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Gender Differences in Medical Cannabis Use: Symptoms Treated, Physician Support for Use, and Prescription Medication Discontinuation

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Abstract

Background: Medical cannabis (MC) utilization continues to expand in the United States, as a growing body of evidence supports the use of cannabis and cannabinoids in the treatment of a range of chronic conditions. To date, gender-related differences in MC use are not widely reported, and little is known regarding physicians' support of patients' use of MC to address symptoms associated with chronic conditions.
Materials and Methods: We conducted a cross-sectional online survey of MC users in Illinois ($n = 361$). We summarized participants' qualifying conditions, symptoms treated with MC, perceived physician support for MC use, use of MC and prescription medications, then analyzed differences by participant gender.
Results: Bivariate analyses indicate that men report higher levels of support for MC use from both specialist and primary care physicians. Women were significantly more likely to increase use of cannabis after acquiring an MC card, and to discontinue prescription medications through MC use. Multivariable analyses indicate that being a woman, using MC to treat multiple symptoms, and reporting higher levels of support for MC use from a primary care provider significantly increased the likelihood of discontinuing prescription medication through MC use.
Discussion: Women are more likely to report decreased use of prescription medications to treat symptoms, and report lower levels of support from physicians for MC use. Future research on gender differences in this population may benefit from more detailed data related to symptomology, utilization, dosing, and outcomes associated with MC, and interactions with the health care system to extend these findings.

Keywords: medical cannabis, pain, chronic conditions, gender differences

Introduction

As legalization and utilization of medical cannabis (MC) continues to expand in the United States, a small but growing body of evidence supports the use of cannabis and cannabinoids for their analgesic, anticonvulsant, and anti-inflammatory properties in the treatment of a range of chronic conditions.[1,2] The integration of MC into health care delivery systems in the United States continues to be stymied by its federal legal status and disagreement over its usage.[3]

In the absence of established clinical guidelines that stem from the paucity of clinical trial testing of MC products on the market, the adoption of MC as a therapy to manage symptoms associated with various chronic conditions continues to proliferate as an alternative or complementary method vis-à-vis prescription medications.[4–6] To date, gender-related differences in MC use are not widely reported, and little is known about physicians' support of patients' use of MC to address symptoms associated with chronic conditions.

There are well-established differences in health care utilization between women and men.[7] Previous research indicates that, compared with men, women are more likely to have a general practitioner, contact their general practitioner and specialists, and obtain a higher number of outpatient

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consultations.[8,9] Women have higher utilization rates for physical, mental, and emergency health services than their male counterparts,[10,11] as well as higher rates of unmet health care needs.[9,11] Women also utilize preventative care more than men,[12] and women exhibit higher utilization rates of mental health services than men even when controlling for prevalence of mental health disorders.[13]

Women's adoption of complimentary or alternative medicine (CAM) also differs from men.[14] Women access CAM services more often than men,[15–17] and pain is a leading motive for patients to seek CAM.[18] Specifically, women also report using CAM more often than men for headaches and migraines, and preventative services.[17,19] Among the U.S. cancer population, women are significantly more likely to use CAM, particularly for pain, depression, and insomnia.[16] Physician support for patients' use of CAM has been investigated chiefly among cancer physicians, and previous research has found support among oncologists.[20] A systematic review of cancer studies and CAM found that significant numbers of cancer patients do not believe that their physicians were aware of their CAM use, but that patient–provider discussion of CAM use enhanced patients' satisfaction with care.[21]

Gender differences within some chronic conditions and symptomology may be particularly relevant to the utilization of MC. A meta-analysis of gender differences in pain indicated that women tended to have higher prevalence of neuropathic, postprocedural, and musculoskeletal pain, specifically osteoarthrosis, abdominal, back, and headache/migraine pain.[22] Research also indicates that, for women, depression is associated with more intense activity-related pain than for men.[23] Hunt et al. found that despite the increased prevalence of back pain and higher health care utilization by women, they were equally likely (not more likely) to consult for back pain, but they were more likely to consult for headache-related pain.[24]

Women may be more likely to be dual diagnosed with an anxiety disorder, bulimia nervosa, or major depressive disorder and, therefore, may have more significant and disabling disease burden.[25] Symptoms such as pain, anxiety, depression, and insomnia often interact and may mutually reinforce one another,[26–28] and recent findings suggest that persons using MC may perceive greater efficacy in treating co-occurring symptoms.[29]

Across jurisdictions where MC is legal, research assessing provider attitudes toward and support for MC use has produced mixed findings. In two U.S. states with relatively recent MC legalization, providers have expressed support for its treatment of selected conditions, yet a lack of knowledge about MC's broader applications. A recent survey in Minnesota reported that a majority of primary care providers expressed support for MC use as an adjunct for cancer patients and in the treatment of terminal illness and intractable pain, but most did not know of MC efficacy in treating the symptomology of other qualifying conditions in the state's MC program.[30]

In New York, a majority of physicians reported willingness to discuss MC with patients and supported its use for the treatment of neuropathy or pain, but were equivocal on their professed knowledge of the endocannabinoid system.[31] By contrast, a 2013 survey of general practitioners in Colorado (where MC had been legalized in 2000) found only a small minority supporting MC use.[32] Research from Israel, where MC was made available in 1990, has found physicians currently split in their attitudes toward MC: some perceive its potential to treat conditions while acknowledging the limits of conventional medicine, whereas others view cannabis as incompatible with biomedicine and with the potential for dependency.[33] Patients in Canada have reported different levels of communication regarding MC with physicians depending on their conditions, as patients with arthritis and HIV exhibit greater likelihood of discussing MC with their physician than do patients with depression or anxiety.[34]

Gendered patterns of cannabis use in the United States includes similar prevalence of recreational cannabis use in adolescence among males and females that increases among males during young adulthood.[35,36] This trend appears to persist even after MC laws have been enacted.[37] Among MC users, although men are more likely to be experienced cannabis users before initiation of MC,[38] women are more likely to report MC use for treatment of nausea, anxiety, and migraines than men.[39] Additional gender-based differences exist for prescription drug use, as women are more likely than men to use antidepressants, antianxiety, and pain medications,[40–42] despite there being no differences in the prevalence of mental health conditions by gender.[13]

With MC emerging as a possible CAM option for treating a range of symptoms, it is important to better understand correlates of patients' decision making in using MC and discontinuing prescription medications, yet little research has examined gender-related differences in MC use vis-à-vis prescription medications. In this exploratory study of MC users in Illinois, we sought to understand gender differences in MC utilization, symptoms treated by MC, physician support for patients' MC use, and discontinuation of prescription medication use subsequent to MC adoption.

The Compassionate Use of Medical Cannabis Program Act (410 ILCS 130) currently allows a person with one of 52 qualifying conditions with written certification from a recommending physician to obtain an MC registry card. Registered participants in the program may purchase MC from a chosen dispensary within the state and are not required to receive prescriptions from physicians.[43]

Materials and Methods

Procedures

We conducted a cross-sectional online survey of persons with Illinois state MC cards recruited from licensed MC dispensaries across the state. Participants were recruited through flyers mailed to dispensaries located in Illinois and through online networks. Persons interested in participating went to the study screening URL to determine eligibility. Inclusion criteria: (1) registered MC user in Illinois, (2) self-reported qualifying condition for MC use in Illinois, (3) age ≥18 years, and (4) current (past month) cannabis use. A total of 22 respondents were determined ineligible at screening. Eligible participants proceeded to the study consent URL and completed an online informed consent process. Those who consented to participate proceeded to the online survey.

Measures

Survey questions included self-reported participant demographic information (*e.g.*, current gender, race/ethnicity, age, and employment status), conditions that qualified

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participants for the state MC program (*e.g.*, severe fibromyalgia, cancer, and multiple sclerosis), symptoms treated with MC (*e.g.*, pain, spasticity, nausea, and anxiety), and cannabis use before qualification for MC use (yes/no). For those reporting prior use, we asked if cannabis use had increased or decreased after qualification for MC use. We assessed discontinuation and reduction of prescription medications by having participants report if they had ever used MC to discontinue prescription medications, or reduce but not discontinue prescription medications, respectively. Perceived support from primary care providers and specialists was rated using a 4-point scale (1 = very unsupportive, 2 = somewhat unsupportive, 3 = somewhat supportive, 4 = very supportive). We asked participants which type of physician provided certification for their qualifying condition: primary care provider, specialist, or another physician willing to provide certification (*e.g.*, ''medical cannabis practice'').

Data collection

The survey was administered online July–August 2017 using Qualtrics survey software. All data were collected anonymously and could not be linked back to individual participants. To avoid multiple survey completions by an individual, Internet protocol (IP) addresses were temporarily stored during data collection to exclude individuals who had already taken the survey. Twelve repeat respondents were deleted for a final sample of 367 respondents. For this article, we analyzed data from 201 women and 160 men ($n = 361$); four participants were excluded as they did not report their current gender, and two participants identifying as transgender were not included as they constituted <1% of the final sample. All IP addresses were deleted from the database when the survey was closed. Password-protected data were stored on protected servers. Upon survey completion, participants were sent by e-mail a $20 electronic gift certificate. The study was approved by the Institutional Review Board of DePaul University.

Data analysis

Statistical analyses proceeded in two steps. First, we compared participants' qualifying conditions, symptoms treated with MC, perceived physician support for MC use, use of MC, and prescription medications by participant gender using chi square for analysis of frequencies on the nominal variables and *t*-tests for scores rating perceived support from provider for MC use. Then, we included gender as a covariate with other variables of interest into logistic regression models predicting discontinuation of prescription medications. Using logistical regression, we tested the relationship of the independent variables (1) gender, (2) physician support for MC use, and (3) number of symptoms treated with MC as predictive of (4) discontinuation of prescription medications.

Results

Participants identified as white (82.5%), Latinx/Hispanic (8.9%), black/African American (3.9%), and multiracial/other (4.7%). Almost one third reported being employed full time (31.8%), with the remaining participants employed part time (21.5%), disabled (25.4%), unemployed (16.8%), or retired (4.5%). Severe fibromyalgia (27.75) and posttraumatic stress disorder (21.3%) were the most commonly reported qualifying conditions, followed by rheumatoid arthritis (8.9%), spinal cord injury (8.9%), cancer (8.0%), and multiple sclerosis (7.5%). Pain (75.1%) was the most frequently reported symptom treated by MC, followed by anxiety (65.4%), inflammation (59.6%), and insomnia (56.2%). Our sample broadly aligned with demographics of the larger population of MC users in Illinois at the time of our data collection (52% women; 48% men) and in terms of the most frequently cited conditions for qualifications for the program, although our sample had proportionally higher percentages of rheumatoid arthritis and lower percentages of cancer.[43]

In the bivariate analyses, women were significantly more likely to report using MC for pain ($X^2 = 13.69$, $p < 0.001$), anxiety ($X^2 = 6.67$, $p < 0.01$), inflammation ($X^2 = 27.50$, $p < 0.001$), and nausea ($X^2 = 8.33$, $p < 0.01$). There were no significant gender-related differences in MC use in the treatment of depression, insomnia, or muscle spasms. Regarding support, we found that men report marginally higher levels of support for MC use from primary care physicians and significantly higher levels of support for MC use from specialist physicians ($F = 4.54$, $p < 0.05$).

Women more frequently received qualifying documentation for an MC card from an MC practice ($X^2 = 4.51$, $p < 0.05$) compared with men. Among participants who reported prior cannabis use, women were significantly more likely to increase use of cannabis after acquiring an MC card ($X^2 = 11.04$, $p < 0.05$). Women were proportionately more likely to report reductions in prescription medications through MC use ($X^2 = 3.87$, $p < 0.05$), and discontinuation of prescription medications through MC use ($X^2 = 13.65$, $p < 0.001$) (Table 1).

Table 2 presents the results of the multivariable analyses that indicate being a woman (odds ratio [OR] = 2.09, 95% confidence interval [CI]: 1.11–3.90), number of symptoms treated with MC (OR = 1.42, 95% CI: 1.23–1.65), and reporting higher levels of support for MC use from a primary care physician (OR = 1.45, 95% CI: 1.10–2.03) increased the likelihood of discontinuing prescription medication through MC use.

Given the relatively large number of participants and disproportion numbers of women qualifying for MC use with fibromyalgia, we conducted a supplementary analysis excluding fibromyalgia patients. The supplemental adjusted model excluding fibromyalgia patients ($n = 261$) resulted in similar parameters as the full model: woman (OR = 2.07, 95% CI: 1.01–4.25), perceived support from primary care provider (OR = 1.77, 95% CI: 1.25–2.51), and number of symptoms treated (OR = 1.45, 95% CI: 1.10–1.91) increased the likelihood of discontinuing prescription medication through MC use.

Discussion

The results from our cross-sectional study describe a number of gender-associated patterns within the use and outcomes of MC among patients with chronic conditions. Women appear to be more likely than men to use MC for a range of symptoms (specifically, pain, anxiety, inflammation, and nausea), to have increased use of cannabis since qualifying for MC, and to subsequently have reduced or completely discontinued their prescription medications.

In addition, the women in our sample reported marginally lower levels of support from their primary care provider, and significantly less support from specialist physicians than the men in our sample, and significantly more of them received

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Table 1. Participant Characteristics

	Women (n = *201*)		*Men* (n = *160*)		*Total* (n = *361*)		
	n	%	n	%	n	%	p
Qualifying condition							
Severe fibromyalgia	87	43.3	13	8.1	100	27.7	0.000
PTSD	38	18.9	39	24.4	77	21.3	0.208
Rheumatoid arthritis	19	9.5	13	8.1	32	8.9	0.659
Spinal cord injury	14	7.0	18	11.3	32	8.9	0.155
Cancer	11	5.5	18	11.3	29	8.0	0.045
Multiple sclerosis	10	5.0	17	10.6	27	7.5	0.043
Crohn's disease							
Spinal cord disease	9	4.5	13	8.1	22	6.1	0.150
Traumatic brain injury	10	5.0	12	7.5	22	6.1	0.319
Lupus	18	9.0	0	0.0	18	5.0	0.000
Symptoms treated with MC							
Pain	166	82.6	105	65.6	271	75.1	0.000
Anxiety	143	71.1	93	58.1	236	65.4	0.010
Inflammation	144	71.6	71	44.4	215	59.6	0.000
Insomnia	119	59.2	84	52.5	203	56.2	0.202
Depression	108	53.7	70	43.8	178	49.3	0.060
Nausea	106	52.7	60	37.5	166	46.0	0.004
Provider supplying Info for MC qualification							
Current primary care provider	54	26.9	49	31.0	103	28.7	0.432
Current specialist	49	24.4	51	32.3	100	27.9	0.214
MC practice	82	40.8	48	30.4	130	36.2	0.000
Other	16	8.0	10	6.3	26	7.2	0.532
No cannabis use before qualifying for MC	64	31.8	19	11/9	85	23.5	0.000
Increased cannabis use after qualifying for MC	132	67.3	80	51.6	212	58.7	0.012
Reduced Rx use with MC	129	64.8	86	54.4	215	59.6	0.046
Discontinued Rx use with MC	159	79.9	99	62.3	258	71.5	0.000
	M	*SD*	M	*SD*	M	*SD*	
Participant age	42.03	11.89	40.88	11.58	21.27	11.83	0.357
Support from provider for MC use							
Primary care provider	2.96	1.06	3.18	0.90	3.06	0.99	0.132
Specialist	2.94	1.15	3.13	0.97	3.02	1.06	0.034

MC, medical cannabis; PTSD, post-traumatic stress disorder; SD, standard deviation.

certification for their state MC card from MC practices. What is noteworthy for health care providers is that a majority of women in this study successfully integrated MC into their chronic condition management and were able to reduce or discontinue prescription medication, despite reporting (as a group) only moderate support from primary care practitioners and specialists.

A closer examination of the impact of MC on patients' medications, using multivariable analysis revealed that being female, treating more symptoms with MC, and having a higher level of support from a primary care physician is significantly associated with discontinuation of prescription medication use. Our results align with recent findings that report men are more likely to be more experienced users of cannabis before onset of medical use,[38] but women are more likely to substitute MC for prescription medications.[44] Population-based studies have shown that men are more likely to report higher levels of cannabis use from middle adolescence through their mid-30s.[35,36] Utilization studies have found that although MC was predominately used by men, among states with relatively early

Table 2. Logistic Regression Model of Discontinuation of Any Prescription Medication Use Through Medical Cannabis Use

							95% CI for OR	
Parameter	β	*SE*	*Wald*	*df*	*Sig.*	*OR*	*Lower*	*Upper*
Woman	0.74	0.32	5.27	1	0.022	2.09	1.11	3.91
Physician support for MC use	0.41	0.16	6.75	1	0.009	1.50	1.10	2.04
No. of symptoms treated with MC	0.35	0.08	22.26	1	0.000	1.42	1.23	1.65
Constant	−2.76	0.76	13.30	1	0.000	0.064		

CI, confidence interval; OR, odds ratio; SE, standard error.

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legalization that gender difference has narrowed over time.[45,46] In our study, male participants were more likely to report use before qualification for MC, whereas among prior users female participants were more likely to report their use of cannabis to increase after initiation of MC. Such differences align not only with the epidemiology of recreational and MC in the United States, but also have implications for how men and women may approach the use of MC and recreational cannabis differently.

Whereas cannabis use was once viewed largely as illicit drug use, the advancement of MC legalization across states in the United States and other international jurisdictions may be shifting attitudes toward the complementary and alternative medical potential of cannabis.

Given that previous research indicates that women engage in CAM services more frequently than men[15,16] the lack of a requirement for a prescription to acquire MC in Illinois may also contribute to it being viewed by many patients as an alternative/complementary treatment for chronic conditions. The implication that women may conceptualize MC as CAM merits further research, as this finding may be viewed as a consequence of patient experience with cannabis, and not only of shifting public attitudes toward it.

Men and women may experience pharmacological effects of MC use differently, as research has shown gender differences in analgesic effects among cannabinoids across animal and human studies.[47] In addition, pharmacological research has identified drug-metabolizing enzymes and drug transporters that may be inhibited by certain compounds of MC.[48] More patient-centered studies on MC are needed to better understand differences in dosing, outcomes, beliefs, attitudes, formulations, pharmacology, and metabolism between men and women.

MC users report a range of motivations for discontinuation of prescription medications, including concerns regarding addiction and toxicities, as well as better management of symptoms and side effects through MC use.[4,6,49] To the extent that such reduced dependence on prescription medication is associated with greater symptom management and higher quality of life, one implication of this study is that primary care practitioners could encourage patients who use MC to track their usage and openly discuss their experiences during office visits. Although it is possible that providers are discontinuing prescriptions after noticing reductions in usage, discontinuation of prescription medications coupled with neutral attitudes of primary care physicians toward MC may be perceived as support for continued MC usage.

Furthermore, given findings from previous studies,[33] there may be differences in provider support for discontinuing prescriptions depending on medication and patient condition. We did not ask participants to characterize physician responses to the lack of their prescription refills, but the interaction between patients and providers in this circumstance warrants further research. We also did not ask participants their provider's gender, but research has shown that gender concordant patient–physician dyads result in higher levels of patient-centered care.[50,51] More detailed data that elucidate decision making between patient and provider would deepen our understanding of how patients and providers conceptualize MC use as alternative, complementary, or integrative health care.

Several characteristics of our sample should be noted in relation to interpreting our results. First, because the participants were recruited through MC dispensaries, we obtained results from patients who almost certainly have experienced success in accessing MC and in using it to manage a range of symptoms related to their chronic conditions. We do not know how the results of the study might be different if we had accessed large numbers of patients who have tried MC but found it ineffective compared with their prescription medication, or patients who are using nonmedical-grade cannabis for therapeutic purposes. Nonetheless, given the growing availability of MC as a therapeutic option for a range of chronic conditions, we believe these results add useful details to the growing picture of patient experiences with MC.

Our study has several limitations that merit consideration. The cross-sectional design precludes any causal assumptions among the correlates of prescription medication discontinuation. All data were self-reported and potentially subject to recall bias. We did not utilize a probability sample, although our participants proportionately resemble the approved MC users in Illinois in terms of qualifying conditions and gender at the time our study was conducted.[43] Despite these limitations, our study provides important data on gender-related differences in MC utilization, symptoms treated, and perceived physician support for use. Future research on gender differences in this population may benefit from more detailed and nuanced data related to symptomology, utilization, dosing, and outcomes associated with MC, and interactions with physicians and others in the health care system to further extend these findings.

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References

1. National Academy of Sciences, Engineering, and Medicine. The health effects of cannabis and cannabinoids: The current state of evidence and recommendations for research. Washington DC: National Academies Press, 2017.
2. Whiting PF, Wolff RF, Deshpande S, et al. Cannabinoids for medical use: A systematic review and meta-analysis. JAMA 2015;313:2456–2473.
3. Abuhasira R, Shbiro L, LandschaftY. Medical use of cannabis and cannabinoids containing products—Regulations in Europe and North America. Eur J Intern Med 2018;49:2–6.
4. Bruce D, Brady JP, Foster E, Shattell M. Preferences for medical cannabis over prescription medications among persons living with chronic conditions: complementary, tapering, and alternative uses. J Alt Comp Med 2018;24:146–153.
5. Mercurio A, Aston ER, Claborn KR, Waye K, Rosen RK. Marijuana as a substitute for prescription medications: A qualitative study. Subst Use Misuse 2019;54:1894–1902.
6. Reiman A, Welty M, Solomon P. Cannabis as a substitute for opioid-based pain medication: Patient self-report. Cannabis Cannabinoid Res 2017;2:160–166.

7. Bertakis KD, Azari R, Helms LJ, Callahan EJ, Robbins JA. Gender differences in the utilization of health care services. J Family Pract 2000;49:147.
8. Glaesmer H, Brähler E, Martin A, Mewes R, Rief W. Gender differences in health care utilization: The mediating effect of utilization propensity. J Appl Soc Psychol 2012; 42:1266–1279.
9. Socias ME, Koehoorn M, Shoveller J. Gender inequalities in access to health care among adults living in British Columbia, Canada. Womens Health Issues 2016;26:74–79.
10. Koopmans GT, Lamers LM. Gender and health care utilization: The role of mental distress and help-seeking propensity. Soc Sci Med 2007;64:1216–1230.
11. Manuel JI. Racial/ethnic and gender disparities in health care use and access. Health Serv Res 2018;53:1407–1429.
12. Vaidya V, Partha G, Karmakar M. Gender differences in utilization of preventive care services in the United States. J Womens Health 2012;21:140–145.
13. Levinson D, Ifrah A. The robustness of the gender effect on help seeking for mental health needs in three subcultures in Israel. Soc Psychiatry Psychiatr Epidemiol 2010;45:337–344.
14. Peltzer K, Pengpid S. Prevalence and determinants of traditional, complementary and alternative medicine provider use among adults from 32 countries. Chinese J Integrative Med 2018;24:584–590.
15. Clarke TC, Black LI, Stussman BJ, Barnes PM, Nahin RL. Trends in the use of complementary health approaches among adults: United States, 2002–2012. Natl Health Stat Report 2015:1–16.
16. Fouladbakhsh JM, Stommel M. Gender, symptom experience, and use of complementary and alternative medicine practices among cancer survivors in the US cancer population. Oncol Nurs Forum 2010;37:E7–E15.
17. Zhang Y, Leach MJ, Hall H, et al. Differences between male and female consumers of complementary and alternative medicine in a national US population: A secondary analysis of 2012 NIHS data. Evid Based Complement Alternat Med 2015;2015:413173.
18. Bauer BA. Tilburt JC, Sood A, Li GX, Wang SH. Complementary and alternative medicine therapies for chronic pain. Chinese J Integrative Med 2016;22:403–411.
19. Rhee TG, Harris IM. Gender differences in the use of complementary and alternative medicine and their association with moderate mental distress in US adults with migraines/severe headaches. Headache 2017;57:97–108.
20. Roberts CS, Baker F, Hann D, et al. Patient-physician communication regarding use of complementary therapies during cancer treatment. J Psychosocial Oncol 2006;23: 35–60.
21. Davis EL, Oh B, Butow PN, Mullan BA, Clarke S. Cancer patient disclosure and patient-doctor communication of complementary and alternative medicine use: A systematic review. Oncologist 2012;17:1475–1481.
22. Fillingim RB, King CD, Ribeiro-Dasilva MC, Rahim-Williams B, Riley III JL. Sex, gender, and pain: A review of recent clinical and experimental findings. J Pain 2009; 10:447–485.
23. Adams H, Thibault P, Davidson N, Simmonds M, Velly A, Sullivan MJ. Depression augments activity-related pain in women but not in men with chronic musculoskeletal conditions. Pain Res Manag 2008;13:236–242.
24. Hunt K, Adamson J, Hewitt C, Nazareth I. Do women consult more than men? A review of gender and consultation for back pain and headache. J Health Serv Res Policy 2011;16:108–117.
25. McLean CP, Asnaani A, Litz BT, Hofmann SG. Gender differences in anxiety disorders: Prevalence, course of illness, comorbidity and burden of illness. J Psychiatr Res 2011;45:1027–1035.
26. Amtmann D, Askew RL, Kim J, et al. Pain affects depression through anxiety, fatigue, and sleep in multiple sclerosis. Rehabil Psychol 2015;60:81–90.
27. Blair MJ, Robinson RL, Katon W, Kroenke K. Depression and pain comorbidity: A literature review. Arch Intern Med 2003;163:2433–2445.
28. Posternak V, Dunn LB, Dhruva A, et al. Differences in demographic, clinical, and symptom characteristics and quality of life outcomes among oncology patients with different types of pain. Pain 2016;157:892–900.
29. Bruce D, Foster E, Shattell M. Perceived efficacy of medical cannabis in the treatment of co-occurring health-related quality of life (HRQoL) symptoms. Behav Med 2019;[Epub ahead of print]; DOI: 10.1080/08964289.2019.1683712
30. Philpot LM, Ebbert JO, Hurt RT. A survey of the attitudes, beliefs and knowledge about medical cannabis among primary care providers. BMC Fam Pract 2019;20:17.
31. Sideris A, Khan F, Boltunova A, Cuff G, Gharibo C, Doan LV. New York physicians' perspectives and knowledge of the state medical marijuana program. Cannabis Cannabinoid Res 2018;3:74–84.
32. Kondrad E, Reid A. Colorado family physicians' attitudes toward medical marijuana. J Am Board Fam Med 2013;26: 52–60.
33. Zolotov Y, Vulfsons S, Zarhin D, Sznitman S. Medical cannabis: An oxymoron? Physicians' perceptions of medical cannabis. Intl J Drug Policy 2018;57:4–10.
34. Belle-Isle L, Walsh Z, Callaway R, et al. Barriers to access for Canadians who use cannabis for therapeutic purposes. Intl J Drug Policy 2014;25:691–699.
35. Chen P, Jacobson KC. Developmental trajectories of substance use from early adolescence to young adulthood: Gender and racial/ethnic differences. J Adolesc Health 2012;50:154–163.
36. Evans-Polce RJ, Vasilenko SA, Lanza ST. Changes in gender and racial/ethnic disparities in rates of cigarette use, regular heavy episodic drinking, and marijuana use: Ages 14 to 32. Addict Behav 2015;41:218–222.
37. Mauro CM, Newswanger P, Santaella-Tenorio J, Mauro PM, Carliner H, Martins SS. Impact of medical marijuana laws on state-level marijuana use by age and gender, 2004–2013. Prev Sci 2019;20:205–214.
38. Boehnke KF, Scott JR, Litinas E, et al. Cannabis use preferences and decision-making among a cross-sectional cohort of medical cannabis patients with chronic pain. J Pain 2019a;20:1362–1372.
39. Cuttler C, Mischley LK, Sexton M. Sex differences in cannabis use and effects: A cross-sectional survey of cannabis users. Cannabis Cannabinoid Res 2016;1:166–175.
40. Roe CM, McNamara AM, Motheral BR. Gender-and age-related prescription drug use patterns. Ann Pharmacother 2002;36:30–39.
41. Simoni-Wastila L, Ritter G, Strickler G. Gender and other factors associated with the nonmedical use of abusable prescription drugs. Subst Use Misuse 2004;39:1–23.
42. Zhong W, Maradit-Kremers H, St. Sauver JL, et al. Age and sex patterns of drug prescribing in a defined American population. Mayo Clin Proc 2013;88:697–707.

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43. Illinois Department of Public Health. Annual progress report 2017: Compassionate use of medical cannabis patient program act, July 1, 2016-June 30, 2017. Available at: www.dph.illinois.gov/sites/default/files/publications/medical-cannabis-annual-report-2017-100217.pdf Accessed March 1, 2020.
44. Boehnke KF, Scott JR, Litinas E, Sisley S, Williams DA, Clauw DJ. Pills to pot: Observational analyses of cannabis substitution among medical cannabis users with chronic pain. J Pain 2019b;20:830–841.
45. Fairman B. Trends in registered medical marijuana participation across 13 U.S. states and District of Columbia. Drug Alcohol Depend 2016;159:72–97.
46. Han B, Compton WM, Blanco C, Jones CM. Trends in and correlates of medical marijuana use among adults in the United States. Drug Alcohol Depend 2018;186:120–129.
47. Cooper Z, Craft R. Sex-dependent effects of cannabis and cannabinoids: A translational perspective. Neuropsychopharmacol 2018;43:34–51.
48. Qian Y, Gurley BJ, Markowitz JS. The potential for pharmacokinetic interactions between cannabis products and conventional medications. J Clin Psychopharmacol 2019; 39:462–471.
49. Lau N, Sales P, Averilla S, et al. A safer alternative: Cannabis substitution as harm reduction. Drug Alcohol Rev 2015;34:654–659.
50. Bertakis KD, Azari R. Patient-centered care: The influence of patient and resident physician gender and gender concordance in primary care. J Womens Health 2012;21:326–333.
51. Schieber AC, Delpierre C, Lepage B, et al. Do gender differences affect the doctor–patient interaction during consultations in general practice? Results from the INTERMEDE study. Fam Pract 2014;31:706–713.

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