITY*

	Gender		Recent Usage		Abuser Status	
	Males (N = 60) %	Females (N = 37) %	Less Frequent (N = 75) %	Frequent Users (N = 22) %	Male Nonabusers (N = 52) %	Male Abusers (N = 8) %
Touching:						
Enhanced	59	57	62	47	60	50
Decreased	0	0	0	0	0	0
Variable	3	3	4	0	3	0
No Effect	39	40	35	53	37	50
Physical Closeness:						
Enhanced	51	56	50	67	55	25
Decreased	0	0	0	0	0	0
Variable	9	4	8	0	10	0
No Effect	40	41	42	33	36	75
Snuggling:						
Enhanced	34	56	42	50	36	25
Decreased	0	0	0	0	0	0
Variable	9	4	8	0	7	25
No Effect	57	41	50	50	58	50
Taste:						
Enhanced	23	33	24	42	23	25
Decreased	0	0	0	0	0	0
Variable	0	4	2	0	0	0
No Effect	77	63	74	58	77	75
Smell:						
Enhanced	23	7	16	17	23	25
Decreased	3	0	0	8	3	0
Variable	0	4	2	0	0	0
No Effect	74	89	82	75	74	75
Hearing:						
Enhanced	17	11	16	8	19	0
Decreased	0	0	0	0	0	0
Variable	3	0	2	0	0	25
No Effect	80	89	82	92	81	75
Sight:						
Enhanced	11	7	10	8	13	0
Decreased	0	0	0	0	0	0
Variable	0	4	0	0	0	0
No Effect	89	93	90	92	87	100

*No group differences significant at or above .05 level.

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TABLE IX

IS MARIJUANA AN APHRODISIAC?

	Gender		Recent Usage		Abuser Status	
	Males (N = 60)	Females (N = 37)	Less Frequent (N = 75)	Frequent Users (N = 22)	Male Nonabusers (N = 52)	Male Abusers (N = 8)
	%	%	%	%	%	%
Yes, mild	36	34	33	54	38	25
Yes, strong	8	11	10	8	9	0
Variable effect	28	21	26	23	25	50
No effect	28	29	31	15	28	25
Group differences	Not significant		Not significant		Not significant	

Marijuana-Induced Effects on Sexual Partner Preference

Comparisons of selected groupings of users:

1. Males and females: A majority of subjects (60% of males, 72% of females) reported that marijuana increased or variably increased their desire for a familiar partner. Three percent of both males and females reported a decrease.

   More males than females reported an increased desire for an unfamiliar partner ($p < .01$). Marijuana had no effect on desire for multiple partners or homosexual partners for over 85% of both males and females. Further analysis revealed that all subjects reporting an increase in their desire for a homosexual partner claimed either bisexuality of homosexuality as their sexual orientation (see Table VII).
2. Frequent and less frequent users: There were no significant differences between frequent and less frequent users on sexual partner preference (see Table VII).
3. Male abusers and nonabusers: There were no significant differences between the groups, but this may be due to the small number of abusers in the sample. When percentage scores were examined, the groups appeared quite distinct, although this may reflect differences in sexual contacts more than differential effects of marijuana. In general, the abusers were more likely to experience an increase in their desire for an unfamiliar partner than for a familiar partner, a pattern unlike any of the other groups under study (see Table VII).

Summary of marijuana-induced effects on sexual partner preference: At least 50% of all groups reported an increase or variable increase in their desire for a familiar partner. A significantly greater percentage of males than females reported an increase in their desire for an unfamiliar partner. Higher proportions of frequent users and abusers also reported this increase. (See Table VII for the partner preference data.)

Marijuana-Induced Effects on Specific Senses During Sexual Activity

The users were asked if marijuana had effects on their senses of touching, smell, sight, taste and hearing as well as snuggling and physical closeness during sexual activity. They reported whether each sense was enhanced, decreased, variably enhanced or was unaffected (see Table VIII).

The modalities most affected by marijuana were the tactile-related senses of touching and physical closeness, which were reported enhanced or variably enhanced by 60% of the users. The next most affected was snuggling (50%), followed by taste (29%), smell (19%), hearing (17%) and sight (10%). Two male subjects reported that marijuana decreased their sense of smell.

The men and women did not differ significantly in their reports of any of these sensory effects, nor did the frequent and less frequent users. A smaller proportion of abusers reported enhancement of touching (50% vs. 63% for nonabusers) and of physical closeness (25% vs. 65%), but there were no significant differences between the groups in their reports on sensory modalities.

General Effects of Marijuana on Sexual Activity and Enjoyment

Perceived aphrodisiac: Over 70% of the users felt that marijuana acts as an aphrodisiac, but only about nine percent rated the effect strong. There were no significant group differences in this estimation (see Table IX).

Pleasure and satisfaction: A majority (81%) reported that feelings of sexual pleasure and satisfaction increased or variably increased when they used mari-

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TABLE X

MARIJUANA-INDUCED EFFECTS ON SEXUAL ENJOYMENT*

	Gender		Recent Usage		Abuser Status	
	Males (N = 60) %	Females (N = 37) %	Less Frequent (N = 75) %	Frequent Users (N = 22) %	Male Nonabusers (N = 52) %	Male Abusers (N = 8) %
Feelings of Sexual Pleasure and Satisfaction:						
Increased	70	76	75	65	72	50
Decreased	3	0	2	0	3	0
Variable	5	14	8	12	6	0
No Effect	23	10	15	24	19	50
Feelings of Emotional Closeness and Intimacy:						
Increased	46	63	52	58	48	25
Decreased	3	0	2	0	3	0
Variable	14	7	10	17	13	25
No Effect	37	30	36	25	36	50

*No group differences reached .05 level of significance.

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juana.

Emotional closeness and intimacy: Sixty four percent reported an increase or variable increase in feelings of emotional closeness and intimacy. Three percent of the males reported a marijuana-induced decrease in both these feelings (see Table X). Overall, however, the males did not differ from the females, nor did the frequent users differ strikingly from the less frequent users in their report of these marijuana-induced feelings.

The abusers reported less effect on their sexual pleasure and satisfaction, and their feelings of emotional closeness and intimacy than nonabusers. The differences, however, were not statistically significant.

Summary of general effects of marijuana on sexual activity and enjoyment: About three-quarters of the users considered marijuana an aphrodisiac, but less than 10% considered the effect strong. Feelings of marijuana-induced sexual pleasure and satisfaction were reported by high percentages (above 75%) of all groups except the abusers. Feelings of emotional closeness and intimacy were reported increased or variably increased by 60% or more of all groups except, again, the abusers. (See Table X for a detailed summary.)

CONCLUSIONS

The evidence from this study indicates that marijuana, when it affects the sexual experience, affects it in a positive way. The most uniformly reported effects were general ones: feelings of sexual pleasure and satisfaction, feelings of emotional closeness and intimacy, and a general concurrence that marijuana has mild aphrodisiac properties.

Specific performance variables were apparently not affected to any large extent. For the majority of these subjects, both men and women, marijuana does not increase the duration of intercourse, as was suggested in the early 1970's, nor does it increase the number of orgasms or the ability of these sexually active adults to repeat sexual activity. However, the majority of males reported an enhanced quality of orgasms while about 40% of the women reported this effect. If as many as one-third of women never or only occasionally experience orgasm (Fisher 1973), then one-third of the females in this sample would have little or no basis of comparison for this item. Controlling for this possibility, about 60% of the orgasmic females would then be reporting enhanced quality of orgasm – a figure roughly comparable to the men. This effect is probably less attributable to set and expectancy than some other general findings, and therefore suggests that marijuana may have some mild but specific effects on sexual performance.

Of the sensory variables, the items involving touch

were, in general, enhanced by marijuana for the majority of users. Enhancement of the other senses was reported by considerably fewer subjects.

Marijuana appeared to increase, in some nonspecific fashion, the desire for a partner (both familiar and unfamiliar) for about half of the male users. Marijuana consistently increased the desire for a familiar partner only on the part of the majority of the women. It may be reassuring for society to note that for most of these chronic marijuana users – men and women – marijuana intoxication did not increase their desire for an unfamiliar partner, for multiple partners or for a homosexual partner. Thus marijuana may be promoting fidelity, a virtue not often associated with this drug or its users.

Comparison of the marijuana users with the nonusers yielded three main differences: (1) more users remained single; (2) the users' first sexual relations occurred at an earlier age; and (3) more users had engaged in homosexual activity. The two groups were quite similar, however, with respect to infidelity rates, the single subjects' number of sexual partners, and participation in group sex or partner swapping.

More users than controls had used an intoxicant at the time of their first heterosexual intercourse, however alcohol was usually the associated drug in these instances. Moreover, the use of all intoxicants, including alcohol, was a less frequent phenomenon in the sex lives of the comparison group.

While a significant majority of the users agreed that marijuana is consistently an aphrodisiac, or at least under some circumstances, it is apparent that only the most frequent users often seek out the use of this substance specifically for its sexually stimulating qualities. For the others, their use of marijuana is more likely to be coincidental to their sexual behavior. While marijuana does appear to be a drug of choice for the users where sexual activity is concerned, the effects are mild, positive and facilitating, but not compelling.

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AN ATTITUDE SURVEY OF THE EFFECTS OF MARIJUANA ON SEXUAL ENJOYMENT

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Determined attitudes on the effects of marijuana on sexual enjoyment by self-report for a group of 84 graduate students of health sciences. The students were grouped in three categories: those who had sexual experience while under the influence of marijuana (experienced smokers), those who have smoked marijuana but who have not had such experience (non-experienced smokers), and non-smokers. Results are again inconclusive despite the fact that a majority in each category responded in a positive manner to the initial question concerning the effect of marijuana on the enjoyment of sexual intercourse. There is sufficient support to indicate that at least some experienced smokers have derived an enhancement of sexual pleasure while they were using marijuana. The implication is that there may be value in researching the use of marijuana in treatment of sexual disorders.

One of the persistent questions related to marijuana usage is that of its effect on sexual performance and enjoyment. Part of the mystique associated with marijuana usage involves its purported qualities as an aphrodisiac. Although marijuana long has been rumored to have these qualities, little systematic research has been directed to this area. Nevertheless, there are several accounts of an enhancement of sexual pleasure as an effect of marijuana usage (Brown & Stickgold,

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1974; Chausow & Saper, 1974; Hager, 1975). Bouguet (1950) stated that in North Africa and Egypt there is a strong belief that marijuana enhances sexual satisfaction and that this is an important cause for initiating use. Chopra and Chopra (1967) reported that 10% of a sample of approximately 1200 users listed increased sexual excitement as a cause that led to the cannabis habit. Goode (1969) surveyed 200 marijuana users with regard to the effects of marijuana on sexual enjoyment. In response to the question, "Do you think being high on marijuana stimulates sex interest, or not?", 38% replied that it did not; 5% replied that it had a decidedly negative effect; 13% replied that the effect depended on either their mood, partner or both; but 44% replied that marijuana definitely increases their sexual desire. With respect to the male-female response pattern, 39% of the men and 50% of the women claimed increased sexual interest. There is, however, insufficient evidence at the present time for conclusive statements on the relationship between marijuana and sexual enjoyment. The need for further investigations in this area is obvious. The present study is an assessment of attitudes with regard to the effects of marijuana on sexual excitement.

Method

Subjects and Instruments

Eighty-four graduate students of health sciences enrolled in a southeastern medical center served as *Ss*. A 57-item multiple choice and true-false questionnaire was developed by one of the authors to determine the attitudes of the individuals in the sample with regard to sexual behavior and marijuana usage as well as the actuarial characteristic of the sample. Included among these questions were 15 Lie (L) scale items from the MMPI[a] (Reproduced by permission for research purpose only. Copyright 1943, renewed 1970 by the University of Michigan. Published by The Psychological Corporation, New York, N.Y. All rights reserved.) These questions were used as a rough validity check of the responses.

Fifty-one percent of the 84 students in this survey were between the ages of 24 and 28; 44% were between the ages of 19 and 23. As might be expected, only 4% of the students were above 28 and 1% below 18 years of age. Seventy-eight percent of the respondents were male and 22% female.

Procedure

An explanation of the purpose of the questionnaire (i.e., to investigate the perceived effects of marijuana on sexual pleasure and satisfaction) was given to the students in a classroom setting. Individuals who had participated in sexual activity while under the influence of marijuana were asked to complete the questionnaire with respect to their personal experience. Those who had not had such experience, whether or not they had ever used marijuana, were asked to answer the question in terms of what they thought the relationship between marijuana and sexual activity would be.

The completed questionnaires were collected and the answers tabulated. Individuals who scored above 11 on the Lie scale questions and those who neglected to note whether they were experienced users of marijuana were omitted from further consideration. Eleven questionnaires were eliminated for these reasons.

Results

A majority of the sample (59 of 84) reported that they had at least once, but most of these smokers reported their use as less than 15 times. Thirty-nine percent of those surveyed reported that they had engaged in sexual intercourse

[a]Since there is evidence to indicate that item responses obtained to selected items isolated from the context of a personality inventory may not be comparable to those obtained within the context, the results of this research should not be considered applicable to the standardized complete form of the inventory.

while under the influence of marijuana. Of the remainder of the sample, 26 were smokers and 25 were not. Since all *S*s were asked to complete the questionnaire regardless of their experience, the data are best viewed with a consideration of three *S* types: Experienced smokers (33 *S*s), non-experienced smokers (26 *S*s), and non-smokers (25 *S*s). The pertinent results are presented in Table 1.

TABLE 1

GROUP RESPONSES TO QUESTIONS THAT CONCERN EFFECT OF MARIJUANA ON SEXUAL PLEASURES

Question	A Experienced smokers ($N = 33$) (%)	B Non-experienced smokers ($N = 26$) (%)	C Non-smokers ($N = 25$) (%)	D Total ($N = 84$) (%)
34. Marijuana usage has the following effect on enjoyment and satisfaction associated with sexual intercourse:				
A. Increases pleasure	88	77	52	74
B. Decreases pleasure	6	8	20	11
C. No effect	6	15	28	15
35. While under the influence of marijuana the sensations associated with sexual intercourse are:				
A. Positive effect	48	69	48	55
B. Negative effect	12	12	12	12
C. No effect	36	19	24	27
D. No response	4	0	16	6
46. Marijuana usage has the following effect on the frequency of engaging in sexual intercourse:				
A. Positive effect	27	38	32	32
B. Negative effect	3	15	12	10
C. No effect	64	46	44	52
D. No response	6	1	12	6
49. My partner's use of marijuana has the following effect on my sexual enjoyment:				
A. Increases pleasure	48	54	44	49
B. Decreases pleasure	3	8	4	44
C. No effect	12	38	52	5
D. No response	7	0	0	2
51. Marijuana usage affects the satisfaction and enjoyment associated with oral sex as follows:				
A. Increases pleasure	42	54	20	39
B. Decreases pleasure	3	15	20	12
C. No effect	39	27	52	39
D. No response	16	4	8	10
52. I engage in more varied sexual activity while under the influence of marijuana:				
A. More varied	12	54	40	33
B. No more varied	76	42	40	55
C. No response	12	4	20	12
53. Marijuana usage affects the frequency of my engaging in oral-genital sex as follows:				
A. Positive effect	24	38	28	30
B. Negative effect	0	4	4	2
C. No effect	64	54	56	58
D. No response	12	4	12	10

TABLE 1 (continued)

Question	A Experienced smokers ($N = 33$) (%)	B Non-experienced smokers ($N = 26$) (%)	C Non-smokers ($N = 25$) (%)	D Total ($N = 84$) (%)
54. When both my partner and I use marijuana, sexual pleasure and satisfaction is affected as follows:				
A. Increases pleasure	76	65	32	60
B. Decreases pleasure	3	8	16	8
C. No effect	12	23	40	24
D. No response	9	4	12	8
55. The use of marijuana has the following effect on the intensity of sexual orgasm:				
A. Increases intensity	58	35	36	44
B. Decreases intensity	6	15	12	11
C. No effect	27	46	40	37
D. No response	9	4	12	8
57. An aphrodisiac increases sexual pleasure and I feel marijuana is an aphrodisiac.				
A. True	61	35	36	45
B. False	27	50	50	44
C. No response	12	15	14	11

Experienced smokers (cf. Table 1) held the most positive views on the pleasure-enhancing effects of marijuana. Marijuana was seen as increasing sexual pleasures and sensations as well as the intensity of orgasm. Usage by the partner or by both individuals was seen as enhancing sexual enjoyment. In general, these students did not feel that marijuana had any major effect on the frequency of sex or oral sex. The majority of this group (61%) considered marijuana an aphrodisiac.

Non-experienced smokers (see Table 1) differed only slightly in their ideas about how marijuana would influence sexual behavior. Marijuana was felt by most students to increase pleasure and sensations associated with sexual intercourse and oral sex. Usage by the partner or by both members was viewed as enhancing pleasure. In general, marijuana was felt to have little or no effect on the frequency of intercourse or oral sex, the variety of sexual encounters, or the intensity of orgasm. In contrast to experienced smokers, this group did not consider marijuana to be an aphrodisiac.

Non-smokers (cf. Table 1) conceded that marijuana would increase the pleasure and sensations of sexual intercourse, but in general viewed marijuana as having no effect. Similarly, marijuana was not considered an aphrodisiac.

When the total sample (cf. Table 1) is considered, highest percentages of positive responses are seen in those items that pertain to increased pleasure, sexual sensations, and intensity of orgasms as well as increasing variety of sexual experiences. Smoking by both partners also is viewed as enhancing pleasure. Respondents reported no effect or a split decision on marijuana's effect on frequency of intercourse or oral sex, and pleasure associated with oral sex, as well as pleasure associated with partner's usage. Similarly, the aphrodisiac question was a split decision; 45% viewed marijuana as an aphrodisiac and 44% said no. Yet, very few respondents felt that marijuana would decrease pleasure or have deleterious effects.

Discussion

The results of this study revealed rather complicated attitudes about the effects of marijuana on sexual excitement, yet several general statements are apparent. Enthusiasm for marijuana as an agent that enhanced sexual pleasure was most prominent in the group of experienced smokers, with the non-experienced smokers and non-smokers following in that order. Very few *Ss* in any of the groups felt that marijuana use would decrease pleasure or have negative effects, yet only the experienced smokers considered marijuana to be an aphrodisiac.

There are at least two possible explanations for the mode of action of marijuana in this regard. The first is that smokers are more inhibited or sexually conflicted and that cannabis use is directed at lessening inhibitions, decreasing anxiety, and/or repressing conflicts. Brill and Christie (1974) in their follow-up study of the psychosocial adaptation of a collegiate population speculated that although users are sexually more active, they are also more maladjusted with regard to sex and marriage. If marijuana is being used to diminish sexual inhibitions, the mechanism might be similar to the punishment-lessening effects of benzodiazepines (Stein, Belluzzi, & Wise, 1977). Winstead and his associates (Winstead, Blackwell, & Lawson, 1978) have viewed drug use as a biological coping device aimed at decreasing an individual's level of discomfort, which is seen as a combination of internal personality susceptibility and external enviromental stress. Such a theory would view marijuana use at the time of a sexual encounter as an individual's attempt to cope with the stress of the situation.

An alternate explanation is that marijuana enhances sexual pleasure by a direct euphorogenic mechanism. Research by Heath and his associates (Heath, 1964, 1972; Heath & Gallant, 1964; Heath, John, & Fontana, 1968) suggests that the active constituents of marijuana produce a unique effect on the activity of brain cells associated with pleasureable feelings. Other data confirm this, as marijuana users have been found to begin sexual experience at an earlier age and to have more sexual experience as well as a more liberal attitude toward sex (Hochman & Brill, 1973). Pleasure enhancement also might be related to marijuana's reported influence on temporal span of awareness and the secondary increase in concentration on present events (Melges, Tinklenberg, Hollister, & Gillespie, 1971).

Obviously both mechanisms might be possible in different individuals or in the same individual at different points in time. Alternately, the effects merely may be dose-related.

Unfortunately, our present study does not answer this question of mode of action. Further research is necessary before any definitive answers are available. Nevertheless, the possibility that marijuana has a role as a treatment adjunct for sexual dysfunctions should be explored.

When one is considering the results of this study, it is important to note several limitations. As is true in much survey research, the validity of individual responses is almost impossible to verify, although an attempt to do so has been made here by inclusion of the Lie scale items from the MMPI. Also, the limited nature of the sample in terms of socioeconomic background must be considered as well. Obviously generalization beyond equivalent samples is questionable at best. Problems of multiple drug use and the confounding effects of drug interactions have not been addressed in spite of the known pattern of simultaneous alcohol and marijuana use (Kandel & Faust, 1975). It is the intention of the authors to present these findings not as conclusive, but for their heuristic value for further investigations.

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Psychological Effects, Personality and Behavioral Changes Attributed to Marihuana Use

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Abstract

Data from 530 marihuana users on the psychological effects, personality and behavioral changes attributed to their marihuana use are presented. Age, sex, marital status, and educational level are reported. Data were analyzed according to five use patterns: (1) trial users, (2) past users, (3) occasional users, (4) regular users, and (5) daily users. *S*s reported on the occurrence of 33 psychological effects of marihuana, changes in 14 behavioral and personality variables, effect on alcohol and tobacco consumption, effect on sexual orientation, and reasons for marihuana use.

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> Results are consistent in that as marihuana use increases, there is an increase in pleasurable effects and beneficial results in personality and behavioral realms and a decrease in negative and untoward sequelae. Trial users report the least pleasant effects and the greatest untoward effects, and past users report considerably less benefits than current users.

The recent volume *Marihuana: A Signal of Misunderstanding* (Shafer et al., 1972), the official report of the National Commission on Marihuana and Drug Abuse, has increased the already widespread interest in the marihuana phenomenon. Until the past 6 or 7 years, most reports of the effects of marihuana were either anecdotal in style or based on poorly designed studies from abroad. More recently there have been laboratory studies on the physiological effects of marihuana (e.g., Isbell, 1967; Weil, Zinberg, and Nelsen, 1968); effect on human performance (e.g., Clarke, 1971; Crancer, 1969; Jones and Stone, 1969; Kiplinger, 1971); and clinical reports on adverse reactions such as feelings of confusion and disorientation (e.g., Smith and Mehl, 1970); depression, panic, and depersonalization (e.g., Keeler, 1967); anxiety and paranoia (e.g., Durham, 1968); and psychotic reactions (e.g., Hekimian and Gershon, 1968). Especially among social scientists there is a trend away from an attempt to relate marihuana use to specific behavioral effects, such as opiate addiction or criminal activity, and to explore the complexity of factors which determine functional use or abuse of marihuana (e.g., Blum, 1969; Blumer, 1967; Fisher and Strantz, 1972; Goode, 1970; Kaplan, 1970; McGlothlin and West, 1968; Smith and Mehl, 1970). The Canadian Commission of Inquiry into the Non-Medical Use of Drugs (Canadian Interim Report, 1970) has concluded, ". . . the psychological effects of cannabis vary greatly with a number of factors and are often difficult to predict. . . (and) depend to a considerable degree on the personality of the user, his past experience with cannabis or other drugs, his attitudes and the setting in which the drug is used."

The present study reports on the natural use of marihuana and presents data on the reported psychological effects of marihuana, the personality and behavioral changes attributed to marihuana use, and the reasons given for use. These data are self-report data and contain all the limitations inherent in such a study.

THE SAMPLE

The sample consists of 530 *S*s. Each *S* completed a 220-item questionnaire. The data were collected in 1969–1970 and sampling was conducted

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using two methods: The social network method and random sampling utilizing voter registration lists. The locale was predominantly Southern California. For the social network method, questionnaires were distributed to acquaintances of the researchers who were asked to enlist the cooperation of their marihuana-using friends. A cover letter explaining the research as well as a stamped, return-addressed envelope accompanied the questionnaire. Anonymity of respondents was assured. Since we were primarily interested in an adult middle to upper class sample, an attempt was made to restrict social networks to this population. However, college and university students were included in these networks. In order to broaden the base of sampling, random sampling, from voter registration lists from Los Angeles County, was conducted. Precincts that were predominantly middle-upper to upper class were utilized. The return rate from the mail-out questionnaire was 35%. Of those 525 usable returned questionnaires, 98 were from *S*s who had used or were currently using marihuana. Thus the user rate from this sample was 18.7%. Of the total 530 users studies, 98 (18.5%) were from the random mail-out sample.

For analysis the sample was categorized according to marihuana use pattern. The following categories were established: (1) *Trial users*: $N = 47$ (*S*s who had only used marihuana from one to three times); (2) *past users*: $N = 79$ (*S*s who had used marihuana in the past but who currently considered themselves nonusers); (3) *occasional users*: $N = 147$ (*S*s whose current use was less than once per week); (4) *regular users*: $N = 200$ (*S*s who use at least once per week to those who use up to 6 days a week); (5) *daily users*: $N = 57$ (*S*s who use at least once every day).

DEMOGRAPHIC CHARACTERISTICS OF SAMPLE

Age

Age distribution by marihuana use group is given in Table 1. The

Table 1
Age Distribution by Marihuana Use Groups

	Trial users	Past users	Occasional users	Regular users	Daily users
Age	% N	% N	% N	% N	% N
20 and under	21.7 (10)	17.9 (14)	12.4 (18)	31.2 (62)	28.6 (16)
21–30	47.8 (22)	57.7 (45)	57.2 (83)	57.8 (115)	58.9 (33)
31–40	17.4 (8)	12.8 (10)	17.9 (26)	8.0 (16)	8.9 (5)
Over 40	13.0 (6)	11.5 (9)	12.4 (18)	3.0 (6)	3.6 (2)

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majority of users in all use groups are in the 21 to 30 year age bracket. The range in age was from 16 to 66 years. The sample is essentially of adults with a tendency for the more frequent users to be younger.

Sex

Sex distribution by marihuana use groups is given in Table 2. The sample consisted of 300 males and 224 females. There was a tendency for the more frequent users to be male and for the occasional users to be female. Trial and past use groups did not differ in sex composition.

Table 2
Sex Distribution by Marihuana Use Group

	Trial users	Past users	Occasional users	Regular users	Daily users
Sex	% N	% N	% N	% N	% N
Male	47.8 (22)	47.4 (37)	61.4 (89)	59.3 (118)	60.7 (34)
Female	52.2 (24)	52.6 (41)	38.6 (56)	40.7 (81)	39.3 (22)

Marital Status

Marital status by marihuana use group is shown in Table 3. The majority of respondents in all categories are single. The regular and daily users have the highest percentage of single respondents, and part of this is undoubtedly due to their being a younger group. About 10% of *Ss* in all use categories are divorced or separated.

Table 3
Marital Status by Marihuana Use Group

	Trial users	Past users	Occasional users	Regular users	Daily users
Marital status	% N	% N	% N	% N	% N
Single	50.0 (23)	55.3 (42)	54.6 (77)	70.9 (139)	64.3 (36)
Married	41.3 (19)	35.5 (27)	33.3 (47)	17.9 (35)	25 0 (14)
Divorced/ separated	8.7 (4)	9.2 (7)	9.9 (14)	10.2 (20)	10.7 (6)
Widowed	0 (0)	0 (0)	2.1 (3)	1.0 (2)	0 (0)

Educational Level

Educational level by marihuana use group is shown in Table 4. The sample is fairly well educated with only a small percentage of *Ss* having

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less than some college education. Occasional users are the best educated—64.4% having baccalaureate or graduate degrees, and the trial users the least educated—13.3% having less than some college education.

Table 4
Educational Level by Marihuana Use Groups

Education	Trial users %	Trial users N	Past users %	Past users N	Occasional users %	Occasional users N	Regular users %	Regular users N	Daily users %	Daily users N
Less than high school	2.2	(1)	0	(0)	0.7	(1)	1.5	(3)	5.4	(3)
High school graduate	11.1	(5)	6.3	(5)	2.7	(4)	4.1	(8)	1.8	(1)
Some college	51.1	(23)	46.8	(37)	32.2	(47)	60.4	(119)	57.1	(32)
College graduate	17.8	(8)	22.8	(18)	24.7	(36)	15.2	(30)	23.2	(13)
Graduate or professional degree	17.8	(8)	24.1	(19)	39.7	(58)	18.8	(37)	12.5	(7)

PSYCHOLOGICAL EFFECTS OF MARIHUANA

Respondents were asked about the feelings and experiences that occur to them when using marihuana. The question was asked "Check the following words which you would use to describe the feelings and experiences *you* have with marihuana." Table 5 shows the results of this question. The phenomena are listed from the most frequently checked to the least frequently checked for the total group. It is readily apparent that *S*s use marihuana because they have more pleasant than unpleasant experiences. Of the 33 phenomena studied, 14 can be considered desirable, 12 undesirable, and seven neutral, depending on a *S*'s reaction to the phenomenon (e.g., distortion of time sense, altered depth perception, openness to suggestion). Of the 16 top ranked occurring phenomena, 10 are positively valued, six neutrally valued, and none negatively valued. Among the 10 lowest ranked occurring phenomena, eight are negatively valued, one neutrally valued, and one positively valued.

Over half of all *S*s experience tranquility (73.3%), increased sensory awareness (69.3%), hunger (68.9%), giggles (64.8%), distortion of time sense (63.3%), and drowsiness (56.3%). Over 40% of all *S*s experience euphoria (49.6%), introspectiveness (45.8%), difficulty with concentration (43.2%), love for fellow man (40.7%), and psychological insight (40.7%). About one-third of all *S*s report experiencing eroticism (39.6%), openness

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Table 5
Marihuana-Induced Phenomena Experienced by Subjects by Use Pattern Groups

Item	Rank frequency	Total *Ss* reporting		Trial users		Past users		Occasional users		Regular users		Daily users	
		%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*
Tranquility	1	73.3	(387)	40.4	(19)	53.8	(42)	77.0	(114)	81.4	(162)	89.3	(50)
Increased sensory awareness	2	69.3	(366)	31.9	(15)	53.8	(42)	67.6	(100)	81.9	(163)	82.1	(46)
Hunger	3	68.9	(364)	25.5	(12)	64.1	(50)	59.5	(88)	82.4	(164)	89.3	(50)
Giggles	4	64.8	(342)	34.0	(16)	57.7	(45)	66.2	(98)	73.9	(147)	64.3	(36)
Distortion of time sense	5	63.3	(334)	36.2	(17)	57.7	(45)	60.8	(90)	72.9	(145)	66.1	(37)
Drowsiness	6	56.3	(297)	17.0	(8)	61.5	(48)	58.1	(86)	63.3	(126)	51.8	(29)
Euphoria	7	49.6	(262)	23.4	(11)	32.1	(25)	48.0	(71)	59.3	(118)	66.1	(37)
Introspectiveness	8	45.8	(242)	12.8	(6)	30.8	(24)	41.9	(62)	57.8	(115)	62 5	(35)
Difficulty with concentration	9	43.2	(228)	21.3	(10)	55.1	(43)	31.8	(47)	53.3	(106)	39.3	(22)
Love for fellow man	10.5	40.7	(215)	12.8	(6)	32.1	(25)	35.1	(52)	50.8	(101)	55.4	(31)
Psychological insight	10.5	40.7	(215)	6.4	(3)	24.5	(23)	27.7	(41)	58.8	(117)	55.4	(31)
Eroticism	12	39.6	(209)	12.8	(6)	33.3	(26)	39.9	(59)	48.2	(96)	39.3	(22)
Openness to suggestion	13	36.2	(191)	10.6	(5)	33.3	(26)	25.0	(37)	44.7	(89)	60.7	(34)
Heightened creativity	14	32.8	(173)	6.4	(3)	17.9	(14)	25.0	(37)	43.7	(87)	57.1	(32)
Greater honesty	15	30.5	(161)	6.4	(3)	21.8	(17)	25.7	(38)	36.2	(72)	55.4	(31)
Altered depth perception	16	25.6	(135)	21.3	(10)	26.9	(21)	21.6	(32)	30.7	(61)	19.6	(11)
Depression	17	23.7	(125)	14.9	(7)	33.3	(26)	16.9	(25)	29.1	(58)	16.1	(9)
Fear	18	23.3	(123)	19.1	(9)	25.6	(20)	19.6	(29)	26.6	(53)	21.4	(12)
Synesthesia	19	22.5	(119)	4.3	(2)	19.2	(15)	19.6	(29)	27.1	(54)	33.9	(19)
Greater ability to concentrate	20	22.2	(117)	12.8	(6)	3.9	(3)	22.3	(33)	25.6	(51)	42.9	(24)

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Sadness	21	21.2 (112)	14.9 (7)	23.1 (18)	19.6 (29)	22.1 (44)	25.0 (14)
Self-consciousness or embarrassment	22	18.6 (98)	10.6 (5)	19.2 (15)	9.5 (14)	25.1 (50)	25.0 (14)
Religious or mystical feelings	23	18.0 (95)	2.1 (1)	14.1 (11)	13.5 (20)	22.1 (44)	33.9 (19)
Hallucinations	24	17.2 (91)	8.5 (4)	15.4 (12)	12.8 (19)	19.1 (38)	32.1 (18)
Hyperactivity	25	15.5 (82)	6.4 (3)	11.5 (9)	10.1 (15)	20.1 (40)	26.8 (15)
Better judgment	26	13.4 (71)	2.1 (1)	5.1 (4)	6.8 (10)	19.1 (38)	32.1 (18)
Telepathy	27.5	12.5 (66)	6.4 (3)	10.3 (8)	7.4 (11)	16.1 (32)	21.4 (12)
Poor judgment	27.5	12.5 (66)	8.5 (4)	24.4 (19)	8.1 (12)	12.6 (25)	10.7 (6)
Headaches	29	11.4 (60)	14.9 (7)	14.1 (11)	8.1 (12)	10.6 (21)	16.1 (9)
Grandeur or feeling of omnipotence	30	8.5 (45)	2.1 (1)	11.5 (9)	7.4 (11)	7.5 (15)	16.1 (9)
Nausea	31	7.4 (39)	4.3 (2)	14.1 (11)	8.1 (12)	4.0 (8)	10.7 (6)
Anger	32	4.2 (22)	0.0 (0)	2.6 (2)	5.4 (8)	4.5 (9)	5.4 (3)
Less honesty	33	2.8 (15)	2.1 (1)	5.1 (4)	.7 (1)	3.0 (6)	5.4 (3)

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to suggestion (36.2%), heightened creativity (32.8%), and greater honesty (30.5%). Fewer than 10% of all *S*s experienced grandeur or feelings of omnipotence (8.5%), nausea (7.4%), anger (4.2%), and being less honest (2.8%). The most frequently reported negatively valued phenomena are depression and fear, and these two reactions are reported by 23.7 and 23.3% of *S*s, respectively.

Consequently, *S*s using marihuana report experiencing considerably more pleasant than unpleasant phenomena, and what we have conservatively called neutral phenomena (e.g., openness to suggestion, altered depth perception) are probably experienced more as a pleasant effect rather than as a negative effect.

Table 6 is generated from the data in Table 5 and reports the ranked frequency of reported phenomena by use pattern group. An attempt was made to determine if there was a difference in reported effects by *S*s with differing use patterns. As use increases there is an increase in the reported frequency of the varying phenomena. This is understandable in that the more one uses marihuana, the more likely the occurrence of a variety of psychic effects. There are marked differences among use pattern groups in the frequency of the occurrence of certain phenomena. As use increases, there is an increase in the reporting of positively valued phenomena. Trial users report the least pleasant experience and the most unpleasant experiences. This would undoubtedly relate to their not becoming marihuana users in that their experiences were not that pleasant. For example, of the 13 most frequently reported phenomena for trial users, only four are positively valued, four negatively valued, and five neutrally valued whereas for daily users, of the 13 most frequently reported phenomena, nine are positively valued, none are negatively valued, and four are neutrally valued. In addition, what we have called "neutrally" valued probably become positively valued as marihuana use increases. It is of interest that characteristic but unusual phenomena which might be distressing to the novice is less prominent to the habitual user. For example, *altered depth perception* is ranked seventh by trial users, fifteenth by past users, seventeenth by occasional users, sixteenth by regular users, and twenty-sixth by daily users. Obviously, adaptation to this characteristic phenomenon occurs with increased use, and it becomes less prominent in the consciousness of the user. This same phenomenon apparently applies to *difficulty with concentration*, which is ranked seventh by trial users, fifth by past users, eleventh by occasional users, tenth by regular users, and fifteenth by daily users. *Distortion of time sense*, another characteristic phenomenon, apparently does not "adapt" in the same fashion, as this

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phenomenon is ranked high by all groups: second by trial users, third by past users, fourth by occasional users, fifth by regular users, and fourth by daily users. *Hunger* is also among the top five ranked phenomena by all use pattern groups.

It is interesting to observe the difference among groups in reported *drowsiness*. Trial users rank it tenth, past users second, occasional and regular users sixth, and daily users thirteenth. Although it is somewhat pretentious to speculate on the dynamics of these differences, it may be that trial users did not relax enough to get the drowsiness sensation, past users had it so frequently so as to make the experience uninteresting, occasional and regular users experience it as part of the total marihuana experience, and daily users have integrated use into their life style to such an extent that marihuana ceases to dull the consciousness as it does in less frequent users.

Post-marihuana *depression* is a sometimes complaint of marihuana users. Past users rank depression ninth and trial users rank it twelfth, whereas occasional users rank it twenty-one, regular users seventeenth, and daily users twenty-eighth. Consequently there is a large difference in the occurrence of depression among use pattern groups with past users reporting the greatest, and daily users the least prominence of this phenomenon in their marihuana experience.

Great differences also occur among use pattern groups in the prominence of other negatively valued phenomenon: *fear* is ranked ninth by trial users, sixteenth by past users, and twenty-fourth by daily users; *headaches* are ranked twelfth by trial users, and twenty-seventh, twenty-ninth, and twenty-eighth by occasional, regular, and daily users, respectively; *sadness* is ranked twelfth by trial users and twenty-second by regular and daily users.

The greatest differences among use pattern groups appear to be in the prominence and frequency of positively valued phenomena. Positive psychologically oriented phenomena are reported more frequently as use increases. For example, *heightened creativity* is ranked ninth by daily users (57.1%), fourteenth by regular users (43.7%), fourteenth by occasional users (25.0%), twenty-second by past users (17.9%), and twenty-fourth by trial users (6.4%). *Greater honesty* is ranked eleventh by daily users (55.4%), fifteenth by regular users (36.2%), thirteenth by occasional users (25.7%), nineteenth by past users (21.8%), and twenty-fourth by trial users (6.4%). *Introspectiveness* is ranked seventh by daily users (62.5%), ninth by regular users (57.8%), thirteenth by past users (30.8%), and fifteenth by trial users (12.8%). *Euphoria* is ranked fourth by daily

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Table 6

Rank	Trial users	Percentage of *Ss* reporting	Rank	Past users	Percentage of *Ss* reporting	Rank	Occasional users	Percentage of *Ss* reporting
1	Tranquility	(40.4)	1	Hunger	(64.1)	1	Tranquility	(77.0)
2	Distortion of time sense	(36.2)	2	Drowsiness	(61.5)	2	Increased sensory awareness	(67.6)
3	Giggles	(34.0)	3.5	Giggles	(57 7)	3	Giggles	(66.2)
4	Increased sensory awareness	(31.9)	3.5	Distortion of time sense	(57.7)	4	Distortion of time sense	(60.8)
5	Hunger	(25.5)	5	Difficulty with concentration	(55.1)	5	Hunger	(59.5)
6	Euphoria	(23.4)	6.5	Tranquility	(53.8)	6	Drowsiness	(58.1)
7.5	Altered depth perception	(21.3)	6.5	Increased sensory awareness	(53.8)	7	Euphoria	(48.0)
7.5	Difficulty with concentration	(21.3)	9	Eroticism	(33.3)	8	Introspectiveness	(41.9)
9	Fear	(19.1)	9	Depression	(33.3)	9	Eroticism	(39.9)
10	Drowsiness	(17.0)	9	Openness to suggestion	(33.3)	10	Love for fellow man	(35.1)
12	Headaches	(14.9)	11.5	Euphoria	(32.1)	11	Difficulty with concentration	(31.8)
12	Sadness	(14.9)	11.5	Love for fellow man	(32.1)	12	Psychological insight	(27.7)
12	Depression	(14.9)	13	Introspectiveness	(30.8)	13	Greater honesty	(25.7)
15.5	Introspectiveness	(12.8)	14	Psychological insight	(29.5)	14.5	Openness to suggestion	(25.0)
15.5	Love for fellow man	(12.8)	15	Altered depth perception	(26.9)	14.5	Heightened creativity	(25.0)
15.5	Eroticism	(12.8)	16	Fear	(25.6)	16	Greater ability to concentrate	(22.3)
15.5	Greater ability to concentrate	(12.8)	17	Poor judgment	(24.4)	17	Altered depth perception	(21.6)

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Rank Order of Marihuana-Induced Experiences by Use Pattern Groups

Rank	Regular users	Percentage of *Ss* reporting	Rank	Daily users	Percentage of *Ss* reporting
1	Hunger	(82.4)	1.5	Tranquility	(89.3)
2	Increased sensory awareness	(81.9)	1.5	Hunger	(89.3)
3	Tranquility	(81.4)	3	Increased sensory awareness	(82.1)
4	Giggles	(73.9)	4.5	Distortion of time sense	(66.1)
5	Distortion of time sense	(72.9)	4.5	Euphoria	(66.1)
6	Drowsiness	(63.3)	6	Giggles	(64.3)
7	Euphoria	(59.3)	7	Introspectiveness	(62.5)
8	Psychological insight	(58.8)	8	Openness to suggestion	(60.7)
9	Introspectiveness	(57.8)	9	Heightened creativity	(57.1)
10	Difficulty with concentration	(53.3)	11	Greater honesty	(55.4)
11	Love for fellow man	(50.8)	11	Love for fellow man	(55.4)
12	Eroticism	(48.2)	11	Psychological insight	(55.4)
13	Openness to suggestion	(44.7)	13	Drowsiness	(51.8)
14	Heightened creativity	(43.7)	14	Greater ability to concentrate	(42.9)
15	Greater honesty	(36.2)	15.5	Difficulty with concentration	(39.3)
16	Altered depth perception	(30.7)	15.5	Eroticism	(39.3)
17	Depression	(29.1)	17.5	Synesthesia	(33.9)

(*continued*)

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Table 6

Rank	Trial users	Percentage of *Ss* reporting	Rank	Past users	Percentage of *Ss* reporting	Rank	Occasional users	Percentage of *Ss* reporting
18.5	Self-consciousness or embarrassment	(10.6)	18	Sadness	(23.1)	19	Sadness	(19.6)
18.5	Openness to suggestion	(10.6)	19	Greater honesty	(21.8)	19	Fear	(19.6)
20.5	Poor judgment	(8.5)	20.5	Synesthesia	(19.2)	19	Synesthesia	(19.6)
20.5	Hallucinations	(8.5)	20.5	Self-consciousness or embarrassment	(19.2)	21	Depression	(16.9)
24	Psychological insight	(6.4)	22	Heightened creativity	(17.9)	22	Religious or mystical feelings	(13.5)
24	Heightened creativity	(6.4)	23	Hallucinations	(15.4)	23	Hallucinations	(12.8)
24	Greater honesty	(6.4)	25	Nausea	(14.1)	24	Hyperactivity	(10.1)
24	Telepathy	(6.4)	25	Headaches	(14.1)	25	Self-consciousness or embarrassment	(9.5)
24	Hyperactivity	(6.4)	25	Religious or mystical feelings	(14.1)	27	Headaches	(8.1)
27.5	Nausea	(4.3)	27.5	Hyperactivity	(11.5)	27	Poor judgment	(8.1)
27.5	Synesthesia	(4.3)	27.5	Grandeur or feelings of omnipotence	(11.5)	27	Nausea	(8.1)
30.5	Less honesty	(2.1)	29	Telepathy	(10.3)	29.5	Grandeur or feelings of omnipotence	(7.4)
30.5	Better judgment	(2.1)	30.5	Better judgment	(5.1)	29.5	Telepathy	(7.4)
30.5	Religious or mystical feelings	(2.1)	30.5	Less honesty	(5.1)	31	Better judgment	(6.8)
30.5	Grandeur or feelings of omnipotence	(2.1)	32	Greater ability to concentrate	(3.9)	32	Anger	(5.4)
33	Anger	(0.0)	33	Anger	(2.6)	33	Less honesty	(0.7)

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(continued)

Rank	Regular users	Percentage of *Ss* reporting	Rank	Daily users	Percentage of *Ss* reporting
18	Synesthesia	(27. 1)	17. 5	Religious or mystical feelings	(33. 9)
19	Fear	(26. 6)	19. 5	Better judgment	(32. 1)
20	Greater ability to concentrate	(25. 6)	19. 5	Hallucinations	(32. 1)
21	Self-consciousness or embarrassment	(25. 1)	21	Hyperactivity	(26. 8)
22. 5	Sadness	(22. 1)	22. 5	Sadness	(25. 0)
22. 5	Religious or mystical feelings	(22. 1)	22. 5	Self-consciousness or embarrassment	(25. 0)
24	Hyperactivity	(20. 1)	24. 5	Telepathy	(21. 4)
25. 5	Better judgment	(19. 1)	24. 5	Fear	(21. 4)
25. 5	Hallucinations	(19. 1)	26	Altered depth perception	(19. 6)
27	Telepathy	(16. 1)	28	Headaches	(16. 1)
28	Poor judgment	(12. 6)	28	Depression	(16. 1)
29	Headaches	(10. 6)	28	Grandeur or feelings of omnipotence	(16. 1)
30	Grandeur or feelings of omnipotence	(7. 4)	30. 5	Nausea	(10. 7)
31	Anger	(4. 5)	30. 5	Poor judgment	(10. 7)
32	Nausea	(4. 0)	32. 5	Anger	(5. 4)
33	Less honesty	(3. 0)	32. 5	Less honesty	(5. 4)

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users (66.1%), seventh by regular users (59.3%), and eleventh by past users (32.1%). It is of interest to note that *greater ability to concentrate* is reported by 42.9% of daily users and ranked fourteenth, whereas only 3.9% of past users reported this phenomenon and ranked it thirty-second. It is also of interest that *eroticism* is ranked highest (ninth) by occasional (39.9%) and past users (33.3%), followed by regular users (48.2%) who rank it twelfth, and ranked equally low (fifteenth) by trial (12.8%) and daily users (39.3%). Thus eroticism appears to be of less prominence for daily and regular users than for less frequent users, and this may be because eroticism is less integrated for less frequent users than for more frequent users. Worth comment is the fact that few *S*s report feelings of *anger* with marihuana. Anger is ranked thirtieth by daily, thirty-first by regular, thirty-second by occasional, and thirty-third by past and trial users. *Less honesty* is another infrequently reported phenomenon by all groups: ranked last by daily, regular, and occasional users, and thirtieth by past and trial users. *Poor judgment* is ranked low by current users: thirtieth by daily, twenty-eighth by regular, and twenty-seventh by occasional users, but ranked considerably higher (seventeenth) by past users and twentieth by trial users. *Hallucinations*, a supposedly common phenomenon with marihuana use, is ranked relatively low by all groups: twentieth by trial, twenty-third by past and occasional, twenty-fifth by regular, and nineteenth by daily users.

Thus the differences in experienced phenomena by use pattern groups are fairly clear: those who use it most report the greatest frequency of the most favorable phenomena and the least relative occurrence of negatively valued phenomenon, whereas past users and trial users, respectively, report the highest relative occurrence of negatively valued phenomena and the lowest relative occurrence of positively valued phenomena.

CHANGE IN SEXUAL ORIENTATION, AND ALCOHOL AND TOBACCO CONSUMPTION AS AN EFFECT OF MARIHUANA USE

Respondents were asked if the use of marihuana had altered their sexual orientation. Of the 495 *S*s answering this item, 88.3% answered that marihuana use had no effect on their sexual orientation whereas 11.7% stated it had had some effect. Four *S*s (0.9%) (one past user, two occasional users, and one daily user) stated their sexual orientation had changed in the direction of homosexuality; 24 *S*s (4.9%) (two past users, three occasional users, 15 regular users, and four daily users) stated their

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sexual orientation had changed in the direction of heterosexuality; and 30 *Ss* (6.1%) (one trial user, one past user, five occasional users, 17 regular users, and six daily users) stated their sexual orientation had changed in the direction of bisexuality. For this latter category, we have no data indicating what percentage of *Ss* who were tending toward a bisexual orientation were previously exclusively heterosexual and what percentage had previously been exclusively homosexual. Thus the most frequent change (6.1%) in sexual orientation is toward bisexuality, followed by a change (4.9%) toward heterosexuality, with few *Ss* (0.9%) changing toward homosexuality. These data do not support the contention that marihuana use causes marked changes in sexual orientation.

Respondents were asked if marihuana had altered their use of alcohol. Table 7 shows the results of this question by use pattern group. As marihuana use increases, there is a decrease in the use of alcohol. Very few *Ss* (total of 13) report an increase in alcohol consumption. The percentage of *Ss* reporting a decrease in alcohol consumption rises sharply as marihuana use increases. These data tend to support the contention that marihuana replaces alcohol use. Other data available indicate that when *Ss* were asked their use of alcohol, current users reported more use of alcohol than nonusers or past users. Thus it is not that marihuana users use less alcohol than nonusers, but that the more they use marihuana, the less they use alcohol. A confounding factor in these data, however, is that wine consumption was not separated out from use of hard liquor. It is apparently a very common practice that wine and marihuana are used simultaneously. Consequently marihuana users reported usage of alcohol may be highly determined by their use of wine rather than hard liquor. When *Ss* were asked if the reasons for their use of marihuana

Table 7
Effect of Marihuana in Changing Use of Alcohol by Use Pattern Group

Change in alcohol use	Use pattern group									
	Trial users		Past users		Occasional users		Regular users		Daily users	
	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*
Alcohol increased	3.0	(1)	1.3	(1)	0.7	(1)	4.7	(9)	1.8	(1)
Alcohol decreased	6.1	(2)	14.7	(11)	27.5	(39)	41.7	(80)	60.0	(33)
No change	90.1	(30)	84.0	(63)	71.8	(102)	53.6	(103)	38.2	(21)
		(33)		(75)		(142)		(192)		(55)

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Table 8
Effect of Marihuana Use on Tobacco Use by Use Pattern Group

Change in tobacco use	Use pattern group							
	Past users		Occasional users		Regular users		Daily users	
	%	N	%	N	%	N	%	N
Tobacco increase	5.4	(4)	2.9	(4)	10.5	(20)	10.9	(6)
Tobacco decrease	12.2	(9)	5.0	(7)	12.1	(23)	29.1	(16)
No change	82.4	(61)	92.1	(129)	77.4	(147)	60.0	(33)
		(74)		(140)		(190)		(55)

paralleled most peoples use of alcohol, among the current users there was an inverse relationship between answering this question positively and frequency of marihuana use. That is, 66.9% of occasional users, 42.7% of regular users, and 34.6% of daily users answered "yes," i.e., that their *reasons* for using marihuana were the same as most peoples' *reasons* for using alcohol. Thus it appears that as an individual's marihuana use increases, his use of alcohol declines, that the heavier the use of marihuana, the less likely is the individual to judge the reason for his use of marihuana parallels other peoples' reason for using alcohol, but that in frequency of use, the heavier the use of marihuana, the heavier the use of alcohol. This last fact, however, might be highly contaminated by the use of wine by marihuana users rather than hard liquor, though we have no data on this factor.

Respondents were asked if their marihuana use had increased, decreased, or had no effect on their use of tobacco. Table 8 shows the results of this question by use pattern group. The majority of respondents in all use groups state that marihuana use has had no effect on their tobacco consumption. Very few respondents (from 2.9 to 10.9%) state their tobacco use has increased as a function of their marihuana use. Twice as many daily users (29.1%) than any other use group state that their tobacco consumption has *decreased* as a function of their marihuana use. Consequently marihuana use does not appear to affect tobacco consumption with the exception of daily marihuana users, 29.1% of whom state their tobacco consumption decreased as a function of marihuana use.

CHANGES IN ATTRIBUTES OF SELF AS A FUNCTION OF MARIHUANA USE

Respondents were asked if they attributed any change in themselves in a number of areas in their life as a function of their use of marihuana. Table 9 shows the results of this question.

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Table 9
Changes in Attributes of Self as a Function of Marihuana Use by Use Pattern Group

	Use pattern group			
	Past users	Occasional users	Regular users	Daily users
	% N	% N	% N	% N
Self-knowledge				
Increased	30.4 (21)	34.3 (48)	59.3 (115)	70.9 (39)
Decreased	1.5 (1)	0.0 (0)	0.0 (0)	0.0 (0)
No change	47.8 (33)	54.3 (76)	32 5 (63)	20.0 (11)
Doesn't apply	20.3 (14)	11.4 (16)	8.3 (16)	9.1 (5)
Self-approval				
Increased	8.7 (6)	21.4 (30)	35.9 (69)	56.4 (31)
Decreased	13.0 (9)	2.1 (3)	2.1 (4)	1.8 (1)
No change	56.5 (39)	64.3 (90)	47.9 (92)	30.9 (17)
Doesn't apply	21.7 (15)	12.1 (17)	14.1 (27)	10.9 (6)
Sexual pleasure				
Increased	25.4 (17)	33.6 (47)	57.5 (111)	69.8 (37)
Decreased	1.5 (1)	0.7 (1)	1.0 (2)	0.0 (0)
No change	53.7 (36)	56.4 (79)	34.2 (66)	26.4 (14)
Doesn't apply	19.4 (13)	9.3 (13)	7.3 (14)	3.8 (2)
Enjoyment of music, movies, paintings, TV				
Increased	36.2 (25)	55.4 (77)	81.4 (158)	83.3 (45)
Decreased	0.0 (0)	0.7 (1)	0.0 (0)	0.0 (0)
No change	43.5 (30)	37.4 (52)	16.0 (31)	14.8 (8)
Doesn't apply	20.3 (14)	6.5 (9)	2.6 (5)	1.9 (1)
Enjoyment of nature				
Increased	34.8 (24)	46.7 (64)	75.5 (145)	75.9 (41)
Decreased	1.5 (1)	0.7 (1)	0.0 (0)	0.0 (0)
No change	46.4 (32)	46.7 (64)	20.3 (39)	22.2 (12)
Doesn't apply	17.4 (12)	5.8 (8)	4.1 (8)	1.9 (1)
Ability to communicate with others				
Increased	18.6 (13)	25.0 (35)	47.1 (89)	63.5 (33)
Decreased	5.7 (4)	0.7 (1)	2.7 (5)	1.9 (1)
No change	58.6 (41)	62.9 (88)	40.7 (77)	30.8 (16)
Doesn't apply	17.1 (12)	11.4 (16)	9.5 (18)	3.9 (2)
Ability to think through problems				
Increased	10.3 (7)	12.1 (17)	22.4 (43)	39.6 (21)
Decreased	11.8 (8)	3.6 (5)	7.3 (14)	3.8 (2)
No change	58.8 (40)	73.6 (103)	62.0 (119)	54.7 (29)
Doesn't apply	19.1 (13)	10.7 (15)	8.3 (16)	1.9 (1)

(*continued*)

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Table 9 (continued)

	Use pattern group			
	Past users	Occasional users	Regular users	Daily users
	% N	% N	% N	% N
Creativity, imagination				
Increased	10.3 (7)	23.0 (32)	49.0 (94)	63.0 (34)
Decreased	7.4 (5)	0.7 (1)	0.5 (1)	1.9 (1)
No change	61.8 (42)	66.2 (92)	44.8 (86)	33.3 (18)
Doesn't apply	20.6 (14)	10.1 (14)	5.7 (11)	1.9 (1)
Memory				
Increased	3.0 (2)	2.9 (4)	6.8 (13)	15.1 (8)
Decreased	16.4 (11)	7.9 (11)	20.4 (39)	20.8 (11)
No change	59.7 (40)	77.0 (107)	67.0 (128)	62.3 (33)
Doesn't apply	20.9 (14)	12.2 (17)	5.8 (11)	1.9 (1)
Mystical interest				
Increased	19.4 (13)	23.0 (32)	43.0 (83)	52.8 (28)
Decreased	1.5 (1)	1.4 (2)	1.0 (2)	1.9 (1)
No change	55.2 (37)	59.7 (83)	44.0 (85)	41.5 (22)
Doesn't apply	23.9 (16)	15.8 (22)	11.9 (23)	3.8 (2)
Sense of responsibility				
Increased	4.4 (3)	6.4 (9)	10.4 (20)	18.9 (10)
Decreased	15.9 (11)	3.6 (5)	12.5 (24)	9.4 (5)
No change	60.9 (42)	73.6 (103)	66.1 (127)	66.0 (35)
Doesn't apply	18.8 (13)	16.4 (23)	10.9 (21)	5.7 (3)
Acceptance of conventional values				
Increased	5.9 (4)	0.7 (1)	3.6 (7)	5.6 (3)
Decreased	32.4 (22)	37.7 (52)	58.0 (112)	61.1 (33)
No change	41.2 (28)	51.4 (71)	26.9 (52)	24.1 (13)
Doesn't apply	20.6 (14)	10.1 (14)	11.4 (22)	9.3 (5)
Conformity to conventional modes of behavior				
Increased	0.0 (0)	0.7 (1)	2.1 (4)	1.9 (1)
Decreased	25.4 (17)	34.8 (48)	56.5 (109)	64.8 (35)
No change	56.7 (38)	55.1 (76)	32.6 (63)	31.5 (17)
Doesn't apply	17.9 (12)	9.4 (13)	8.8 (17)	1.9 (1)
Conventional religious interest				
Increased	4.4 (3)	3.6 (5)	4.7 (9)	7.6 (4)
Decreased	10.3 (7)	8.0 (11)	18.8 (36)	24.5 (13)
No change	64.7 (44)	70.3 (97)	57.1 (109)	49.1 (26)
Doesn't apply	20.6 (14)	18.1 (25)	19.4 (37)	18.9 (10)

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Self-Knowledge and Self-Approval. As marihuana use increases, there is an increase in self-knowledge and self-approval. Among daily users, 70.9% reported an increase of self-knowledge, and only one *S* of the total group reported a decrease in self-knowledge. Daily users also reported the highest increase, 56.4%, in self-approval, and past users reported the highest decrease, 13.0%, in self-approval. Consequently, the more one uses, the greater the probability of his reporting an increase in self-knowledge and self-approval, with no current users reporting a decrease in self-knowledge and a minimum number reporting a decrease in self-approval.

Enjoyment of Nature, Music, Movies, Sexual Pleasures, etc. As marihuana use increases, there is an increase in sexual pleasure. Daily users report the highest increase in sexual pleasure, 69.8%, and past users report the least amount of increase, 25.4%. Only three *S*s of the total group report a decrease in sexual pleasure. As use increases, there is an increase in the enjoyment of music, movies, painting, TV, etc. A high percentage of regular and daily users, 81.4 and 83.3% respectively, report an increase in enjoyment in these areas. Only one *S* of the total group reported a decrease of enjoyment in these areas. Again, past users report the least increase, 36.2%. As use increases, there is an increase in the enjoyment of nature. Only two *S*s of the total group report a decrease in this area. A high percentage of regular and daily users, 75.5 and 75.9%, respectively, report an increase in enjoyment of nature.

Ability to Communicate, Think Through Problems, and to be Creative and Imaginative. As marihuana use increases, there is an increase in the ability to communicate with others, to think through problems, and to be creative and imaginative. Only seven current users (about 1%) report a decrease in the ability to communicate, and three report a decrease in the ability to be creative and imaginative. A larger, but still negligible percentage (about 5%), report a decrease in the ability to think through problems. Daily users again report the greatest increase, 63.5%, in ability to communicate and the greatest increase, 63.0%, in creativity and imagination. Past users report the smallest percentage of increase and the largest percentage of decrease in all three areas.

Memory. Among all use groups, the majority of *S*s report no change in memory. However, 20% of both regular and daily users report a decrease in memory whereas 16% of past users and 8% of occasional users report such a decrease. It is of interest to note that 15% of daily users report an increase in memory function whereas only 7, 3, and 3% of the other use groups report such an increase. Consequently, the ma-

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jority of *S*s report no change in memory with about 20% of regular and daily users reporting a decrease and 15% of daily users an increase.

Mystical Interest and Conventional Religious Interest. As use increases, there is an increase in mystical interest and a decrease in conventional religious interest. Except for daily users, the majority of users report no change in their interest in conventional religion. Very few *S*s report an increase in conventional religious interest and few *S*s report a decrease in mystical interest. Daily users report the highest increase, 52.8%, in mystical interest and the highest decrease, 24.5%, in conventional religious interest.

Sense of Responsibility. The majority of all *S*s in all use groups report no change in sense of responsibility. As use increases, there is an increase in sense of responsibility, with 18.9% of daily users reporting such an increase. Past users report the highest decrease, 15.9%, in sense of responsibility whereas 12.5% of regular users report a decrease, and 9.4% of daily and 3.6% of occasional users report such a decrease. Consequently, most *S*s report no change in sense of responsibility with past users reporting the highest decrease (15.9%) and daily users reporting the highest increase (18.9%).

Conformity to Conventional Modes of Behavior and Acceptance of Conventional Values. As use increases, there is a decrease in acceptance of conventional values and a decrease in conformity to conventional modes of behavior. Very few *S*s report an increase in either area. Past users report the least change and daily users the greatest changes in these two areas. There is a greater change for all groups in their value system than there is in their conformity to conventional modes of behavior. Consequently, behavior changes appear more slowly than value changes.

The results of these aspects of attributes of self as a function of marihuana use are not surprising. The greater the use of marihuana, the more favorable the reporting of the consequences of that use. Past users report the least favorable results and the greatest negative results, whereas daily users generally report the greatest favorable results and the least negative results. It is of interest that a very high percentage of users reported favorable results in almost all areas and a negligible number of users reported unfavorable results. The only exception to this is in the area of memory, where one-fifth of daily and regular users report decreases in memory function. This phenomenon is certainly not new and is part of the marihuana folklore.

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REASONS FOR USING MARIHUANA

Respondents were asked "How frequently do you take marihuana for the following reasons" and the *S*s marked "never," "occasionally," "frequently," or "always" to 16 listed reasons. Table 10 shows the results to this question by use pattern group with the reasons listed in order from the most to least frequent given reason for using as "frequently" or "always."

As use increases, there is an increase in the frequency of using marihuana for a variety of reasons. Daily users use marihuana for a greater variety of reasons more often than do regular users, and they, in turn, use for a greater variety of reasons more often than do occasional users. For example, 44.4% of daily users report "frequent or always" use of marihuana for "developing inner life" whereas 16.7% of regular users and 5.8% of occasional users report using marihuana with that frequency for that reason. Again 29.1% of daily users report "frequent or always" use of marinhuana for introspective psychological purposes whereas 15.4% of regular and 9.2% of occasional users report using that often for that purpose. Among daily users, 34.5% report "frequent or always" use for "facilitating creative abilities" whereas 13.9% of regular and 5.8% of occasional users report using marihuana that frequently for that endeavor. This pattern is seen throughout the data and consistently applies to all motivations—the more one uses, the more varied are the reasons for use. Consequently, the greater the use of marihuana, the greater the effects of the drug and the more varied the experiences with the drug. This confirms other data in the study.

The primary reason for using marihuana is "to have fun," supporting the notion that marihuana, regardless of the plethora of reasons for use, is a pleasure-recreational drug. Of note is that this reason is given almost twice as frequently as the second most popular reason. The second most popular reason, like the first, is to increase and sustain pleasure. The third most frequent reason is again in the service of pleasure, i.e., to be relieved of boredom, monotony, and dullness. The fourth ranked reason is of a different quality, that of inducing relaxation by relieving tension. The fifth ranked reason is again in the service of pleasure, specifically sexual pleasure. The next four reasons given are in the area of psychological introspectiveness, creativity, and sociability. Relatively few *S*s (about 5%) state that they "frequently or always" use marihuana out of a compulsion or something they feel they have to have. Thus it appears that few *S*s

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Table 10

Rank order	No. *Ss* reporting frequent or always	Reason	Occasional users: Never %	Never *N*	Occasionally %	Occasionally *N*	Frequent or always %	Frequent or always *N*
1	280	To have fun	10.6	(15)	25.5	(36)	63.8	(90)
2	147	To make a good mood last longer or to make a fine feeling into an even better one	30.7	(43)	45.0	(63)	24.3	(34)
3	81	To relieve boredom, e.g., break up monotony or a dull period	45.8	(65)	44.4	(63)	9.9	(14)
4	75	To relieve tension or nervousness	45.8	(65)	44.4	(63)	9.9	(14)
5	72	To improve your sexual appetite or sensitivity or to improve your sexual capacities	46.1	(65)	39.7	(56)	14.2	(20)
6	64	To develop inner life	74.8	(104)	19.4	(27)	5.8	(8)
7	60	To make you more friendly or extroverted, to enhance sociability	52.5	(73)	36.7	(51)	10.8	(15)
8	59	To find out more about yourself, e.g., about your personality, your inner problems, or your human potentials	62.4	(88)	28.4	(40)	9.2	(13)
9	54	To facilitate creative abilities	76.8	(106)	17.4	(24)	5.8	(8)
10	31	To make you feel less depressed or sad	74.6	(106)	23.2	(33)	2.1	(3)
11	26	To have a religious or mystical feeling or to come close to God	85.2	(121)	13.4	(19)	1.4	(2)
12.5	17	To relieve or counteract anger or irritability	84.3	(118)	15.0	(21)	0.7	(1)
12.5	17	To satisfy a strong craving or compulsion, something you just *had* to have	90.8	(129)	6.3	(9)	2.8	(4)
14.5	10	To make you feel less afraid or more courageous	90.8	(128)	7.8	(11)	1.4	(2)
14.5	10	To make you smarter or improve your ability to learn or remember things	95.7	(135)	4.3	(6)	0.0	(0)
16	1	To reduce sexual desires or sexual activities	97.1	(135)	2.9	(4)	0.0	(0)

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Reasons for Using Marihuana by Use Pattern Group

Regular users						Daily users					
Never		Occasionally		Frequent or always		Never		Occasionally		Frequent or always	
%	N	%	N	%	N	%	N	%	N	%	N
4.1	(8)	23.2	(45)	72.7	(141)	1.8	(1)	10.7	(6)	87.5	(49)
14.9	(29)	40.2	(78)	44.8	(87)	13.0	(7)	38.9	(21)	33.8	(26)
25.4	(50)	50.8	(100)	23.9	(47)	12.5	(7)	51.8	(29)	35.7	(20)
28.4	(55)	50.0	(97)	21.6	(42)	13.5	(7)	50.0	(26)	36.5	(19)
41.8	(82)	40.8	(80)	17.3	(34)	20.4	(11)	46.3	(25)	33.3	(18)
57.8	(111)	25.5	(49)	16.7	(32)	33.3	(18)	22.2	(12)	44.4	(24)
40.7	(79)	42.8	(83)	16.5	(32)	34.5	(19)	41.8	(23)	23.6	(13)
49.2	(96)	35.4	(69)	15.4	(30)	34.5	(19)	36.4	(20)	29.1	(16)
53.6	(104)	32.5	(63)	13.9	(27)	30.9	(17)	34.5	(19)	34.5	(19)
51.0	(98)	39.1	(75)	9.9	(19)	18.9	(10)	64.2	(34)	17.0	(9)
75.9	(148)	17.9	(35)	6.2	(12)	60.0	(33)	18.2	(10)	21.8	(12)
72.3	(141)	23.6	(46)	4.1	(8)	37.0	(20)	48.1	(26)	14.8	(8)
78.1	(153)	17.9	(35)	4.1	(8)	64.3	(35)	25.9	(14)	9.3	(5)
84.5	(164)	14.9	(29)	0.5	(1)	72.2	(39)	24.1	(13)	3.7	(2)
91.2	(176)	6.7	(13)	2.1	(4)	74.5	(41)	14.5	(8)	10.9	(6)
96.9	(186)	3.1	(6)	0.0	(0)	92.6	(50)	5.6	(3)	1.9	(1)

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feel they are addicted or habituated to marihuana use. Marihuana is seldom used to make one feel less afraid and more courageous, a concept that heretofore has been much proposed by opponents of marihuana.

Summarily, the more one uses marihuana, the more varied the effects and the greater the breadth of reasons for use. Marihuana is used primarily for pleasure-recreational purposes and, secondly, for psychological introspective purposes. A sizeable number of daily users also use the drug to induce a religion-mystical consciousness. Few *S*s consistently use marihunana for any other reasons.

IMPLICATION FOR DRUG EDUCATION

Among our *S*s, there was a relationship between frequency of use and reported effects—the more frequent the use, the more varied the effects, the more pleasant and beneficial the effects, and the fewer the unpleasant and untoward effects. Those *S*s who had more unpleasant than pleasant effects either did not continue to use after trial experimentation or else they quit after some period of use. For those continuing to use, beneficial results far outweigh negatively valued results. In a previous paper (Fisher and Strantz, 1972) we have said, ". . . in approaching a project aimed at the ameliorating of drug abuse it behooves the change agent. . . (to) analyze whether use or abuse is occurring. He must first of all determine if the user. . . considers his drug use to be functional (usage) or dysfunctional (abusage), i.e., whether or not he sees his drug use as an integral part of his whole life style in that it enhances and enables him to meet needs and achieve goals, within his system, that he deems of value. If in fact, he evaluates his drug use as an enabling phenomenon within his total value orientation, it is highly unlikely that an external change agent is going to have much success in changing the user's *evaluation* of his drug experience. . . . If the user evaluates his drug usage as basically dysfunctional, i.e., not positively contributing to a realization of his value system, then the change agent has some entree into the user's psychological world." In a program with youthful drug offenders, Blumer (1967) sought to establish a core of prestigious youth leaders, who would be won over to a position of nonusage, and that these youths would by their opinion leadership position be influential in convincing other youths to give up drug usage. Blumer stated, "We found rather early we were not having any success in developing a form of collective abstinence. It became clear that the youths were well anchored in their drug use and well fortified in their belief against all the 'dangers' of drug use. . . we would invite any group of educators, scientists, welfare workers or police officials to try

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to meet effectively the well-buttressed arguments, based on personal experience and observation, that our youthful drug users present in frank, open and uncowed discussion. In sum, we learned that youthful drug users are just not interested in abstaining from drug use."

The results of this study would suggest that it would be highly unlikely that these marihuana users would give up their usage as they overwhelmingly report positive, rather than negative, results from their usage. If the dominant culture evaluates such drug usage to be dysfunctional, whereas the user judges such usage to be functional, what position and action can agents of the dominant culture take? The current position in America is to imprison the breaker of the cultural mores. An alternative would be to let the individual be his own judge as to the effective-ineffective use of the drug. A third alternative, the success of which rests upon the ingenuity of the establishment's change agent, is the ecological approach. Based on the assumption that for any one individual there exists a complex of interrelated variables relative to his drug use, and that it is the individual's evaluation of his drug use differential to each of these variables within his total system, we have earlier suggested, ". . . the only position the change agent can take is to induce a change in the *evaluation* by the user of his drug experience by changing the ecosystem of which that drug experience is but one part. The only entree the change agent has is through manipulating other variables in the ecosystem of the user. In manipulating and changing the character of the user's ecosystem lies the possibilities of changing the evaluation by the user of his drug usage" (Fisher and Strantz, 1972, p. 1409). We await with interest the reporting of research and treatment programs which successfully implement changes in the marihuana habituee's ecosystem which appreciably reduces his use of the drug.

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Marijuana and Sexual Activity

WAYNE C. KOFF

Abstract

This research was intended to discern any correlations between marijuana and human sexual activity. I was specifically interested in exploring the concept that the drug might produce different effects on males and females in regard to their sexual activity. Finally, I was concerned with the dosage of the drug which would produce the most pronounced effect on the majority of the users in regard to their sexual activity.

The controversy over a possible aphrodisiac effects of marijuana has lingered ever since introduction to the drug. Our research was limited to a study of marijuana and heterosexual activity.

In researching the connection between marijuana and various aspects of sexual activity, several methods were utilized. Questionnaires were distributed at eight major universities in the United States. The colleges involved were Washington University; Michigan State University; SUNY at Albany; University of Miami; University of Denver; Massachusetts Institute of Technology; Boston University; George Washington University. The method of distribution was via the campus mail of the colleges, to insure confidentiality. The participants were chosen at random, and of the 640 questionnaires 345 were returned, a ratio of 53.9%. Figure 1 is a sample of the questionnaire distributed.

The second method consisted of interviews with known marijuana users. The questions were directed towards the comparison between sexual activity with and without the use of marijuana. The final method of research was aimed at eliminating a variable in marijuana use, that of dosage. Several marijuana users were asked to roll certain weeds (including marijuana) into cigarettes which were then weighed to determine the "average" constitution of a joint. The results of these tests will be discussed extensively in a later section.

One must bear in mind that the majority of cannabis users (in the U.S.) are youths between the ages 14—25. Bloomquist (1968) notes, "The age span 14—25 needs no aphrodisiac to stimulate either interest or capacity to perform. If young men have the sex act in mind when they use the drug, they will probably move toward a

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The following questionnaire is a segment of a research project concerning the connections between sexual activity and marijuana. You have been chosen in a random sampling and we wish that you will answer the questions truthfully and to the best of your ability. When you have completed this form please return it to:

RESEARCH STUDY
Box 4375 Washington University
6515 Wydown Blvd.
Clayton, Missouri 63105

One final note, the questionnaire is designed to be anonymous, so please *do not* include your name. Thank You.

1. **Sex: M F (circle one)**
2. **Age: a) less than 17 b) 17—24 c) 25—30 d) over 30 (circle one)**
3. **Use of Marijuana:**
   a) never
   b) occasionally—at parties etc.
   c) daily **(circle one)**
   d) other—Please comment
4. **Method of using Marijuana:**
   a) smoking
   b) eating—in brownies, cookies, etc. (circle one or more)
   c) other—Please comment
5. **Amount of marijuana used each time you take the drug:**
   a) one "joint" or less
   b) 2—4 "joints" (circle one)
   c) more than 4 "joints"
6. **Following the use of marijuana, was *sexual desire:***
   a) increased
   b) decreased (circle one)
   c) remained the same
7. **As compared to sexual activity without the use of marijuana, was sexual activity following the use of marijuana:**
   a) more enjoyable
   b) less enjoyable (circle one)
   c) the same
8. **As compared to sexual activity without the use of marijuana, would you say *your partner* following the use of marijuana found sexual activity:**
   a) more satisfying
   b) less satisfying (circle one)
   c) the same
9. **Realizing that marijuana affects different people in different ways due to such factors as personality and atmosphere, please comment on the way in which the drug affects *you*, and what effect it has on *your* sexual activity. Please feel free to add any additional comments concerning marijuana and sexual activity on both the remainder of this side and on the back of this page.**

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FIG. 1. *RESEARCH STUDY: Marijuana and human sexual activity*

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selected partner. The woman for her part will find it easier to acquiesce . . . "

Medical opinion as to the capacity of marijuana to act as an aphrodisiac is extremely varied. Some physicians undoubtedly are convinced that the drug is specifically associated with sensuousness and carnality, while others claim that the aphrodisiac effect of marijuana is purely a wild notion. It is a known fact that the Orientals in the 19th century took the drug to prolong coitus. Doria, in Brazil, reports instances of women becoming unusually aggressive in sexual affairs while under the influence of the drug. Considering this wide diversity of opinion, the questionnaire (fig. 1) and interviews were conducted as an attempt to clear up this controversy. Table 1 gives the numerical results of the questionnaire. It must be noted that of the 345 replies, 93 never smoked marijuana and so are not included in the results.

As shown in Table 1, #6, following the use of marijuana sexual desire was said to increase by 48.5% of those questioned. The significant plurality of this result may be attributed to various factors. First of all, the mysticism surrounding the drug plays an integral part in its effect. Psychologists stress the importance of mood, expectation, and setting as shaping the nature of the drug experience. With marijuana, all of the ideas concerning its inhibition releasing and sexual stimulating tendencies may result in the increase of sexual desire. It seems conclusive now that the drug itself is not a sexual stimulant. However, one cannot separate the drug from its surroundings. The social conditions of marijuana use make it act as an aphrodisiac.

Ms. A is between the ages 17—24. She smokes marijuana two to three times per week, averaging two joints per sitting. Her comment concerning the issue of sexual desire was, "Marijuana itself does not in any way increase sexual desire. It is merely the atmosphere in which the drug is used combined with the drug . . . a darkened room with candlelight, incense burning possibly, often just the two alone, which actually promotes sexual desire."

Mr. B smokes marijuana occasionally one joint or less and is also between the ages 17—24. He comments, "I find that after using marijuana, I experience a period of intense sexual arousal and suggestibility for about 40 minutes after which the effect seems to diminish . . . closely related to this phenomenon is the increase of

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TABLE 1

1. Sex: Male 123 Female 128 Total 251

2. Age: 98% of sample between ages 17—24; 2% were 25—29

3. Use of marijuana:

a) occasionally—	Male 65.3%	Female 81.2%
b) daily—	Male 22.2%	Female 8.5%
c) other—	Male 12.4%	Female 10.2%

4. Method of using marijuana:

a) smoking—	Male	85.4%	Female	79.8%	Total	82.6%
b) eating—	Male	14.5%	Female	20.1%	Total	17.3%

c) other—two replies of snorting the drug

5. Average dosage each time drug is taken:

a) 0—1 joints	Male	25.0%	Female	22.6%	Total	23.8%
b) 2—4 joints	Male	68.8%	Female	71.4%	Total	70.1%
c) More than 4	Male	6.2%	Female	5.9%	Total	6.1%

6. Sexual Desire:	Increased	Decreased	Remains the Same
a) Male	39.1%	10.9%	50.0%
b) Female	57.8%	4.8%	37.4%
c) Total	48.5%	7.9%	43.6%

7. Sexual Enjoyment:	Increased	Decreased	Remains the Same
a) Male	59.8%	6.5%	34.7%
b) Female	42.9%	6.5%	50.6%
c) Total	51.3%	6.5%	42.2%

8. Partner Satisfaction—from sexual activity following use of marijuana.

	Increased	Decreased	Remains the Same
a) Male	59.5%	4.1%	36.4%
b) Female	47.4%	8.8%	43.7%
c) Total	53.5%	6.5%	40.0%

fantasies, and the relaxation of the body. I strongly suspect that part of the excitement generated by pot is a result of psychological suggestion, one expects to be aroused after its use."

Though 48.5% of all the people replying noted that sexual desire was increased, the proportions were extremely varied between males and females. While only 39.1% of males noted an increase, a remarkable 57.8% of the females said that their desire was increased. Performing a chi-square probability test on these results, we obtained a P value equal to .048 which is equivalent to saying that the results were significant and not dependent on chance alone. How then may

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this 18.7% difference between males and females be explained? Erich Goode, a sociologist at SUNY Stony Brook, interviewed 200 marijuana users in 1969 and recorded a 50% increase in sexual desire among women following marijuana use as compared to a 39.0% increase among men. Goode (1969) notes, "First, because of their cultural association with sex, women are more likely to think themselves into becoming excited; second, women need an excuse to justify their desire; third, men are less concerned with the ritual of sex and with what textbooks refer to as foreplay, than are women. For women, these aspects of the sexual act are often more meaningful than the immediate physical gratification it gives her . . . . a woman is more preoccupied with the path to sex, whereas for the man, the overture is often only instrumental." In addition one may say that man's cultural role permits him to freely express his desires. The woman has been taught to repress sexual desires more than man. They have been taught the sex-evil, sex-dirty, sex-forbidden notions more than the sex-fun, sex-enjoyable ones. The lessening of tensions and of inhibitions allows the woman to overcome these concepts and to express her desires. Therefore, as an inhibition releaser and body-relaxer, one may group these effects of marijuana under the heading of "stimulant to human sexual activity."

The next area of interest is the connection between marijuana and sexual enjoyment. It was shown that 51.3% of those questioned said that following the use of marijuana, sexual enjoyment increases. This result may be accounted for in different ways. First of all, many of those replying noted that sex while "high" was a completely different experience than sex while straight. It seems probable that the effects of the drug cloud the mental scope of human sexual activity and allow the physical sensation to become more pronounced. To many, this pronouncement of the physical sensation seemed exciting, vibrant, and fantastic.

Ms. C replying to the question concerning sexual enjoyment said, "Although I seemed to get more physically involved, I was much less mentally involved . . . . it kind of feels like you're in a weird, dream-like world with the person you're with, and sex can be more exciting because it's a new and different experience."

Ms. D, a 19 year old marijuana user who averages smoking two joints per day notes, " . . . sex is different since some sensations are seemingly heightened by the drug. However, sex is neither worse nor

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better. Sexual activity seems to take on a bit more variety or bizarreness when you are under the influence of pot."

From the male point of view, Mr. E eats the equivalent of one joint of marijuana in brownies and cookies every other day. He replies, "Any effects of the drug would tend to make the user less inhibited under situations where you would worry if someone walked in on you or fear pregnancy. The effect of the drug seems more noticeable during orgasm, there appeared to be more sensation in the genital organs and the rest of the body seems to be placed in a void. While I find a relaxed mood after sexual intercourse, I found that marijuana seemed to take a lot out of me, leaving me very tired while still being sexually aroused. While the physical sensation may be better, I find the mental sensation not as pleasing as when straight."

Dividing the males and females up for the question of sexual enjoyment, our results show the converse of sexual desire. While 59.8% of the males seemed to enjoy sexual activity more when stoned, only 42.9% of the females were in accord with this concept of increased enjoyment. At first glance, these results seem unexplainable in light of the sexual desire figures. However, by taking into account the cultural and sociological factors, one arrives at a definite correlation between the results on sexual desire and sexual enjoyment. Referring to the culture scheme once again, the physical sensation of sexual activity is more predominant than the mental response from the males' standpoint. In contrast, the female views the foreplay as a more gratifying precursor to the actual climax than the male. When marijuana is smoked (or ingested), the drug tends to relay a feeling of unreality while also making tactile stimulation seem more distinct. In other words, physical sensations seem more real, and mental reactions more oblique. For the female, her inability to have complete control of the mental feelings lessens her enjoyment. For the male, the increased physical sensation results in a more enjoyable sexual experience.

Another factor closely related to sexual enjoyment concerns partner satisfaction. In our sample, 59.5% of the males believe that their partners' satisfaction of sexual activity was greater while stoned, while 47.4% of the females believe that their partners found sexual activity more satisfying while "high." When the male is enjoying sexual activity, it seems reasonable for him to assume that his partner is also enjoying it. The same is true for females. Thus, there should

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be a positive correlation between the questions of sexual enjoyment and partner satisfaction. We verify this by comparing the results of #7 and #8 in Table 1 and noting that they are nearly identical. Upon questioning Mr. F concerning sexual enjoyment and partner satisfaction, he replied "We had made love just before getting stoned, not expecting to want to afterwards. My girlfriend was turned on sexually and I got aroused; we made love and I climaxed much sooner after the last time than I would normally have been able to. My girlfriend's desire and satisfaction were probably heightened judging from the number of her orgasms."

From the female standpoint: Ms. G smokes daily and believes that both sexual desire and sexual enjoyment are increased from the drug, as well as her partner's satisfaction. She is between the ages 25—30 and comments, " . . . the closeness of someone's body while stoned gives me a sense of security and uniqueness. Weed decreases my inhibitions allowing me to express more affection and give more to my partner's enjoyment."

Realizing that partner satisfaction is undoubtedly more subjective than replies concerning desire and enjoyment, conclusions reached from the area of partner satisfaction are considered less relevant than others. However, it is interesting to note that the majority of those people claiming that sexual enjoyment was decreased following the use of marijuana, also stated that they believed that their partner's satisfaction was also decreased.

Upon obtaining results for such concepts as sexual desire and enjoyment following marijuana use, one must not overlook the variable factor of dosage. Dosage can be divided into two categories, those being quality and quantity. For our purposes, the quality of the marijuana used was impossible to be accurately judged since those interviewed and questioned used different types of marijuana at different times. It is learned that the strength of the drug is dependent on its content of both 9—THC and 6—THC. (THC is abbreviation of tetrahydrocannabinol; 9 and 6 are the two most active constituents of marijuana, distinguished by their chemical formulas.) The quality of the marijuana is dependent on the quality of the resin found in the plant. The most potent marijuana known originates in Thailand and consists of 4.1% THC. Most marijuana used in the United States originates in Mexico and its THC content ranges from 0.8%—1.4%. For the sake of simplicity, we assume that

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the THC content of marijuana from Mexico has the average value of 1.0%. Having ascertained a value for the quality of the drug, the final aspect of dosage is the quantity. To find the average constitution of a joint of marijuana by weight, twenty users of the drug volunteered to roll into cigarettes four leafy, grainy substances (one of which was marijuana). Upon averaging the weights of the rolled marijuana cigarettes, the value of .73 gm was found for the constitution of a joint by weight. The weights of the rolled cigarettes ranged from .49—1.8 gms. By simple mathematics, it is shown that a joint smoked and shared by two people places between 3.75 and 5.00 mg of THC into the bloodstreams of the users. One marijuana cigarette is usually sufficient to produce an adequate intoxication of two people.

Having determined the dosage, one is now able to make a comparison of the effects of one joint of marijuana on sexual desire and enjoyment of sexual activity, as opposed to using two or more joints of the drug. Specifically, in regard to sexual desire, 61% of those individuals who smoked one joint or less noted an increase. Separating this percentage by the sexes of the individuals involved, 50.5% of the males and 70.9% of the females noted an increase in sexual desire. For the people who smoked two or more joints per sitting, males recorded a 34.5% increase while 49.5% of the females concurred that their sexual desire had increased. Thus, it is evident that as dosage increases, the tendency for an increase in sexual desire decreases.

Concerning enjoyment of sexual activity following the use of marijuana, males who smoked one joint or less noted more of an increase in enjoyment than those who smoked two or more joints per sitting. The same quantitative conclusions were recorded by the females. This result further substantiates the idea that as the dosage is increased past a peak concentration point, the positive effects of increased sexual desire and enjoyment of sexual activity will not be as noticeable. The quantitative results of the question concerning dosage are summarized in Table 2.

From the results in Table 2, it seems evident that over-intoxication of marijuana does not enhance either sexual desire or enjoyment of sexual activity as much as mild dosage. Once again it must be noted that the varied quality of the marijuana has a definite effect on these results. For instance, one cigarette of 2% THC quality is equivalent to two cigarettes of 1% THC quality. For our purposes however,

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assuming the use of a consistent quality of the drug upholds the validity of our data and subsequent conclusions.

Finally, a comparison may be made between the effects of smoking the marijuana through cigarette or pipe, or ingesting it through brownies, cookies, etc. The different methods of use are known to cause different types of "highs." Smoking yields a shorter, more potent intoxication, while eating results in a milder, longer intoxication. From our survey, 82.6% of those questioned smoked their marijuana while 17.3% ingested the drug to obtain a "high." With regard to sexual desire and enjoyment of sexual activity, the results indicate that there is no appreciable difference in the effect of the different methods of use. The quantitative results of this question are compiled in Table 3. Thus, although the type of "high" obtained from the two methods is different, both affect sexual desire and enjoyment is a similar fashion. This may be explained by noting that although the type of "high" differs, a person who eats marijuana is more likely to use a larger dose than one who smokes, assuring himself of an adequate supply of THC in his bloodstream. Overcoming the digestion process (in which some of the THC is not absorbed into the bloodstream) by using larger doses, the ingester matches the THC content of the smoker and thus shows the same effects to sexual stimuli.

TABLE 2

1. Sexual Desire	Increased	Decreased	No Change
a) 1 joint or less			
1) Male	50.5%	8.6%	40.9%
2) Female	70.9%	5.4%	23.7%
3) Total	61.0%	6.9%	32.1%
b) 2 or more joints			
1) Male	34.5%	14.6%	50.9%
2) Female	49.5%	4.6%	45.9%
3) Total	42.1%	9.6%	48.3%
2. Enjoyment of Sexual Activity	Increased	Decreased	No Change
a) 1 joint or less			
1) Male	67.0%	2.5%	30.5%
2) Female	51.0%	5.1%	43.9%
3) Total	59.0%	3.8%	37.2%
b) 2 or more joints			
1) Male	45.2%	10.7%	44.1%
2) Female	32.5%	8.4%	59.1%
3) Total	38.9%	9.5%	51.6%

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TABLE 3

1. Sexual Desire	Increased	Decreased	No Change
a) Smoking	48.1%	8.5%	43.4%
b) Eating	48.8%	7.8%	43.4%
2. Enjoyment of Sexual Activity	Increased	Decreased	No Change
a) Smoking	52.7%	6.9%	40.4%
b) Eating	50.1%	6.2%	43.7%

Totals given without respect to sex. Insufficient numbers of individuals who ingested marijuana made a division by sex invalid for our purposes. There were 44 individuals who noted ingesting marijuana, of which 27 were female and only 17 male.

In summary, the study of the effects of marijuana on human sexual activity is a field in need of more research. One must consider the psychological and sociological factors of both the drug and human sexual activity when attempting to draw the connective lines. The physiological effects of marijuana may also affect the sexual response of the human being. Our survey revealed cases of secondary impotence among males, and cases of situationally nonorgasmic females following marijuana use. On the other hand, there were also cases of multi-orgasm (from two different girls who both stated that they never had more than one orgasm when engaged in intercourse while not under the influence of marijuana). Three males noted that orgasm was reached at a faster rate after using marijuana as against not using it. It seems conceivable that marijuana, with suitable psychological and sociological conditions, and taken in a light to moderate dose releases inhibitions to the extent of being termed "aphrodisiac." Perhaps a certain level of THC content in the blood is needed for these effects to be manifest. Our results have shown that the most active dose (the one in which sexual desire and enjoyment is increased to the greatest extent) is between 1—2 cigarettes containing 1% of THC. To verify these results, laboratory tests on THC content in the blood, absorbtion rates of THC into the bloodstream, and THC content of the resin of Cannabis sativa should be undertaken. Our study has tried to reveal some of the mysteries of marijuana in connection with human sexual activity and to offer highly qualitative and semi-quantitative conclusions. Quantitative laboratory data are now needed to confirm our hypotheses and conclusions.

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Marijuana use Patterns

LLOYD HAINES* and WARREN GREEN*

I. THE SAMPLE

This survey is compiled from a total of 131 questionnaires. Subjects were not selected with the goal of obtaining a representative cross-section of the community. Rather, emphasis is on the use patterns of moderate to heavy marijuana smokers. Of the 131 people interviewed, only 8 (6 per cent) smoked less often than once a week.

Although many subjects were from the Berkeley area, effort was made to analyze people from other areas as well. Questionnaires were returned from New York, Illinois and Michigan, in addition to other cities in California.

Of the 131 respondents, 75 were male and 56 female. 74 were students, 43 worked full-time, and 14 were unemployed. The student group broke down as follows: 32 were in or had completed some high school, 27 had some college education and left before graduation, 43 were currently in college, and 29 were doing or had completed some graduate work.

As noted above, the sample consisted mainly of moderate and heavy smokers. Broken down, the results were as follows:

Every day:	32	24·4%
Every other day:	29	22·1%
At least twice a week:	30	22·8%
Once a week:	32	24·4%
Less frequently:	8	6%

Throughout this paper, reference will be made back to the figures given in this section.

Questionnaires were administered orally avoiding the risk of blank answers. Subjects were questioned about their answers, permitting the interviewer to find out why a particular answer was given. Occasionally, questions were asked twice, at different times during the interview session, in order to establish the validity of a response. On the average, each questionnaire took 50–70 min to administer. Subjects were questioned in private, eliminating any possibility of their inhibitions affecting an answer.

Use patterns may differ in areas where laws regulating marijuana are different. Thus in Berkeley, where little enforcement of the marijuana laws is attempted, people will smoke while walking in the streets. In Chicago, for example, where strict enforcement is practiced, and jail sentences are imposed, use is almost exclusively restricted to residences.

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Another aspect of use that differs in various communities is size of a marijuana cigarette. In California, where marijuana is relatively inexpensive, large "joints" are used and grass is freely given to friends. In contrast, New York smokers roll very thin "joints," and are more covetous of their dope supply. Price differentials in these two areas may be as high as 150 per cent.

II. TURNING ON THE FIRST TIME

Approximately three of every four subjects first smoked with a close friend or relative. Only 2 stated that their first drug experience was with a stranger. This clear pattern is undoubtedly a product of the illegality of marijuana use and the resulting "subculture." Also, for novices, drug use is a relatively important event. The initiate is most at ease around close friends.

The survey suggested, although a precise empirical finding was not possible, more experienced smokers were more willing to smoke with strangers. Those who recently have begun using marijuana do most of their smoking with close friends.

It is commonly thought most people do not get high the first time they smoke. Surprisingly, this survey revealed that better than two of every three subjects (91 v. 40) did get high the first time they tried. There is some evidence that the older the novice, the less likely he was to get high on his first attempt; this, however, is not a clear finding.

Subjects were asked to recall how much marijuana they smoked to get high the first time, and how long they had to smoke. Few, however, could even venture a guess, although most were sure they smoked more than they must now smoke to get stoned.

III. METHOD OF USE

Respondents were asked how they usually use grass. Not at all surprisingly, smoking was the predominant method. Only 20 people replied they smoked less than 90 per cent of the time. Most people had tried cooking grass into brownies or cookies at least once. Only a few had boiled it to tea.

The main reasons given for the popularity of smoking as opposed to ingesting were: relative ease of preparation and predictability of dosage. Most who had eaten cooked marijuana said there was no accurate way to gauge a likely reaction to a given amount of ingested grass.

Other than the factor of ease and predictability, few subjects told of a qualitative preference for smoking or ingesting. Yet most noted varying degrees of qualitative difference in the two experiences. Ingested grass was said to take much longer to "come on," perhaps upwards of two hours. The experience was likely to be of longer duration and greater intensity, although this may be related to the amount taken, which is usually greater when ingested. A small number of respondents (6) who had also taken LSD or mescaline, likened the ingesting experience (if the dosage proved adequate) to "dropping" a psychedelic drug.

When the subjects smoked marijuana, by far the most popular method was the "joint." The breakdown between joint and pipe was as follows:

Joint	
100% of the time	38
95% " " "	17
90% " " "	21
80% " " "	14
70% " " "	19
50% " " "	15
40% " " "	4
20% " " "	3

This result is not surprising, since joints are the most uniform method of gauging dosage, and require minimal investment or preparation. Many subjects volunteered the fact, however, that the likelihood of a pipe being used increased when the number of smokers increased.

Respondents were asked the approximate number of joints they must presently smoke to get high. Answers ranged from a low of $\frac{1}{4}$ to a vague "1 to 4." The vast majority of responses were between $\frac{1}{2}$ and one joint, and the group average was 0·91 joint.

This finding, however, is of extremely limited value, for an overwhelming number of subjects said that this depends on the quality of the grass smoked (124 vs. 7). Those answering affirmatively were asked if these qualitative differences were "major," "moderate," or "slight." The results:

major	=	84
moderate	=	35
slight	=	5

Perhaps consistently with these results, a vast majority of those questioned believed there are different "types" of grass, e.g., "Acapulco Gold," "Panama Red," "michoacan," etc. 98 replied affirmatively, and only 15 negatively. 18 declined to answer.

Asked to rate these "types" in order of potency, the test group came up with no consistent finding. They did state that Acapulco Gold and Panama Red were clearly distinguishable by their color, that michoacan was the flowered tops only, with no stems, and that all three varieties were far stronger than "average" grass.

Eleven respondents said they had smoked grass cured in psilocybin, a mixture which is apparently highly potent. A few of these people said that such grass had a faintly bitter smell, and if taken in moderately heavy doses could produce hallucinations.

Four of the subjects believed they had smoked grass cured or soaked in belladonna. Their opinion of this blend was unfavorable. The mix was highly potent, but alien to a grass high. The consensus was that the belladonna had been added to make otherwise low-quality grass saleable.

Many reported having seen or smoked marijuana cut with sugar; probably this was not designed to enhance quality but to increase weight.

Most smokers continue to smoke even after they are high. Of 125 people answering this question, only 30 replied negatively. Of these 30, 21 had been

smoking for less than a year. This finding seems consistent with the over-all developmental trend the interviewers perceived: novices treat turning on as a "big thing," while the more experienced smokers develop increasingly casual attitudes.

IV. SETTING OF USE

Subjects were asked where they turned on, and how regularly in each setting. Obviously, most cited "private residence." More interesting, however, were the responses to other settings; car, outdoors, and entertainment activity. Fully half of the test group stated that they had turned on in cars. These 66 people turned on an average of 14 per cent of the time in cars. 83 people turned on outdoors, for an average of 12 per cent of the time. And 51 said they smoked at entertainment activities (e.g., Fillmore, movies, etc.) for an average of 10 per cent of the time.

Those subjects who turned on in one non-residence setting, were likely to do so in the other settings as well. Apparently, once the initial fear of arrest subsides, the smoker is likely to turn on most everywhere. Predictably, novices (especially females) were least likely to smoke outside of a private residence.

V. OWNERSHIP PATTERNS

Three of every four respondents own their own grass. Here it is appropriate to reiterate that the sample consists of relatively heavy users, and is not a representative cross-section of the community. Of those who do not own their own (32), 20 were girls, and of these 20, 14 had husbands or boy friends who do own their own grass.

By far, the amount most commonly owned was the lid. 74 usually owned about a lid; 9 usually owned about 2 lids; 7 usually owned less than a lid; and 9 usually owned about one pound.

Most of these subjects usually buy their grass by the lid. 17 subjects purchase by the kilogram, on an average of 56 per cent of the time. All of these 17 admitted to doing some selling of grass.

Small-time selling was fairly widespread among the sample. 51 replied that they had sold, and 61 had never done so. The most likely sellers were experienced male smokers. There was no clear evidence linking selling to more "hard core" drug users. Although sellers turned on more often than the rest of the sample, they by no means monopolized use of other drugs. One who sells marijuana is not necessarily a hard-core drug user.

105 people said they had at least one particular "source." Those having one, two, or three such sources were divided fairly evenly, and constituted 80 per cent of the subjects. Very few knew more than three sources.

The subjects are generally well acquainted with their sources. Subjects were asked if they knew their sources closely, fairly well, slightly, or hardly at all:

Closely:	67
Fairly well:	35
Slightly:	3
Hardly at all:	0

Most of the sample was confident of their ability to obtain grass whenever they wanted it. Asked how probable were their chances of success at a given time, they replied as follows:

Certain:	54
Highly probable:	62
Fair chance:	15
Improbable:	0

These results are probably influenced by the high degree of usage of the test group. Ease of access would seem to increase as does one's involvement in the drug's "subculture".

VI. ACTIVITY PATTERNS

Subjects were asked if they usually get high with a purpose in mind. They were also given several activities, and asked what percentage of the time they turned on for the purpose of performing that activity. The results of the first general question, i.e., do subjects usually get high with a purpose in mind, were inconclusive. 72 said yes and 53 no. Affirmative answers were particularly prevalent among those who had been turning on for a relatively short period of time; conversely, experienced smokers turned on more often with no purpose in mind.

The following, listed by purpose/activity, tells how many people turn on for that purpose, and, on the average, what percentage of the time they turn on for the purpose.

Purpose	No. of people saying yes	Average % of time
To relax	81	35%
Entertainment activity	68	36%
Sexual activity	47	14%
To pass the time	44	22%
To go to sleep	29	10%
Go to class	12	13%
Work (non-school)	11	40%
Study	8	4%

Subjects were asked if they usually became more quiet or talkative when high. The results here were inconclusive. 47 said they became more quiet, 25 became more talkative, 33 said that both may happen, depending on their mood, 26 did not know.

One fairly clear finding was most people become more passive when stoned. 19 said they became more alive or agitated, and 76 said they became more passive.

40 subjects have worked while high. This is not a regular occurrence. 8 subjects work on a regular or semi-regular basis while high. These eight subjects work a good part of the day. They turn on during lunch and coffee breaks. The jobs do not require great mental acuity. Four of the subjects work in gas stations and the others perform various other manual labor tasks. These eight subjects claim to work as effectively or more effectively in comparison to being "straight." One subject, a gas station attendant, feels he can communicate better with his customers and can give them outstanding service when high. It should be noted that these eight subjects are high *every day, whether at work or not.*

Of the 32 remaining subjects who answered yes, 23 have worked infrequently when high. They are fairly heavy users at home, but do not like to smoke or be high on their jobs. 16 feel their ability is impaired, and 7 do not feel comfortable in business surroundings while high.

Many subjects are students who hold part-time jobs. These jobs tend to require little concentration, which may contribute to the reason(s) why the subjects are willing to be high. 8 subjects work fairly regularly when high and find they can perform adequately. This group will read for pleasure when high. They claim to read just as effectively on comparison to being "straight." These subjects are generally long-time users, having used the drug for an average of two years. They also use marijuana at least every two days. It is possible to conclude that because marijuana has been integrated into most of their activities, they can perform "as normal" at work.

Study

33 subjects study when high. (60 per cent of the test group are students; thus 40 per cent of the students study when high.) 28 of the subjects study infrequently. 16 of the 28 feel their potential to study is inhibited, and attempt to stay "straight" when required to study. In contrast, 12 feel they function just as effectively in comparison to being "straight." 8 of the 12 feel their reading speed is decreased, but retention is increased. 25 of the 28 prefer to study when "straight" and study when high only if the situation arises.

Five subjects claim to study exclusively when high. They also claim their effectiveness is improved by using marijuana. These five subjects feel they are more productive when high. They will drive, read and work when high. They have integrated marijuana into all aspects of their lives. One law student has finished three years at Hastings in a continued high state. He has taken finals when high, and just recently graduated.

40 per cent of the students have attended class when high. 23 per cent of the students find their classwork ineffective, and 17 per cent can perform adequately. All but 5 attend class infrequently when high. These 5 are discussed above. They study, attend class, and do many things when high.

Read

84 subjects read for pleasure when high. 47 do not. Every subject who studies when high also reads for pleasure while high. 40 people read infrequently while high. 36 read frequently, and 8 read most of the time, while high. Of all the subjects who read while high, those subjects who read most often are generally the most effective readers. This is not an exclusive rule, however. Many claim their reading speed is slowed considerably. This problem seems to be offset by increased retention or heightened enjoyment from reading the material. 18 feel they read more effectively, 36 just as effectively; and 30 less effectively.

Drive

81 licensed drivers answered that they have driven while high. Of the 50 who said no, 30 were female, who permitted their escorts to do the driving. The other

20 were licensed drivers who either drove infrequently, or found marijuana to impair their driving abilities.

An interesting fact about this group (those who can drive but don't), is that they have not been turning on very long, i.e., they averaged only 11¼ months. This might mean that they have not had enough experience with marijuana to function properly. It should also be noted that this group also cannot read or study when high. Marijuana appears to impair their whole behavioral pattern.

Of the 81 who drive while high, 63 drive frequently. They do not let marijuana interfere with their plans. They use highways and city streets. As earlier indicated, many use the car to turn on, while others turn on in the car when traveling to a particular destination.

67 of the 81 mentioned above, feel they drive as well as, or better than driving while "straight." 59 of the 67 expressed confidence in their ability to drive. 14 feel they drive less effectively. 18 expressed some doubts in their ability.

None of the subjects has ever incurred physical harm or has been involved in an auto accident when stoned. This finding is fairly important, because many of the subjects have been driving for some time when stoned. This fact dispels many theories that marijuana aids in causing traffic accidents. 25 of the people who drive on a regular basis claim their ability to control the car is improved by use of marijuana. They feel their concentration is improved and find fewer distractions compared to being "straight." 15 subjects feel motion is slowed and therefore their reactions seem improved.

Subjects were questioned if they were concerned about others who drive when high. Unanimous concern was expressed if the "high" in question was a product of speed, LSD or liquor. The subjects felt little concern about drivers using marijuana. One subject stated: "Smoking in automobiles is a way of life." This feeling was fairly pervasive among the subjects. Subjects in a fast-moving city, such as New York, showed concern about scurrying automobile traffic. It is obviously more difficult to drive in this setting than in Berkeley. One subject, who lives in New York and attends a school in Berkeley, drives constantly while high in Berkeley. When in New York, he prefers to stay "straight" if driving is required.

Eat

All the subjects responded affirmatively to this question. 91 per cent of the subjects eat every time they smoke.

85 per cent of the people interviewed ate greater quantities when high. The interviewers tried to elicit the reason for this phenomenon and were unsuccessful in finding any one answer. 30 per cent said they were hungrier; 27 per cent felt they liked the tastes of food and the textures; 37 per cent said they liked the chewing and swallowing sensation; and 6 per cent did not know.

One may attempt to explain the phenomenon simply by stating people are usually in the house and have easy access to food consumption. This is too simplistic, because many subjects stated they went out to exotic restaurants when high and ate "hot" foods. When high, people have many reasons for eating. Hunger is only one. Many subjects (67 per cent) confessed they continued to eat voraciously even when their hunger is gone. 27 per cent continued to eat when bloated. They

attribute this to the enjoyment received from tastes and textures. 17 per cent consider eating an enjoyable, sensual activity.

Sex

84 per cent of the subjects engage in sexual activity when high. Of the 16 per cent who don't, approximately half do not engage in sex at any time (many high school students were interviewed, thus many of the subjects were young). Of the 109 people who engage in sex, approximately 45 do so more frequently than when "straight." 60 engage in sex at the same frequency. Only 4 subjects have sex less frequently. 53 subjects claim the sexual act is longer. 80 subjects feel the experience is more enjoyable compared to being "straight." The explanation for these findings is that marijuana enhances physical sensations.

It is apparent from an analysis of the answers elicited on eating food and on sexual activity, that marijuana has a sensual effect on the subjects. They were more aware of their bodily functions and sensual pleasures. This is true of male and female, long- and short-term users, both moderate and heavy smokers. This is not to say that when one smokes marijuana, he or she immediately engages in sexual activity. The responses show that most subjects have regular sexual partners, whether it be a spouse or lover. The incidences occur when they are together and have the opportunity.

Only one unattached subject in the test group claimed to go out and "hustle" or try to "pick up" a partner. All the other unattached subjects found their ability to "hustle" impaired after smoking marijuana. They had little ambition to get up, get dressed, and attempt to meet people. The subjects dispelled notions that marijuana smokers roam the streets in search of sexual prey. In fact, quite the opposite occurs; the subjects stay at home and engage in sex only if a partner is available and willing.

Movies

Subjects were questioned about movies. Four-fifths of the subjects attend movies when high. They were split in their answers as to frequency. 43 go frequently; 51 infrequently; and 10 go most of the time. Compared to being "straight," 38 attend movies more often; 32 go just as often; and 34 go less frequently.

The subjects have a tendency to get high, intending to go to the movies. They claim to appreciate colors, characterizations, and good films much more when high. They become more selective about the movies they attend. The subjects will not see poor movies. The subject's tolerance for poor acting and trite plots decreases when high. 23 subjects have walked out of movies after a few minutes for precisely this reason. However, 62 per cent have gone to see cartoons or children's films when high. Subjects also stated certain films are "head" films. Some feel that such pictures are especially produced to be seen when high: "Yellow Submarine" was the most commonly given example, with "2001" also mentioned often.

TV and Music

When high, $\frac{2}{3}$ of the subjects watch TV. The responses to the questions on TV were similar to those on movies. The subjects had little tolerance for poor TV shows.

Watching TV, along with listening to music and talking, constitute most of the average "head's" time. The explanation for this is quite simple. The TV is easily accessible in one's house; thus TV, music and talking become the major activities. 55 people listen to music most of the time when high. 68 subjects listen frequently. 43 per cent of the subjects listen to music at a louder volume when high. 57 per cent have a tendency to listen to "hard rock" music when high.

SUBJECTIVE VIEWS

Subjects were questioned if marijuana is part of their "life style." Subjects were occasionally hesitant in responding to these questions, but, after repetition of the question, all subjects were cooperative.

Do you consider grass part of your life style? ¾ (95) responded Yes: 32 said No. Subjects were questioned about what "part" or "role" marijuana plays in their lives. Those who felt marijuana was not part of their life style checked "no particular role," exclusively. Those who checked "major role—fairly important role," were the heaviest users. This was not a mutually exclusive category, however. 6 subjects who smoke every day checked "no particular role," and said they could stop at any time. They said marijuana served as a pleasurable "thing," but could be eliminated from their lives without any trouble. Few of the light smokers (once a week) felt marijuana played more than a minor role. There is not a direct correlation between the amount one smokes and his view on what role it plays, as the following chart demonstrates.

	Every day	Every other day	Twice week	Once week	Longer	(how often smoke)
Major role	16		3			
Significant role		12	4	6		
Fairly important	3	2	6	7		
Minor role	5	9	16	14		
No particular role	6	4	3	3	12	

32 subjects said grass was not part of their life style, even though some of these used marijuana every two days. These subjects explained that marijuana was just a pastime, like drinking liquor or playing cards, and it meant little in the spectrum of their lives.

Subjects were questioned about their feelings when marijuana was unavailable, 6 considered this question not applicable. They have always been able to get marijuana. Of the remaining subjects, 81 said they *did* miss grass when unavailable; and 42 replied in the negative. Subjects rated their feelings:

5 — lost without it
2 — intensely aware of its absence
33 — significantly miss it
39 — only slightly miss it
42 — don't miss it

When do you begin to miss grass?

immediately	—	13
after one day	—	8
after a few days	—	36
after a week	—	13
longer	—	14
do not miss it	—	39

The findings are fairly clear. However, the difference between "significantly miss it" and "slightly miss it" did not depend on frequency of use. Both heavy and moderate users checked each category. The following chart shows the correlation between frequency of use and feelings when grass is unavailable.

	Every day	Every other day	Twice week	Once week	Longer
Lost without it		4	2		
Intensely aware of absence	4				
Significantly miss it	17	6	7	3	
Slightly miss it	9	6	11	9	3
Do not miss it	3	4	11	19	5

Heaviness of use will not necessarily determine when a subject will miss marijuana.

	Every day	Every other day	Twice week	Once week	Longer
Immediately	5	4		3	
After one day	8			3	
After a few days	11	15	5	4	
After a week			6	6	
Longer	7	2		3	3

(note—39 subjects never miss grass)

The majority of heavy users, 24, feel the loss within a few days. 3 subjects who smoke once–twice weekly do not miss marijuana.

A surprising finding is $\frac{1}{3}$ of the subjects, who have been without grass, feel a change of mood. These 34 subjects feel tension, experience irritability, and increased nervous energy. Most of the 34 are heavy users (at least every other day). Subjects were conscious that marijuana acts as a quasi-tranquilizer. One student said, "Before I began using grass on a regular basis," at least every other day, "I was nervous and irritable. I required tranquilizers. Since I have been using grass, I find no need for tranquilizers and am perfectly satisfied with my new-found tranquility."

Half of the subjects have substitute activities in the absence of marijuana. The substances most commonly used are liquor and hashish. Mescaline and LSD are used less frequently. 41 of the 56 who use substitutes during the summer, a period when marijuana is often scarce, relied on hash to "get through." They feel hash is the closest substitute for marijuana, and is readily available in times of grass shortage. Wine and beer were listed frequently. Little hard liquor was consumed.

Two-thirds (86) of all subjects claim that after long periods of being stoned, i.e., 10 hours or more, they feel physical differences. People complain of headaches,

grogginess and haziness. Subjects did not seem overtly concerned with this physical state. Some said they just took aspirin for the headache. Others would stop using marijuana for a while. Generally, the subjects accepted as fact that those who maintained a continual high would not operate at maximum efficiency.

Communication

When high, do you deal with people who have never turned on?

(yes–97) (no–34)

How effectively?	more effectively	14
	less effectively	63
	just as effectively	54

Are you inhibited or nervous at such times?

(yes–63) (no–68)

When high, do you deal with people who have turned on but who are not stoned?

How effectively?	more effectively	12
	less effectively	26
	just as effectively	93

Are you inhibited or nervous at such times?

(yes–23) (no–108)

When high, do you deal with people who are also high?

(yes–131) (no–0)

How effectively?	more effectively	52
	less effectively	18
	just as effectively	61

Are you inhibited or nervous at such times?

(yes–5) (no–126)

The charts show responses to questions: how well do you deal and communicate with people when they are high? Subjects were also questioned about their nervousness and inhibitions. Most subjects deal with all three types of people. Almost half the subjects feel they deal less effectively with people who have never turned on. Half the subjects feel they deal more effectively with those who are also high. Explanations were "heads understand each other," or "straight people don't understand." These responses can be tied in with findings that $\frac{6}{7}$ (109) subjects felt that high people have a sixth sense and can understand unspoken feelings and thoughts. Subjects had difficulty in explaining this phenomenon, but were emphatic in their assertion that it does exist.

Subjects reinforce their beliefs by staying with stoned people after smoking. They will generally avoid straight people unless it is necessary for shopping or doing chores. An artificial barrier is placed between straight and stoned people. Subjects

deal with straight people infrequently, but deal with stoned people most of the time. Two separate communities are created, but this does not happen continually. When subjects are straight, their dealings with other straight people increase. However, good friends of smokers are usually "heads." Few straight people are in their peer group.

Subjects feel better understood by fellow smokers.

Nervous

63 subjects were inhibited or nervous when dealing with straight people. In comparison, only 5 subjects felt this way when dealing with people who were high.

The explanation for their feelings is two-fold. First, the subjects feel a bit paranoic when dealing with straight people. 23 subjects responded this way and showed some special concern about the police. The remaining 39 cannot express themselves well, and feel foolish at such times. 113 subjects feel they can communicate with people who are high in an effective manner (only 69 can do this with straight people).

80 subjects can perceive if someone else is high. 40 cannot. Subjects can usually tell by a person's eyes, actions, and speech patterns whether or not a person is stoned. This makes for easy group identification. This fact reinforces segregation of smokers from non-smokers.

Subjects were asked to analyze qualitatively the effects of marijuana. They were questioned about grass being a stimulant or depressant. The results are:

Stimulant	—	36
Depressant	—	45
Neither	—	7
Depends on mood	—	5
Both	—	18

Both stimulant and depressant 50 per cent of time—19.

Subjects were fairly well divided when asked if they tired more or less easily after smoking. 48 said they tired more; 63 said less; and 9 tired just as easily. Subjects explained, classifying marijuana as a stimulant or depressant often depends on the type of marijuana. Several subjects thought "Panama Red" has a stimulating effect. After smoking "red," several subjects found themselves doing chores around the house.

Marijuana affects people differently. Some become stimulated and others lethargic. When one becomes stimulated, it is in areas that do not require strenuous physical activity. Those who claim grass is a depressant usually sit around, talk, watch TV and listen to music. Rarely do they engage in activities outside their homes. Only 4 subjects engage in strenuous activity when high. They ride motorcycles, run and swim.

Subjects were questioned about their performance of planned activities after smoking. The responses were almost unanimous. 98 subjects complete the activity as planned. Even those who reported grass as a depressant complete planned activities after they smoke. It seems that marijuana only depresses spontaneous action, and has little effect on scheduled plans.

VII. GRASS-SMOKERS AND THE LAW

Subjects were asked if the fact they were breaking the law in any way disturbed them. Almost half (57 v. 69) of those answering said No. Those saying Yes were asked to explain how it disturbed them. All cited the fear of arrest, while none expressed any moral qualms whatever.

Whilst most smokers are aware of the possibility of arrest, relatively few show great concern. Asked how worried they were about the prospects of arrest, the subjects responded as follows:

Extremely worried	—	15
Concerned	—	29
Little concern	—	61
No concern	—	18

Of the test group, only 4 had ever been arrested (1 for codeine possession) and none had been sent to jail.

The test group was asked if they perceived a difference in their fear of being arrested when they are and are not high. The results were almost perfectly even: 60 said Yes and 63 No. Of those saying Yes, 7 were less concerned when stoned, and 2 could go either way.

Predictably, an overwhelming majority view the marijuana laws as being unrealistic. Asked if they should be changed, all but two answered affirmatively. These two did not express approval of the present laws, but stated that they simply didn't know what was right. The others uniformly advocated milder laws.

VIII. SUBJECTIVE VIEWS

In the next section of the survey, subjects were asked to give their opinions on various drugs, rating each on the basis of its physical, psychological and moral harm. For each category, a rating of "*5*" was "most harmful," and "*1*" was "least harmful." This section was intended to provide some insight as to the way confirmed marijuana smokers view the over-all drug context.

The first category was that of physical harm. The results are set out below:

	1	*2*	*3*	*4*	*5*
Cigarette smoking	9	11	28	50	33
Marijuana	91	15	7	0	0
Alcohol	0	20	33	41	24
Tranquilizers	9	29	31	0	36
Stimulants	7	9	22	36	44
LSD	11	19	20	30	37

What is most significant in these results is that most of the sample, although moderately heavy users, continued to recognize a sharp delineation between grass and other "heavier" drugs. The results were contradictory to the notion that experienced, heavy smokers lose their sense of perspective and become psychologically attuned to all drugs.

Using *3* to *5* ratings as expressing opinions of physical harm, this finding is quickly perceived. While only 7 ratings of *3* were given to marijuana, there were 87 ratings of *3* to *5* for LSD; 67 for tranquilizers; and 102 for stimulants.

Also significant is the fact that this perceived delineation between grass and other drugs was not restricted to those who only use grass. Even those subjects who had experimented extensively with other drugs did not lump them together in the same category with grass.

The next category was *psychological* harm.

	1	*2*	*3*	*4*	*5*
Cigarette smoking	47	16	30	11	20
Marijuana	55	47	10	0	2
Alcohol	15	26	26	25	31
Tranquilizers	8	22	41	25	14
Stimulants	9	9	20	44	31
LSD	3	10	23	22	49

These results are consistent with the above-mentioned delineation between grass and other drugs. While only 12 people give grass a psychological harm rating of *3* to *5*, 94 feel LSD is harmful; 80 find tranquilizers harmful; and 95 think stimulants are psychologically harmful. Here again, there is no perceivable trend among frequent users to stop discriminating between drugs.

Asked to rate drugs on the basis of *moral* wrong, a slightly different result was noticeable. A large number of subjects (38) refused to make any moral judgments whatsoever on the taking of any drugs. This attitude seemed linked to the length of time the subject had been turning on. The results:

	1	*2*	*3*	*4*	*5*
Cigarette smoking	80	7	3	3	7
Marijuana	93	6	5	0	0
Alcohol	81	26	0	0	0
Hashish	88	13	3	2	0
Tranquilizers	68	6	19	10	3
LSD	70	9	7	10	13
Barbiturates	38	7	8	9	17
Stimulants	59	8	6	6	20
Opiates	56	0	13	7	28

As can be seen from the above, more than 20 subjects refused to answer the question at all; in addition, 31 marked a uniform "*1*" for all topics. There is thus a strong tendency among frequent smokers to avoid moral judgments on the taking of any drugs. Among those who did make judgments, however, the same delineation that was evident in the first two ratings was present. There were only 5 ratings of *3* to *5* for both marijuana and hashish, while there were 48 for opiates; 32 for stimulants; 30 for LSD; and 32 for tranquilizers.

PERSONAL PERCEPTIONS

86 subjects have less confidence in their ability to perform tasks when high; 31 have greater; and 14 have equal confidence. The subjects explained that motor functions are occasionally imparied and sometimes mental acuity is lessened. 92 perceived a differing ability to perform. A vast majority of subjects prefer to stay straight if required to function in demanding situations.

However, 113 subjects have deeper thought and insights when high; 115 become more introspective; and 109 become more analytic. It is indeed odd that subjects report this type of ability, and still feel mental acuity is impaired. Apparently, there is a distinction between functional, utilitarian thought—directed to a given purpose—and spontaneous, unrestricted thought. The former seems more difficult when stoned, while grass seems to facilitate the latter.

AFTER-EFFECT

Subjects were asked approximately how long, on the average, they stayed high without smoking more. The results broke down as follows:

Less than 1 hr	2
1–2 hr	16
2–3 hr	46
3–4 hr	42
More than 4 hr	11

Thus, of those answering, 75 per cent usually stayed high from 2 to 4 hr.

The sample was also asked for how long a period they felt they were "coming down" from a grass high. The results:

Less than 1 hr	17
1–2 hr	43
2–3 hr	21
3–4 hr	3
More than 4 hr	5

Thus, the vast majority of people felt they came down on the average of less than 3 hours. Consistent with this is the finding that only 22 felt they usually had to sleep it off before being "completely normal"; 90 disagreed.

Respondents were asked if their next-day performance was in any way impaired by having been high. 38 said Yes, stating they felt a slight lethargy or fuzziness, especially in the morning; 91 said their next day performance was in no way impaired. Of those who noted some impairment, all but one said that such impairment did not continue throughout the entire next day.

CONCLUSION

This study has focused its attention on various aspects of Marijuana use. The study was begun with the intention of finding if some pattern of marijuana use exists. The information gathered has in fact proved that frequently marijuana smokers think and act alike.

Some concern may be expressed over faulty methodology, i.e., not choosing a random sample. Of course it is difficult to choose a random sample in a study such as this, but it can be done.

Interestingly enough, the authors feel the test group represents a cross-section of heavy marijuana smokers. After data was compiled and conclusion drawn, new questionnaires were administered to randomly selected subjects. A few people were approached on the streets of Berkeley and asked to cooperate in a survey. In addition,

people unknown by the authors were approached at a New Jersey party. They too were requested to complete questionnaires. The responses to the questions were remarkably similar to the majority of answers elicited from the original test group. Although not conclusive, these facts lead the authors to believe the selected test group is representative of heavy marijuana users.

Some selected findings deserve mention. These findings dispel often held misconceptions about marijuana use. First, although one makes marijuana part of his life style, he can and will function in society. A heavy user still can drive, read, work and attend school. Secondly, one can be a heavy user and still refrain from using other "hard core" drugs.

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September 20, 2023

Board of Medicine

RE: New Professional Recommendations for Medical Marijuana Treatment -Female Orgasmic Difficulty/Disorder (FOD)

Dear Board of Physicians,

I am petitioning the Board to add female orgasm difficulty/disorder (FOD) as a condition for treatment in your State Medical Cannabis Program.

Up to 41% of women experience sexual problems in the National Health and Social Life survey of 3000 women. In the PRESIDE study over 31,000 women were surveyed. Again, 44% had sexual dysfunction and 20% had problems with orgasm. This is more than will experience glaucoma, Parkinson's, Crohn's and other approved conditions. Currently there are no conventional medications that can help.

Cannabis to improve sexual function in men and women has received a lot of attention in the last 10 years. Study after study has revealed there is improved enjoyment, sensation, pleasure and orgasm.

I have been certifying patients for Cannabis and studying the various benefits for 5 years. I am a Board-certified OBGYN (30 years) and practice Sexual Medicine (18 years).

Please consider the addition of Female Orgasmic Disorder to the list of approved conditions.

If I can be of further service or answer any questions, please do not hesitate to contact me.

Sincerely,

Maureen Whelihan MD FACOG

USF '93 UF-Shands Jax '97

inhaleMD

September 20, 2023
Board of Physicians
Connecticut Department of Consumer Protection
Medical Marijuana Program
450 Columbus Blvd, Suite 901
Hartford, CT 06103-1840

RE: Section I: Professional Recommendations for Medical Marijuana Treatment
Female Orgasmic Difficulty/Disorder (FOD)

Dear Board of Physicians,

I write to support the petition to add female orgasm difficulty/disorder (FOD) as a condition of treatment for the state of Connecticut's Medical Cannabis Program. FOD is an under-reported public health problem of enormous proportion. Up to 41% of women will experience this problem.[1] This is vastly more than will experience high blood pressure [2] or diabetes.[3] Unfortunately, despite the pervasive and pernicious effects of Female Orgasm Difficulty/Disorder, there are no conventional medications that can help.[4] Cannabis for female sexuality has actually been researched for over 50 years. Study after study has revealed that cannabis helps women with this issue. [5-16] Yet no state has yet put FOD on their list of approved indications. I hope that Connecticut will be a leader.

I have been a practicing Cannabinoid Specialist for over 12 years. I am faculty at both Harvard Medical School and MassGeneral Brigham Hospital. My research focus is on cannabinoids for human sexuality. In my practice, I have been prescribing medical cannabis to patients who have FOD and can attest that women report benefit from cannabis in ways no other medication or program can match.

If I can be of further service or answer any questions, please do not hesitate to contact me.

Warm Regards,

Jordan Tishler, MD
Harvard Medical School
President, Association of Cannabinoid Specialists
CEO, inhaleMD

References

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SEX COACH U

February 29th, 2024
norelyn@sexcoachu.com

Re: Female Orgasmic Difficulty/Disorder to be considered as a condition for treatment with medical cannabis

To Whom It May Concern,

As a certified sex coach with a PhD in Human Sexuality and certified cannabis health coach, I am writing to ask that you approve Female Orgasm Disorder as a condition for prescribing cannabis.

My professional experience supports the use of cannabis as an extremely effective treatment for orgasm disorders. In addition, I have found that conventional treatments and therapies are not sufficient to treat this disorder.

Thank you for your consideration. Please do not hesitate to contact me for any further information.

Sincerely,

Norelyn Parker, PhD, CSC
General Manager, Sex Coach U

CANNASEXUAL

Ashley Manta, MA
Sex and Relationship Coach
Women's Cannabis Project www.womenscp.org
ashley@ashleymanta.com
1-484-947-6153

November 9, 2023

To Whom It May Concern:

This letter is my personal testimonial in support of female orgasmic difficulty/disorder becoming a condition of treatment for medical cannabis.

As a sexual assault survivor with a diagnosis of vaginismus and PTSD, I spent a significant portion of my sexually active adulthood struggling with pain with penetration and difficulty accessing orgasm due to my trauma. After seeing countless specialists and being prescribed a range of ineffective treatments including lidocaine cream, dilators, and antidepressants, I moved to California so I would have access to medical cannabis. Using cannabis, both topically and via inhalation, allowed me to both enjoy sex without pain and access orgasm reliably for the first time.

Cannabis is medicine, and for the millions of women suffering from orgasmic difficulty/disorder, a beacon of hope in an otherwise dreary outlook for their intimate lives. Cannabis made such a profound difference in my life that I became a vocal (and internationally recognized) advocate for utilizing cannabis to improve sexual experiences, especially for women who have a history of trauma-related disorders.

Please approve the petition to add female orgasmic difficulty to your state's condition of treatment for medical cannabis.

Sincerely,

Ashley Manta

Ashley Manta, MA

Female Orgasm Research Institute
Proven Pathways to Orgasm

Suzanne Mulvehill. PhD. MBA
Clinical Sexologist, Executive Director
Female Orgasm Research Institute
www.femaleorgasmresearch.org
info@femaleorgasmresearch.org
+1 561 526 5590
+39 375 5078 140

November 8. 2023

To Whom It May Concern:

This letter is my personal testimony in support of female orgasmic difficulty/disorder becoming a condition of treatment for medical cannabis.

I saw four sex therapists over a period of more than thirty years to help me overcome my orgasm difficulty, yet, and unfortunately, talk therapy and the exercises the therapists suggested did not help me access my orgasm. I secretly suffered from the feelings of inadequacy and shame that accompanied my orgasm problem for decades.

After reading online that cannabis could help women orgasm, I got a medical perscription for it in Florida. I discovered that cannabis helped me access orgasm and gave me a new sense of confidence. I sold my international company and returned to school for my PhD to conduct research to evaluate cannabis as a treatment for female orgasmic difficulties/disorder. Most recently, I presented my statistically significant results on cannabis as a treatment for FOD at the World Conference for Sexual Medicine in Dubai, in December, 2023.

Please approve the petition to add female orgasmic difficulty to your state's condition of treatment for medical cannabis.

Sincerely,

Suzanne Mulvehill, PhD, MBA
Executive Director

IICS

International Institute of Clinical Sexology

9620 NE 2nd Ave Suite 207
Miami Shores FL 33138

ClinicalSexologyPhD.org
IICSPhD@gmail.com

305-891-1827
Fax : 815-346-3476

February 25, 2024

Ohio Medical Cannabis Board
medicalmarijuana@med.ohio.gov

Re: *Female Orgasmic Difficulty/Disorder* to be considered as a condition for treatment with medical cannabis

To Whom It May Concern:

I am the President of the International Institute of Clinical Sexology, where Dr. Suzanne Mulvehill completed her doctoral work and earned her PhD in Clinical Sexology. Her doctoral dissertation is titled:

Cannabis for the Management of Female Orgasm Difficulty/Disorder: An Observational Study.

This research supports the use of medical marijuana to treat or alleviate the condition of Female Orgasmic Difficulty Disorder.

As a sex therapist with a PhD in Human Sexuality, I can confidently state that conventional medical therapies are insufficient to treat this disorder.

Please do not hesitate to contact me for any further information.

Sincerely,

Carol L. Clark, PhD, LMHC, CST
President, IICS

Attachment 3

Media Articles referencing scientific documentation of cannabis treatment for female orgasm difficulty/disorder

MARIJUANA MOMENT

Connecticut Officials Vote To Add Female Orgasmic Disorder And Autism As Medical Marijuana Qualifying Conditions

on
June 8, 2024

By
Ben Adlin

Connecticut is on track to allow access to medical cannabis for the treatment of female orgasmic disorder (FOD) following a decision on Friday by the state Medical Marijuana Program Board of Physicians.

Doctors on the state panel unanimously agreed that cannabis is more likely than not to have a beneficial effect on FOD, which they acknowledged as a debilitating condition. Orgasms in people with FOD are delayed, infrequent or entirely absent.

The body also signed off on a separate proposal to add autism spectrum disorder as a qualifying condition for Connecticut's medical cannabis program.

The push to add FOD as a condition for marijuana access stems from a petition submitted last year by Suzanne Mulvehill, a clinical sexologist who's working to expand access to cannabis for people with FOD.

The executive director of the Female Orgasm Research Institute and the related Women's Cannabis Project, Mulvehill has published research indicating that cannabis use increased orgasm ease and frequency in more

than 70 percent of patients with FOD. Her study also found that marijuana improved sexual satisfaction in about two thirds (67 percent) of those with FOD. Despite the promising results, Mulvehill told the panel, discussing women's sexual satisfaction still carries stigma.

"We rarely talk about this topic, but I think it's time," she said, "because up to 41 percent of women suffer from it, and that statistic has not changed for more than 50 years."

Referencing drugs for erectile dysfunction, such as Viagra, Mulvehill argued that "there is a solution for men, you know, but there really isn't one for women."

"This can be that solution," she said of medical marijuana.

"When a woman can actually overcome a problem that is stigmatized and shamed, and no longer carry that around as a burden," she added, "there's a there's a dimension of confidence."

After a few questions from members of the board, the body approved adding FOD to Connecticut's list of qualifying conditions.

One member asked about dosing, wondering whether effects were observed "only at psychoactive doses" or also when lower doses of marijuana were administered.

Mulvehill replied that women she's talked to "knew exactly how much they needed to use."

"Some women said, 'I take one hit.' Some women said, 'I use a quarter of a brownie,'" she explained, noting that lower doses are typically recommended at first.

"If we were to approve this, then a doctor was going to say, 'Listen, yes, how do we start?'" Mulvehill said. "We start with small doses, very small doses. And it'd be recommended that they would start on their own."

Pressed on whether she was able to ascertain what dose was typical for patients in her study, Mulvehill replied: "Not specifically, other than saying what the research across the board has said: low doses."

Another board member asked Mulvehill how patients with FOD would go about obtaining cannabis given that therapists aren't authorized to recommend marijuana in Connecticut.

"Typically, a woman would go to a therapist first," Mulvehill replied, explaining that marijuana would be "an adjunct to therapy." They would then go to a doctor, ideally one with an understanding of therapeutic cannabis.

The board was clear that it was approving medical marijuana as a treatment for FOD specifically—not, as one member put it, "someone who just wants to use marijuana, you know, for pleasure or for intimacy."

The vote to accept FOD as a qualifying condition doesn't itself enact the change. The recommendation will be reviewed by the commissioner of the Department of Consumer Protection to make a final determination.

Mulvehill has been one of the leaders behind state-level efforts to recognize female orgasmic disorder as a qualifying condition for medical marijuana. Connecticut was in the first group of states where she and others tried to add FOD as qualifying conditions. In March, officials in Illinois voted in favor of the addition, she told the panel on Friday.

Ohio officials, meanwhile, rejected the addition of FOD—along with autism spectrum disorder—at a meeting last month.

As for how marijuana might benefit people with FOD, a report in the journal Sexual Medicine by Mulvehill and Jordan Tishler—a doctor at the Association of Cannabinoid Specialists and the company inhaleMD—identified a few possible theories.

Among them is dishabitation theory, the idea that cannabis "lessens the routine of habits, such as cognitive distraction, a known FOD cause."

Neuroplasticity theory, meanwhile, "proposes that some women learn to orgasm while using cannabis, as seen in comments in this study and anecdotally."

"Cannabis and endocannabinoids, the cannabinoids created by the human body, are increasingly recognized for their roles in neural development processes, including brain cell growth and neuroplasticity," the study says.

The research found that cannabis use did not help all women orgasm. "Among survey respondents," it says, "4% reported never having an orgasm, even though they used cannabis before partnered sex."

There's growing evidence that marijuana can improve sexual function, regardless of sex or gender. A study last year in the Journal of Cannabis Research found that more than 70 percent of surveyed adults said cannabis before sex increased desire and improved orgasms, while 62.5 percent said cannabis enhanced pleasure while masturbating.

Because past findings indicated women who have sex with men are typically less likely to orgasm than their partners, authors of that study said cannabis "can potentially close the orgasm in equality gap."

A 2020 study in the journal Sexual Medicine, meanwhile, found that women who used cannabis more often had better sex.

Numerous online surveys have also reported positive associations between marijuana and sex. One study even found a connection between the passage of marijuana laws and increased sexual activity.

Yet another study, however, cautions that more marijuana doesn't necessarily mean better sex. A literature review published in 2019 found that cannabis's impact on libido may depend on dosage, with lower amounts of THC correlating with the highest levels of arousal and satisfaction. Most studies showed that marijuana has a positive effect on women's sexual function, the study found, but too much THC can actually backfire.

"Several studies have evaluated the effects of marijuana on libido, and it seems that changes in desire may be dose dependent," the review's authors wrote. "Studies support that lower doses improve desire but higher doses either lower desire or do not affect desire at all."

Part of what cannabis appears to do to improve orgasms is interact with and disrupt the brain's default mode network, Tishler, Mulvehill's co-author, told Marijuana Moment in an interview earlier this year.

"For many of these women, who cannot or do not have an orgasm, there's some complex interplay between the frontal lobe—which is kind of the 'should have, would have, could have [part of the brain]'—and then the limbic system, which is the 'emotional, fear, bad memories, anger,' those sorts of things," he said. "That's all moderated through the default mode network."

Modulating the default mode network is also central to many psychedelic-assisted therapies. And some research has indicated that those substances, too, may improve sexual pleasure and function.

A paper earlier this year in the journal Nature Scientific Reports, which purported to be the first scientific study to formally explore the effects of psychedelics on sexual functioning, found that drugs such as psilocybin mushrooms and LSD could have beneficial effects on sexual functioning even months after use.

"On the surface, this type of research may seem 'quirky,'" one of the authors of that study said, "but the psychological aspects of sexual function—including how we think about our own bodies, our attraction to our partners, and our ability to connect to people intimately—are all important to psychological wellbeing in sexually active adults."

Psychology Today

Why Orgasms Matter

New developments for women navigating challenges.

Posted December 18, 2023 | Reviewed by Abigail Fagan

KEY POINTS

- Sexual satisfaction is now considered an important factor contributing to overall well-being by the WHO.
- It is widely acknowledged that the most important single predictor of sexual satisfaction for women is orgasm.
- Thirty to fifty percent of women worldwide report some level of orgasm difficulty.

It is widely acknowledged that the most important single predictor of sexual satisfaction for women is orgasm. The ability to experience sexual satisfaction is now considered by the World Health Organization as an important factor contributing to overall well-being and impacting global health. Because this is so critical, I have addressed this issue in a previous post where I

share tools for working through obstacles to experiencing orgasm. Here, I give an update about new developments in the field of sexology.

Thirty to fifty percent of women worldwide report some level of orgasm difficulty (OD), a statistic that has not changed in 50 years. Studies show that although women may not be formally diagnosed with OD, about half still indicate moderate to high distress regarding their condition. It is the second most frequently reported sexual problem (with lack of sexual desire coming in at number one).

A conversation with a pioneer in sexual wellness

In this post, I share the highlights of my conversation with Suzanne Mulvehill, founder of the Female Orgasm Research Institute (for the full interview, see here).

We discuss the correlation between mental health conditions and OD in women and highlight the importance of relaxation and focus during sexual experiences. Last but not least, we discuss how research has shown that cannabis may be of help.

Orgasm difficulty in women can have various underlying psychological and physical factors

The most frequently mentioned reasons for OD are (in order) stress/anxiety, arousal difficulty, sex-specific anxiety, and issues with their partner.

The use of antidepressant and antipsychotic medications, illness, sexual trauma, and stigmatization can also contribute to sexual dysfunction and OD.

The psychological toll of orgasm challenges

The feelings reported by women with OD include frustration, feelings of inadequacy, relationship issues, familial discord and divorce, and a negative impact on general mental health.

The loop of stress leading to sexual and general frustration can lead to more feelings of inadequacy, brokenness, and loss of self-esteem which in turn creates more stress. The feeling of brokenness for women about their sexuality is common.

These difficulties can be influenced by multiple factors such as age, hormonal status, sexual experience, history of physical or psychological trauma, general mental health, type of stimulation, and the nature of the sexual activity.

A recent study by Mulvehill found that women diagnosed with OD reported 24% more mental health issues than non-OD women, 52% more PTSD, and 29% more depressive disorders.

Three types of OD

OD can be broken down into three categories: primary, acquired and situational. (Anorgasmia is the technical term for problems experiencing orgasm.) Primary OD is when the person has never ever had an orgasm. Acquired or secondary anorgasmia is when one could previously orgasm but is no longer able to do so. Situational OD refers to particular circumstances in which one is unable to orgasm (for example during partnered sex vs. masturbation).

What you can do if you are experiencing OD

First and foremost: Don't panic. It is not unusual for our ability to experience orgasm to come and go (pun intended). It is precisely when people start to panic about not experiencing orgasm that it becomes a thing. As I like to say, "A watched orgasm never boils." Once we become self-conscious about orgasm, we tend to get into our heads about it. Good sex starts with being in our bodies and our sensations. When we can be in our sensations, sex tends to be sensational.

I advise clients who report ongoing symptoms of OD to learn to take a stand for what they need and want to increase the probability that they will experience orgasm, whether it's with a partner or solo.

Mulvehill says we need to become friends with our sexual style (and yes, we all have unique erotic fingerprints, which is how we inhabit and express our own sexuality and relate to lovers) We also need to know what relaxes us, helps us focus and turns us on. She emphasizes the importance of feeling safe and understood by our partners.

New report: Cannabis and OD

Recently, for her doctoral dissertation, Mulvehill studied the use of cannabis before sex by women with OD. In her study, women who reported a history of sexual abuse had a more positive orgasm experience when using cannabis before partnered sex. Another recent study found that women who use cannabis are twice as likely to experience orgasm.

Mulvehill, together with Jordan Tischler, a Harvard Medical School professor and cannabis specialist who treats sexual issues are behind efforts to get OD on the list of conditions for which medical cannabis can be prescribed.

This important new research into this aspect of women's sexual wellness deserves more attention and study.

Related conditions and how to navigate OD

An experience related to OD is a lack of spontaneous sexual desire. Although lack of desire might be a factor that contributes to orgasm disorders, in my clinical experience I see many women who orgasm easily but report no spontaneous sexual desire.

My advice for women experiencing OD is to communicate, explore, practice masturbation, and Kegel, Kegel, Kegel. A Kegel practice can be a powerful part of tuning up the orgasm machinery. Remember you can't play in a band unless you've already learned how to play your own instrument!

Further, if you have shame about sex or have traumas large or small, you should talk to a therapist. It will allow you to unpack and reevaluate old learning around sex and update your map.

We need to radically accept what is while at the same time celebrating our bodies, our senses, and our sexual selves.

In conclusion

It is important to know that orgasms, while not the be-all-end-all of the sexual world, can become more available when we say "Yes!" to the experience we are having. When we can simply *allow the sensations to feel good*, without striving for an orgasm or bigger or better sexual experiences, paradoxically we can release ourselves into the sensations, and feel more connected to ourselves and our partner. What we know from individuals who report sexual satisfaction over a lifetime is that good sex is sex that is about connection.

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Forbes

Cannabis Can Help Women Reach Orgasm, But It's 'More Than Pleasure'

Sarah Sinclair

Contributor

An award-winning journalist covering cannabis health and policy.

Mar 29, 2024,09:07am EDT

Updated Apr 1, 2024, 05:56am EDT

Female orgasm disorder affects millions of women worldwide.

Over half of women have faked an orgasm. Surprised? Probably not.

But while some women fake it from time-to-time, for others the lack of ability to reach orgasm is a far more debilitating issue.

Female orgasm disorder/difficulty (FOD), sometimes referred to as orgasm dysfunction, occurs when an individual has difficulty reaching orgasm, even when they are sexually aroused.

It affects millions of women worldwide and yet remains drastically under-studied.

"FOD is an under-recognized and under-treated serious public health issue," says Dr Suzanne Mulvehill, founder of the Female Orgasm Research Institute, in written correspondence.

"The purpose of the Female Orgasm Research Institute is to identify proven pathways to female orgasm, conduct female orgasm research, bring awareness to the persistently high percentage of women affected by female orgasm difficulty, and provide an online female orgasm research library."

According to Mulvehill's research, the condition affects up to 41% of the female population, a statistic that has remained unchanged for 50 years.

She puts this down to a number of reasons that include "shame, stigma, lack of research, and lack of treatments".

A quick search of clinicaltrials.gov and you'll see that there are currently no clinical trials recruiting or in the early stages of development on FOD and only 13 completed studies.

This is compared to 363 completed studies on erectile dysfunction and 88 in the early stages.

Dr Mulvehill says: "When I was conducting my dissertation research, I was shocked to discover that there is only one empirically validated treatment for

FOD and that is only for women who never orgasmed, or rather, have not yet orgasmed, and this is called directed masturbation and was developed in the 1970s.

"There are no empirically validated treatments for the largest group of women affected by FOD which is women who have what is referred to as Situational FOD, meaning women who can orgasm in some situations but not others, such as orgasm from masturbation but not during partnered sex."

There is one potential treatment which is showing significant promise though.

While previous research has suggested cannabis could have therapeutic potential in a number of female sexual disorders and could enhance pleasure for both men and women, the latest study to be published by the Female Orgasm Research Institute is the first to specifically evaluate the effects of cannabis in treating FOD.

What The Study Found

The observational study conducted among almost 400 women between March-November 2022, evaluated baseline demographics, sexual behavior, mental health, cannabis use, and the orgasm subscale questions of the Female Sexual Function Index (FSFI), evaluating orgasm frequency, orgasm satisfaction, and orgasm ease, with and without cannabis before sex.

The majority of women in the study who reported difficulty reaching orgasm were between the ages of 25–34 (52%), reported their race as white (75%) and were married or in a relationship (82%).

Among those respondents reporting orgasm difficulty, cannabis use before partnered sex was found to increase orgasm frequency (72.8%) improve orgasm satisfaction (67%) or make reaching orgasm easier (71%).

According to the findings, the frequency of cannabis use before partnered sex correlated with increased orgasm frequency for women with FOD, while orgasm response to cannabis depended on the reasons for use.

These findings echo 50 years of research, Dr Mulvehill says.

"I honestly do not know of any other condition that has more of a research history than cannabis and sex, and in particular female orgasm," she continues.

"What we do know is that 50 years of research shows cannabis helps women orgasm and helps women who have FOD. In the 1970s Dr Eric Goode speculated that it helped women release sexual inhibition.

"Aldrich found that cannabis has been used since ancient times to enhance sexual pleasure, and extensively documented the tantric use of cannabis in India from the seventh century onward to aid sexual pleasure and enlightenment.

"In 2020, Kasman et al. found that for each step up in cannabis use, female sexual dysfunction declined by 21%."

FOD: The Bigger Picture

It starts to make sense when you look at the bigger picture around FOD.

Dr Mulvehill's study also examined the mental health difficulties experienced by women with FOD. Those with the condition reported 24% more mental

health issues, 52.6% more PTSD, 29% more depressive disorders, 13% more anxiety disorders, and 22% more prescription drug use than women without FOD. Women with FOD were also more likely to report sexual abuse history than women without.

"Rabinak et al found that hypervigilance, anxiety, and PTSD are responses of the amygdala while studies from 2007 and 2015 found that trauma responses commonly impair sexual response," she explains.

"We also know that orgasm difficulties are the number one sexual complaint of sexual abuse survivors. When we start to put the research puzzle together, we see cannabis medicine helping women overcome FOD."

Dr Mulvehill and her research partner, Dr Jordan Tishler, have been trying for three years to secure the funding to conduct a randomized controlled trial to examine cannabis as a treatment for FOD in more depth.

Among as yet unanswered questions such as why it works first-time for some and not others, this is an issue about "more than just pleasure" and could have a much wider impact on health.

FOD has a well-documented link to anxiety, childhood sexual abuse, PTSD, and cognitive distractions.

Studies have shown that THC, one of the main cannabinoids found in cannabis, can significantly reduce rates of anxiety and traumatic memories related to trauma and PTSD by reducing activity in the amygdala and reduces cognitive distractions by inhibiting activity in the prefrontal cortex."

"As it turns out, orgasm is way more than being about pleasure. It is about a human right, a sexual right, and mental and physical health," says Dr Mulvehill.

FOD has been linked to heart disease and cardiovascular issues, while a 2009 study found that of the sexually active women with type 1 diabetes, 51% of women reporting female sexual dysfunction had problems with orgasm."

"If we start to actually ask women if they orgasm or not when screening for medical conditions, we may find out that lack of orgasm is linked to other health conditions. We know that during orgasm massive amounts of oxytocin are released.

"And what condition is related to a lack of oxytocin? Alzheimer's disease. We also know that women in their 60's are twice as likely to develop Alzheimer's. We will not know until we start asking the questions."

FOD And Public Policy Changes

Dr Mulvehill began researching this area following her own experience of overcoming FOD with the help of cannabis. And she's not alone.

The study comes as four U.S. states are now considering adding FOD to the list of qualifying conditions for a medical cannabis prescription.

This month, the Illinois Medical Cannabis Board approved adding FOD and endometriosis as conditions of treatment with medical cannabis and is now awaiting final approval from the state's director of public health.

Dr Mulvehill's personal testimony has been submitted as part of the Illinois public comments process, alongside that of other women.

Meanwhile, Ohio's State Medical Board also recently announced that FOD, along with autism spectrum disorder, would move forward for expert review and public comment following petitions submitted online.

New Mexico and Connecticut are also reported to be considering the issue.

Dr Tishler, founder of the Association of Cannabinoid Specialists and president of inhaleMD, already prescribes cannabis for FOD and other sexual disorders, and has also submitted a letter of support to regulators in New Mexico.

He highlights the importance of women having access to legally prescribed cannabis and clinical guidance when using it to manage these conditions.

"Cannabis is a medicine and as such must be treated as a medication," he comments over email.

"It has risks as well as benefits and best practices that lead to better outcomes. This is certainly true for the treatment of FOD. Using cannabis in a recreational manner is more likely to lead to no benefit and higher risk of misuse. Further, as cannabis overuse can worsen anxiety and depression, it can worsen FOD. Women who have FOD, like any other illness, deserve proper treatment from a knowledgeable and caring cannabinoid specialist."

Despite the lack of robust scientific evidence through RCTs, Dr Mulvehill highlights how this hasn't prevented other conditions being approved for medical cannabis treatment. PTSD was approved in New Mexico in 2009, with no published studies and only case reports.

"The 50 years of research, combined with doctors prescribing medical cannabis for FOD, therapists recommending it, and women using cannabis

before sex, tells me there is enough evidence for FOD to become a condition of treatment with medical cannabis," she says.

"Just google cannabis and orgasm and you will see all of the articles on it. It is not new news. What is new is getting a public policy change to add FOD as a condition of treatment with medical cannabis. Just like PTSD has dealt with stigma through awareness and education, the same can be said for FOD."

Dr Mulvehill adds: "FOD is a medical condition that deserves proper medical treatment. It is not something that women should have to 'figure out on their own'."

The Sex Therapists Using Pot to Help Patients Find Their 'Full Sexual Potential'

While weed is not a traditional tool in mainstream sex therapy, a handful of California sexologists have begun informally incorporating cannabis into their practices, arguing the drug can help patients relax, feel less inhibited, and achieve orgasm.

By Maria Yagoda

April 20, 2017, 3:25pm

According to thousands of people who swear by stoned sex, marijuana enables more present, embodied, and pleasurable sexual experiences. I've spoken with several people, women especially, who've found that smoking is the only way they can get out of their heads enough to orgasm.

"As someone who can often have a difficult time enjoying sex, discovering high sex in college was huge," says a 26-year-old woman named Rebecca. "It upped my libido and kind of gave me an excuse to be weird."

While weed is not a traditional tool in mainstream sex therapy, both because it's still illegal in most states and because its sexual side effects have not been widely studied, a handful of California sexologists and therapists have begun informally incorporating cannabis into their practices, suggesting their clients try masturbating while high.

Diana Urman, a Bay Area sexologist, recommends weed to clients who are having trouble orgasming or who have never experienced an orgasm, even after decades of sexual activity.

"Now that [weed is] legal in California, my job is easier," Urman says. "Marijuana allows people to be more present in their bodies and more whole. It slows you down."

Urman, who has a PhD in human sexuality, sometimes observes dramatic changes when clients who have experienced difficulty orgasming try masturbating—and eventually having sex with a partner—while stoned.

"My clients can feel a lot of anxiety about not being able to let go or be fully present in their bodies, which creates a disconnect between mind and body," she says. "Weed often improves people's abilities to self-pleasure and, as a result, feel more connected to partners."

The ideal, of course, is to eventually access that connectedness without substances. Seth Prosterman, a certified sex therapist in San Francisco, views weed as a sort of stepping stone.

"While pot can help bring out our most sexy selves, disinhibit us, or relax us during sex, I would highly recommend that people learn to be in the moment and deeply feel and connect with their partners without using enhancing drugs," Prosterman says. "Pot can give us a glimpse of our sexual potential. Working towards our sexual potential, with our partners, is part of developing a higher capacity for intimacy, passion, and deep connection."

While the disinhibiting effects of weed are regularly recognized by sex professionals, marijuana is still not widely recommended as a tool. Sunny Rodgers, a professional sex coach based in Los Angeles, says she's never suggested a client incorporate weed in their sex life, though adds, "I *have* had people tell me how great sex is when they can be high and ultra-relaxed."

When I ask Rodgers if she knows any professionals who do recommend weed to clients, she responds, "I've asked around and not a single coach or counselor I spoke with has recommended weed." Urman, who regularly recommends weed, finds this to be a systemic problem: "The usefulness of marijuana is not commonly understood among sex therapists."

For people struggling to find joy or pleasure in sex, weed can inject a playfulness that is otherwise hard to access, Urman says. In Gabby Bess's story on the role of weed in relationships, a man says he prefers to be with a partner who smokes and recounts a whimsical weed-fueled sexual experience he had with his girlfriend.

It upped my libido and kind of gave me an excuse to be weird.

"I remember one time she was smoking a joint while I was going down on her, and she said something along the lines of, 'This is how couples should smoke together,'" he says. "I remember blowing smoke on her clitoris while she came. Kinda hot!"

While there aren't many studies exploring the link between marijuana and sexual pleasure, there are a handful in which participants have offered anecdotal evidence. In the 2003 study "Cannabis Effects and Dependency Concerns in Long-Term Frequent Users," 54 percent of the 104 "experienced" marijuana users surveyed said smoking weed had the effect of sexual stimulation. (Ninety-five percent of respondents said it made them feel relaxed, while 86 percent said the drug made them feel comfortable.) Another Canadian study, from 2008, "Understanding the Motivations for Recreational Marijuana Use Among Adult Canadians," nearly half of the 41 adult participants said that marijuana enhanced their sexual experiences, with effects including increased libido, control, and sensitivity. Most recently, a small 2016 study in the *Archive of Sexual Behavior* comparing sex on weed and sex on booze found that sexual experiences with marijuana resulted in more pleasure (and fewer regrets) than drunk sex.

While Urman has never seen a client's sex life instantly transform after incorporating marijuana, she has observed that weed can be a catalyst on the path to having orgasms, individually or with a partner.

"It's a slow process, especially for someone who hasn't been orgasmic for their whole life. It's not like at some point they were orgasming and then stopped," she says. "But I have found their ability to self-pleasure has dramatically increased while using marijuana."

Rebecca, who had never had difficulties making herself come solo, found that smoking upped her (still pretty low) chances of getting off during sex. But there was always the possibility that weed would make things worse.

"It became kind of a crutch where, for a while, I would have to smoke literally before every time I had sex," she says. "As I got more and more anxious and depressed, it became worse, because if I was in a good place, great, but if I was in a bad place, I would get stuck there. It's very easy to get stuck in your head when high, which is dangerous for sex. You end up just internally freaking out about your relationship or how weird you're being or the fact that your vagina won't get wet. Because [weed] can also give you dry vagina, like dry mouth."

In his practice, Prosterman has found that the weed–sex combo is a bad idea for people who get anxious when they're high—but you probably guessed that.

"Any increase in anxiety will potentially interfere with sexual functioning, so for some people, weed can be an inhibiting factor in sex," he says. As with most sex advice, it's about figuring out what works best for you. "The main thing is to know how weed affects you *prior* to trying to use it for enhancing a sexual experience."

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MARIJUANA MOMENT

Marijuana Improves Sex And Could Help Close 'Orgasm Inequality Gap' Between Men And Women, New Study Indicates

January 23, 2023

By
Ben Adlin

Yet another study has found evidence that cannabis can lead to better sex, with participants reporting heightened desire, more intense orgasms and sharpened sensory perception.

The paper, published Friday in the Journal of Cannabis Research, was led by Amanda Moser of East Carolina University, now a Denver-based sexologist specializing in combining cannabis and sex.

Results of Moser's online survey of 811 adults who've used cannabis found greater perceived sexual functioning and satisfaction regardless of age or gender: More than 70 percent of people said using cannabis before sex increased desire and improved orgasms. Another 62.5 percent said cannabis enhanced their pleasure while masturbating.

But Moser and co-authors say the study's findings are especially relevant for women's pleasure. The results "suggest that cannabis can potentially close the orgasm inequality gap," they write, referring to past findings that women who have sex with men are typically less likely to orgasm than their partners.

"Women may be more likely to orgasm when using cannabis before sexual encounters, which could contribute to equity in the amount of sexual pleasure and satisfaction experienced by both women and men," the study says.

Past studies have found that while more than 90 percent of men report usually having orgasms during intercourse, fewer than 50 percent of women do. "To me that's a problem," Moser told Marijuana Moment in 2019, shortly after her survey was conducted.
To recruit participants, Moser posted the survey on social media and shared links with medical marijuana and legal cannabis advocacy organizations. Respondents were excluded if they were under 18 or hadn't ever used cannabis.

Majorities of respondents identified as white (78.9 percent), female (64.9 percent) and college-educated (80.1 percent). Nearly a quarter (23.1 percent) identified as LGBTQIA+. Ages ranged from 18 to 85, and 73.7 percent said they were in a monogamous relationship.

The survey included questions on cannabis use and its effects on participants' perceived senses of smell, taste and touch. It also asked about a dozen questions regarding marijuana's influence on specific aspects of sex and arousal. "This comprehensive scale moves beyond the physiological effects (e.g., achieving an erection) and incorporates overall sexual functioning and satisfaction," the study says. Most respondents (62.8 percent) reported using cannabis daily. About 6 in 10 (58.9 percent) said they used cannabis intentionally before engaging in sex.

Many findings, the authors write, were consistent with existing literature. Both men and women, for example, reported heightened desire and orgasm intensity. Women said they were better able to have multiple orgasms.

"These results align with the increased relaxation when using cannabis," the study says. "Those who use cannabis report being more relaxed, whether mental or physical, which would improve overall sexual functioning and pleasure."

More than 70 percent of respondents said cannabis enhanced their senses of taste and touch. While that much might be clear to anyone who's ever had the munchies, the study's authors note that taste and touch are also "two senses that are heavily used during sexual intercourse."

One area where the survey results break from past studies is men's ability to maintain and achieve an erection with cannabis. While some research indicated that cannabis could inhibit that ability, the men polled in Moser's study reported no such difficulties. "However, due to the self-report nature of this survey, social desirability may have prevented them from reporting erectile issues," the paper says.

Indeed, a fundamental limitation of the study is its reliance on self-reported recollections of cannabis users. "Participants were asked to retrospectively self-report based on many years," it says, "which would result in recall bias." It notes that "results are measuring participants' perceptions of the effects of cannabis rather than the collection of physiological data."

Moser points out that sexual satisfaction was improved by an especially wide margin when participants purposefully used cannabis before sex.

"These results may be because of the mental mindset that using cannabis will increase pleasure due to the aphrodisiac notions of cannabis rather than a true physiological effect," Moser acknowledges. "However, the relaxation effects of cannabis may contribute to increased desire or reduced inhibitions that might contribute to increased sexual functioning and satisfaction."

The study's findings may have implications for treating medical dysfunctions, especially with women, Moser says. "Women with vaginismus (i.e., painful intercourse) may benefit from the muscular relaxation and increased sexual functioning that results from cannabis use, while women with decreased desire could also see possible benefits."

Becky Lynn, a women's health specialist and professor of obstetrics and gynecology at Saint Louis University in Maryland, was the lead author of a 2019 study with similar findings. In that survey of women at an OB/GYN practice, women who said they used marijuana before sex were more than twice as likely to report satisfactory orgasms.

"I have seen [cannabis] used in women with chronic pain disorders that lead to painful sex, women who experience difficulty with orgasm or an inability to orgasm, and women who use it to improve their libido, which may not match their partner's libido," Lynn told Weedmaps at the time.
A 2020 study in the journal Sexual Medicine, meanwhile, found that women who used cannabis more often had better sex.

Numerous online surveys have also reported positive associations between marijuana and sex. One study even found a connection between the passage of marijuana laws and increased sexual activity.

Yet another study, however, cautions that more marijuana doesn't necessarily mean better sex. A literature review published in 2019 found that cannabis's impact on libido may depend on dosage, with lower amounts of THC correlating with the highest levels of arousal and satisfaction. Most studies showed that marijuana has a positive effect on women's sexual function, the study found, but too much THC can actually backfire.

"Several studies have evaluated the effects of marijuana on libido, and it seems that changes in desire may be dose dependent," the review's authors wrote. "Studies support that lower doses improve desire but higher doses either lower desire or do not affect desire at all."

CITATION: Adlin, B. (2023, January 23). *Marijuana improves sex and could help close "orgasm inequality gap" between men and women, New Study indicates*. Marijuana Moment. https://www.marijuanamoment.net/marijuana-improves-sex-and-could-help-close-orgasm-inequality-gap-between-men-and-women-new-study-indicates/

Cannabis could improve orgasms for women, study finds

Study finds women who used marijuana before sex were twice as likely to say they had 'satisfactory' orgasms

Maya Oppenheim

Women's Correspondent

Friday 12 April 2019 21:19 BST

Around a third of women in the US have used cannabis before sex and those who do say they experienced increased desire and better orgasms, a study has found.

The study published in journal *Sexual Medicine* found women who used marijuana before sex were twice as likely as those who did not to say they had "satisfactory" orgasms.

While women who regularly used the drug were twice as likely as occasional users to have satisfying orgasms.

Researchers noted that marijuana use has been on the rise among adults in the US as a growing number of states pass laws which legalise it for both medical and recreational purposes.

The study surveyed 373 female patients at an obstetrics and gynaecology practice in an academic medical centre in Saint Louis, Missouri. Overall, 127 women, or 34 per cent, reported using marijuana before sexual activity.

Researchers note there is a dearth of research that has looked at the drug's impact on sexual health – despite the fact cannabis is thought to act on the cannabinoid receptor in the brain which is involved in sexual function.

Marijuana has long been linked to an increase in sexual activity among teenagers - in the same way that alcohol and recreational drugs also have.

Earlier research has also tied marijuana to unsafe sex and higher rates of sexually transmitted diseases.

But this study, carried out by Dr Becky Lynn of Saint Louis University School of Medicine and colleagues, focused on the link between cannabis and women's satisfaction with their sex lives, sex drive, orgasms, lubrication and pain during intercourse.

Overall, 197 women in the study, or about 52 per cent, did not use cannabis at all. Another 49 women, or 13 per cent, used the drug but did not do so before having sex.

"What's new about this study is that marijuana is framed as being useful for sex," said Joseph Palamar, a population health researcher at NYU Langone Medical Centre in New York who was not actually involved in the study.

He added: "Typically, drugs are investigated as risk factors for sex. I think this paper signifies that times are changing".

The study found women who did use cannabis before sex appeared to have more lubrication and less pain during intercourse than women who did not. However, the differences were too small to rule out the possibility they were down to chance.

Limitations of the study include its small size and that is was not a controlled experiment designed to prove whether or how cannabis might directly impact sexual health.

CITATION: Oppenheim, M. (2019, April 12). *Cannabis could improve orgasms for women, study finds*. The Independent. https://www.independent.co.uk/news/health/marijuana-sex-women-weed-cannabis-smoke-orgasm-a8867756.html

Psychology Today

Why Women Benefit More From Cannabis Use

Pain relief may be linked to estrogen levels.

Posted May 27, 2022 | Reviewed by Vanessa Lancaster

Written by Gary Wenk, Ph.D.

KEY POINTS

- Women respond differently to cannabis than men.
- The behavioral and neurobiological effects of cannabis in females have different magnitudes depending on the level of sex hormones.
- Females may be more sensitive to the pain-relieving and euphoric effects of cannabis than males.

Women respond differently to cannabis than men. Females report experiencing a greater "High" than male participants when given a relatively low dose of THC (0.015 mg/kg). Females tend to progress to tolerance and dependence faster than males after initiation of regular cannabis use.

Cannabis use is associated with improved sexual function among females, but not males. A recent study demonstrated that cannabis helps women orgasm who have difficulty having orgasms, enhances the frequency and quality of women's orgasms, and, of clinical relevance, helps women orgasm who have a female orgasmic disorder.

The behavioral and neurobiological effects of cannabis in females have different magnitudes depending on the level of sex hormones. Recent studies have investigated the interaction between fluctuations in the levels of the female sex hormones estrogen and prolactin and exogenously administered cannabinoids.

It is well known that cannabis increases prolactin release in males, causing gynecomastia (aka, man-boobs); in contrast, cannabis has no direct effect on prolactin levels in females. Female sex hormone fluctuations, especially estrogen, alter the function of the brain's endocannabinoid system in a region-dependent manner.

While the number of cannabinoid receptors in the limbic system (a collection of brain regions that control emotional responses) does not fluctuate, the responsiveness of the CB1 receptor,

the receptor responsible for allowing us to experience euphoria, becomes much greater when estrogen levels are increasing.

When estrogen levels in the blood become elevated, the pituitary levels of the brain's endocannabinoid transmitters, 2-AG and AEA, are also significantly elevated. Taken together, these neurobiological changes might explain why women experience a greater level of euphoria at lower doses of THC.

No one currently understands the neurological mechanisms underlying these region-specific changes, and less is known about the effects of administering exogenous cannabinoids to cycling females.

One recent study reported that administration of a relatively small dose of THC induces a greater degree of anti-nociception (pain reduction) when estrogen levels are elevated. This anti-nociceptive action also correlates with a time when the endocannabinoid receptors in the PAG (a brainstem region responsible for blocking incoming pain signals) are more responsive, and endogenous levels of endocannabinoid neurotransmitters are elevated.

Estrogen does not bind directly to the brain's endocannabinoid receptors; however, it clearly interacts with how cannabinoids, both exogenous and endogenous, influence brain function. For example, 2ithin the hippocampus, a brain region responsible for forming new memories, estrogen acts at its receptor to increase the release of the endocannabinoid AEA, which, paradoxically, increases the activity within this brain region.

The importance of these changes remains on how the brain consolidates memories to be determined. Overall, due to the regular fluctuation in sex hormones, particularly estrogen, females may be more sensitive to the pain-relieving and euphoric effects of cannabis than males.

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Study: could cannabis help close the 'orgasm gap'?

Over 40% of women said cannabis increased their ability to have multiple orgasms during sex.

Published
10 months ago

on
3rd February 2023

By
Sarah Sinclair

Over 70% of men and women reported that cannabis increases desire.

Cannabis appears to increase sex drive and satisfaction, and may help close the gender gap when it comes to sexual pleasure, say those behind a new study

Researchers at East Carolina University and North Carolina State University in the US have suggested that cannabis could help to close the so-called 'orgasm gap' by increasing desire, satisfaction and orgasm intensity in both men and women.

The research team, led by Amanda Moser, a sexologist and cannabis researcher, investigated the effects of cannabis on sexual functioning and satisfaction, given the lack of science in this area to date.

They surveyed over 800 adults between the ages of 18 – 85-years-old. The majority of participants were female, white/caucasian and most said they were in a monogamous relationship. Almost a quarter of the participants identified as LGBTQIA+.

Participants were asked a series of questions related to sex and cannabis use, including its effect on desire, satisfaction, masturbation and orgasm intensity. Over half reported using cannabis daily for recreational and medicinal purposes and intentionally used cannabis before engaging in sex.

Cannabis was shown to have a 'positive influence on perceived sexual functioning and satisfaction' regardless of gender or age.
Over 70% of men and women reported that cannabis 'slightly or significantly increases desire'. In contrast to previous research, men perceived either 'no effect or an increased ability to achieve and maintain an erection' when using cannabis.
In addition, over 70% of men and women reported that cannabis 'slightly or significantly increased orgasm intensity', with over 40% of women saying cannabis increased their ability to have multiple orgasms during sex.
"The relaxation effects of cannabis may contribute to increased desire or reduced inhibitions that might contribute to increased sexual functioning and satisfaction," the authors state.

Closing the 'orgasm gap'

They go on to say that these findings, along with further research, could have implications in the treatment of conditions such as vaginismus (which causes debilitating pain during sex) and in increasing libido. Low libido, or lack of sex drive, is a common symptom of many physical and mental health conditions and is experienced by many women during menopause.
According to Moser and colleagues, cannabis could even help close the 'orgasm gap' – a term coined to highlight the disparity in orgasms between men and women'.
Research shows that men are statistically more likely to orgasm per sexual encounter compared to women. More than 90% of men report reaching orgasm 'usually or always' during sex, compared to less than 20% of women. Over 80% of women say they don't orgasm from intercourse alone.
"Women may be more likely to orgasm when using cannabis before sexual encounters, which could contribute to equity in the amount of sexual pleasure and satisfaction experienced by both women and men," the authors say.
They concluded: "Overall, cannabis use tends to have a positive influence on perceived sexual functioning and satisfaction for individuals despite gender or age and cannabis might help to decrease gender disparities in sexual pleasure."

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ATTACHMENT 5 – References/Citations

References/Citations for Petition to add Female Orgasmic Difficulty/Disorder (FOD) as a Condition of Treatment for Medical Cannabis

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