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Willingness to Use Cannabis for Gynecological Conditions: A National Survey

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Abstract

Objective: Expanded legal access to cannabis in the United States has led to its increased use for treating medical conditions. We assessed the use of and attitudes toward cannabis for treating gynecological conditions.
Materials and Methods: We utilized Amazon.com Inc.'s Mechanic Turk platform to administer a survey to U.S. women 18 years and older about cannabis use for recreational and medicinal purposes and willingness to use cannabis to treat 17 gynecological conditions. We collected sociodemographic data and views about the legal status of cannabis. We used logistic regression to identify factors associated with willingness to use cannabis for gynecological conditions.
Results: In our analytical sample ($N = 995$), women who reported ever using cannabis were more willing to use cannabis to treat a gynecological condition compared with never users (91.6% vs. 64.6%, $p < 0.01$). Women willing to use cannabis for gynecological conditions were most interested in using cannabis for treating gynecological pain (61.2% of never users vs. 90.0% of ever users; $p < 0.001$) compared with procedural pain (38.2% vs. 79.0%, respectively; $p < 0.001$) or other conditions (38.0% vs. 79.8%, respectively; $p < 0.001$). In multivariate analysis, willingness to use cannabis for a gynecological condition was associated only with a history of ever using cannabis and views that cannabis should be legal in some capacity and not by age, race, or education.
Conclusions: The majority of women would consider using cannabis to treat gynecological conditions. Overall, respondents who had a history of cannabis use were more likely to report willingness to use cannabis for all gynecological conditions, but a large proportion of those who reported never using cannabis were also willing to use it.

Keywords: cannabis, marijuana, gynecology, MTurk

Introduction

Removal of legal restrictions on cannabis in some U.S. states has coincided with increased consumption.[1] Currently, 33 states and the District of Columbia (DC) enforce legalized medical cannabis laws, and 11 of these states and DC have also legalized cannabis for recreational use (Fig. 1).[2] According to the National Survey of Drug Use and Health, cannabis use within the past month at the national level increased from 5.8% in 2007 to 10.1% in 2018 (Ref.[3]).

The use of cannabis specifically for medical reasons is also increasing; people most commonly report using it to treat symptoms of pain, anxiety, and depression.[4] The endocannabinoid system modulates neuronal and immune cell function, essential elements in the complex mechanism of pain perception.[5] Several studies have demonstrated the efficacy of cannabinoids in decreasing pain in chronic pain states such as multiple sclerosis and diabetic neuropathy.[6] In addition, recent studies suggest that access to medical cannabis may decrease opioid use,[7] thereby providing a safer alternative to opioid analgesia for some patients.[8,9]

However, limited evidence exists about using cannabis to treat gynecological conditions. In 2017, the National Academy of Sciences released a comprehensive report of the health effects of cannabis and it contained no information with regard to women's reproductive health outside of pregnancy.[10] However, there are small studies focused on the potential benefit of cannabis in specific conditions. In a study of women with endometriosis, participants reported that cannabis offered the highest amount of pain relief among self-management modalities.[11] Another survey of 226 women undergoing medical abortion found that 19% self-medicated with cannabis, with women reporting some relief of pain.[12]

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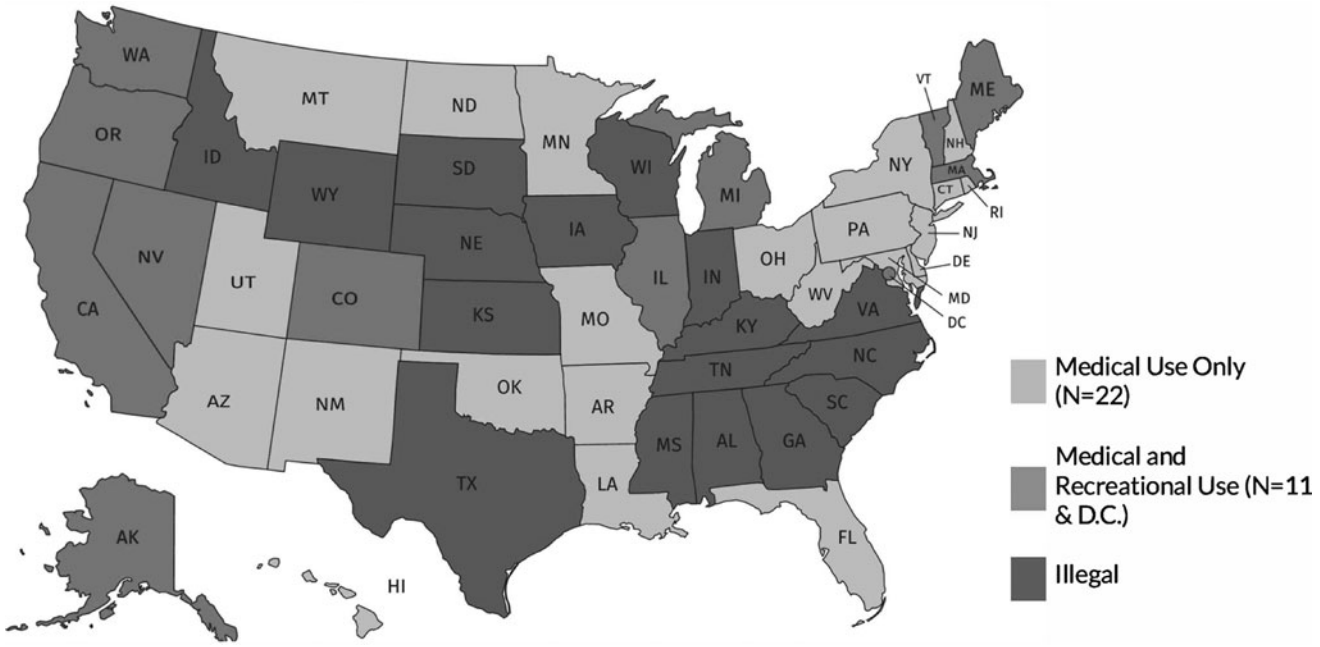

FIG. 1. U.S. map of cannabis legality.

Beyond these condition-specific studies, it remains unknown whether women would consider using cannabis for most gynecological conditions. The purpose of this study was to assess women's current practices and views on cannabis use, and to identify factors associated with willingness to use cannabis to treat and/or manage a range of common conditions seen in gynecological practices.

Materials and Methods

We conducted a cross-sectional survey. Over 8 days in March–April 2018, we collected data using Amazon.com Inc.'s Mechanical Turk (MTurk) platform, a digital marketplace for crowdsourcing online tasks to anonymous users (''workers'') that is increasingly being used for health research.[13–16] We recruited MTurk workers who identified as women, were age 18 years or older, and living in the United States. We titled our survey ''Women's Health & Pain'' in an effort to capture a diverse respondent pool and decrease selection bias based on cannabis use or opinions. Only eligible workers (U.S.-residing women 18+ years old) could see the survey title and compensation amount (50 cents) on the MTurk platform work list and elect to enter the survey. After entering the survey, respondents read a statement informing them that this survey voluntary, anonymous, and part of academic research project approved by the Oregon Health and Science University Institutional Review Board. MTurk-assigns unique IDs attached to the worker's social security number (for payment purposes) which prevents participants from repeating the survey more than once. Once the survey was entered (clicked on), this was recorded as ''started'' regardless if any questions were answered. Survey responses were captured automatically through the MTurk platform; data were exported for analysis after all surveys were completed. Following previous work, we aimed to recruit 1,000 participants.[16]

We designed a 21 question survey with five sections: demographics, history of cannabis use, reproductive health history, willingness to use cannabis, and political opinions (Supplementary Appendix S1). All participants received the same questions in the same order. Our primary outcome was willingness to use cannabis for any of a list of 17 common gynecological conditions (see Table 3 for the list of conditions). We grouped conditions as related to gynecological pain, procedural pain, and other conditions.

Our independent variable was a binary indicator of the respondent's report of having ever used cannabis (vs. reporting they had never used cannabis). To be concise, we refer to these groups as ''ever use'' and ''never use'' throughout. In our survey, we defined cannabis as a ''group of flowering plant… known by a variety of names including marijuana, tetrahydrocannabinol (THC), weed, pot, and cannabidiol (CBD).'' We asked if they had ever used cannabis, frequency of use, types of cannabis consumption (smoke/vape, edible, oral, topical, other), and preferred route of consumption. We also asked participants specifically about cannabis use to treat a medical condition and which condition(s) they were attempting to treat (recorded as free text).

We collected data on age, which we collapsed into 5 year age bands (18–24, 35–39, 30–34, 35–39, 40–44, 45–49, and 50+ years), race and ethnicity, educational attainment (four categories), household income (six categories), and zip code, which we used to determine state of residence. History of use of other illicit drugs, alcohol, and tobacco use was also collected. We used previously validated survey questions for respondent demographics.[3,17,18]

For reproductive history, we asked if they had ever been pregnant and pregnancy outcomes. We asked participants if they had ever experienced any of the list of 17 conditions. We asked participants about whether cannabis was legal (recreational, medicinal, or both) in their home state. We used this information and state of residence to make an indicator

variable of whether or not the respondent knew the cannabis law in her home state. In addition, we asked whether or not they believed cannabis should be legal (medically, medically, and recreationally, or at each state's discretion). Finally, we inserted an attention question into the survey for quality assurance. If respondents answered ''yes'' to the question, ''Have you ever been in a car accident in the snow during the summer and not survived?'' their survey was considered invalid and they were excluded.

Data analysis

We used tabulations, descriptive statistics, and graphs to examine sociodemographic variables and attitudes about cannabis by ever use of cannabis. We used chi-squared tests to compare sociodemographic characteristics among ever users and never users of cannabis. Among those who reported they had ever used cannabis, we described cannabis consumption behavior. We compared willingness to use cannabis for any of the 17 gynecological conditions individually and grouped by pain, procedure, and other by ever use of cannabis.

Finally, we developed a logistic regression model (complete case analysis, $n = 990$) to identify factors associated with willingness to use cannabis for at least one of the 17 gynecological conditions. In this model, we controlled for age (collapsed into three categories), education, race/ethnicity, history of a gynecological condition, history of pregnancy, knowledge of cannabis law in home state, ever use of cannabis, ever use of

Table 1. Respondent Demographics by History of Cannabis Use

		Ever use cannabis?		
	Total N = *995* n *(%)*	*No* N = *353* n *(%)*	*Yes* N = *642* n *(%)*	p
Age (years)				0.463
18–24	70 (7.04)	30 (8.5)	40 (6.23)	
25–29	170 (17.09)	50 (14.16)	120 (18.69)	
30–34	176 (17.69)	68 (19.26)	108 (16.82)	
35–39	140 (14.07)	51 (14.45)	89 (13.86)	
40–44	115 (11.56)	41 (11.61)	74 (11.53)	
45–49	90 (9.05)	29 (8.22)	61 (9.5)	
50+	234 (23.52)	84 (23.8	150 (23.36)	
Race/ethnicity				<0.001
White	794 (79.8)	258 (73.09)	536 (83.49)	
Black	94 (9.45)	48 (13.6)	46 (7.17)	
Asian	44 (4.42)	25 (7.08)	19 (2.96)	
American Indian	12 (1.21)	3 (0.85)	9 (1.4)	
Latina	51 (5.13)	19 (5.38)	32 (4.98)	
Education				0.008
Less than HS/HS	114 (11.46)	32 (9.07)	82 (12.77)	
Some college/associates degree	371 (37.29)	115 (32.58)	256 (39.88)	
Bachelor's degree	373 (37.49)	154 (43.63)	219 (34.11)	
Master's degree or above	137 (13.77)	52 (14.73)	85 (13.24)	
Income				0.060
Less than $19,999	111 (11.16)	47 (13.31)	64 (9.97)	
20,000–39,999	264 (26.53)	82 (23.23)	182 (28.35)	
40,000–59,999	224 (22.51)	68 (19.26)	156 (24.3)	
60,000–79,999	159 (15.98)	66 (18.7)	93 (14.49)	
80,000–99,999	111 (11.16)	40 (11.33)	71 (11.06)	
100,000+	126 (12.66)	50 (14.16)	76 (11.84)	
Positive history of pregnancy ($N = 990$)	655 (66.16)	226 (64.57)	429 (67.03)	0.434
Positive alcohol use in the past 6 months ($N = 992$)	709 (71.47)	217 (61.82)	492 (76.76)	<0.001
Positive tobacco use in the past 6 months ($N = 989$)	288 (29.12)	38 (10.92)	250 (39	<0.001
Positive illicit drug use in the past 6 months*	39 (3.92)	2 (0.57)	37 (5.76)	<0.001
Correctly identified cannabis legality in own state	639 (64.22)	209 (59.21)	430 (66.98)	0.014
Census region				0.091
Northeast	191 (19.20)	63 (17.85)	128 (19.94)	
South	384 (38.59)	146 (41.36)	238 (37.07)	
Midwest	232 (23.32)	90 (25.5)	142 (22.12)	
West	188 (18.89)	54 (15.3)	134 (20.87)	
Attitude toward cannabis legality				<0.001
Should not be legal under any circumstances	91 (9.15)	50 (14.16)	41 (6.39)	
Should be legal for medical and recreational purposes	505 (50.75)	113 (32.01)	392 (61.06)	
Should be legal for medicinal purposes only	262 (26.33)	147 (41.64)	115 (17.91)	
Should be legalized at each state's discretion	137 (13.77)	43 (12.18)	94 (14.64)	

HS, high school.

medicinal cannabis, use of alcohol or tobacco in the past 6 months, and opinions about whether cannabis should be legal. We selected covariates based on both theoretical relevance and significance at the bivariate level. We performed several sensitivity analyses: we stratified on history of pregnancy, we tested interactions of history of pregnancy with age, history of gynecological conditions, and education in separate models. Results were robust to these specifications and we present only our final model.

Results

Over the 8 days the survey was posted, 1,011 women entered and began the survey (recruitment rate 100%). We excluded 15 observations due to answering ''yes'' on the attention question or due to missing data for dependent and independent variables (completion rate 98%). Our analytic sample included 995 women; we had respondents from all 50 states and 91% had no missing data.

Respondent characteristics by history of cannabis use are listed in Table 1. Sixty-four percent reported they had ever used a cannabis product. Compared with never users, cannabis ever users were more likely to be white (83% vs. 73%, $p<0.001$), have used alcohol (77% vs. 62%, $p<0.001$), or tobacco (39% vs. 11%, $p<0.001$) in the last 6 months. Cannabis ever users were also more likely to believe that cannabis should be legal for recreational purpose (61% vs. 32%, $p<0.001$). Cannabis ever users were less likely to have a college degree or greater (48% vs. 59% never users, $p<0.001$). Cannabis ever users were similar to never users in age ($p=0.46$), household income ($p=0.06$), and pregnancy history ($p=0.43$).

Among respondents that had ever used cannabis (64%; $n=642$), 33% reported not using it in the past 6 months, 39% reported using it monthly or less, and 15% were daily users (Table 2). The majority of users reported smoking or vaping (73%) cannabis. Thirty-seven percent ($n=237$) reported having used cannabis to treat a specific medical condition. Pain and depression/anxiety were the most common and 17% (40/237) reported using cannabis to treat a gynecological condition, with menstrual cramps the most common gynecological condition ($n=26$).

Table 2. Frequency of Cannabis Use, Preferred Method of Use, and Use of Medical Cannabis in Women Reported Ever Use of Cannabis ($N=642$)

Cannabis use patterns in the past 6 months	n *(%)*
No use	215 (33.49)
Monthly or less	252 (39.25)
Weekly or once every few days	80 (12.46)
Once or multiple times daily	95 (14.8)
Ever use of cannabis for medical purpose	
No	405 (63.08)
Yes	237 (36.92)
Preferred method of cannabis use	
Smoke/vaporize	458 (73.05)
Edible	116 (18.5)
Oral	31 (4.94)
Topical	15 (2.39)
Other	7 (1.12)

Table 3. Willingness to Use Cannabis for Gynecological Conditions Overall and Individual Conditions by History of Cannabis Use, $N=995$

	Ever use cannabis?	
Would consider using cannabis for	*No (%)*	*Yes (%)*
Any gynecological condition (overall)	64.6	91.6
Pain conditions	61.2	90.0
Pain in pregnancy	13.1	41.1
Gynecological cancer pain	54.7	82.5
Dyspareunia	25.5	67.3
Dysmenorrhea	30.0	75.5
Endometriosis	35.2	74.9
Pelvic pain	35.4	80.1
Procedural pain	38.2	79.0
Preprocedure anxiety	30.6	70.7
IUD insertion pain	20.4	64.0
Surgical abortion pain	23.4	62.0
Medical abortion pain	23.5	62.9
Cesarean delivery pain	22.7	57.5
Vaginal delivery pain	20.1	57.5
Other conditions	38.0	79.8
Nausea in pregnancy	12.8	39.4
Sexual dysfunction	25.9	66.1
Infertility	16.7	39.9
Irregular menstrual bleeding	20.4	56.6
PMS/PMDD ($N=995$)	27.2	73.4

Note: $p<0.001$ for all comparisons by history of cannabis use.
IUD, intrauterine device; PMDD, premenstrual dysphoric disorder; PMS, premenstrual syndrome

A larger proportion of women who reported ever using cannabis were willing to use cannabis to treat conditions commonly seen in gynecological practices compared with never users (91.6% vs. 64.6%, $p<0.01$; Table 3). Figure 2 shows the proportion of respondents who were willing to use cannabis to treat conditions grouped as pain, procedural anxiety or pain, and other conditions. Women willing to use cannabis for gynecological conditions were most interested in using cannabis for treating gynecological pain (61.2% of

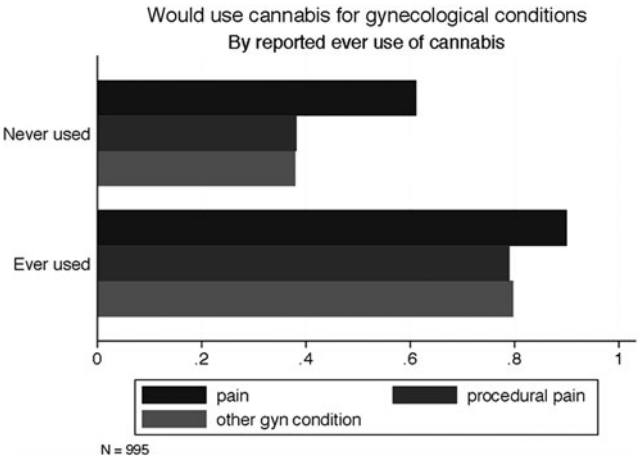

FIG. 2. Proportion of respondents who would consider cannabis use for gynecological pain, procedural pain, and other gynecological conditions by cannabis use history.

never users vs. 90.0% of ever users; $p < 0.001$) compared with procedural pain (38.2% vs. 79.0%, respectively; $p < 0.001$) or other conditions (38.0% vs. 79.8%, respectively; $p < 0.001$; Figure 2; Table 3). Overall, respondents who had a history of cannabis use were more likely to report willingness to use cannabis for all gynecological conditions, but a large proportion of those who reported never using cannabis were also willing to use it.

In multivariate analysis, a history of cannabis use for recreational or medicinal purposes was associated with willingness to use cannabis for a gynecological condition, controlling for other factors (Fig. 3). Respondents had higher odds of reporting willingness to use cannabis if they had every tried cannabis (adjusted odds ratio [aOR] 3.0, confidence interval [CI] 2.0–4.6), used it for medical purposes (aOR 4.2, CI 1.8–10.3), or believed that it should be legal in any way, compared with illegal, (medical only; aOR 3.3, CI 1.9–5.8, medical and recreational; aOR 8.5, CI 4.7–15.3, states discretion; aOR 5.2, CI 2.6–10.5).

Discussion

In this cross-sectional survey of a diverse sample of U.S. women, we found that more than half of participants reported using cannabis at least once, and of those participants, one third reported that they had used cannabis for medicinal purposes. Our sample expressed the highest willingness to use medical cannabis for gynecological cancers as well as mental health conditions, chronic pelvic pain, and endometriosis. A majority of both women with a history of cannabis use (92%) and no history of cannabis use (65%) reported willingness to use cannabis to treat at least one of the conditions we listed. In our multivariable analysis, women with a history of a gynecological conditions had higher odds of willingness to use cannabis for treating conditions seen in gynecological practices, as did women who had ever used cannabis. Age, race, or education were not associated with increased willingness to using medicinal cannabis.

A majority of women, even those who had never used cannabis, would consider using it to treat gynecological as well as other medical conditions. This supports data that suggest public perception of cannabis as harmless is also increasing as access to and use of medical and recreational cannabis products increase.[19,20] According to the U.S. National Survey on Drug Use and Health survey, the perception that cannabis use is risky declined from 50% to 33% between 2002 and 2014 in adult respondents.[21] A 2019 study of cannabis use in pregnancy reported that women perceived cannabis as more ''safe'' and ''natural'' compared with other substances, including prescribed medications.[22] Coinciding with the increased perception of cannabis safety is the increased national recognition of the dangers of opioid pain medications. Of the 64,632 deaths in 2016 related to overdose, it is estimated that over half stem from prescribed opioids[23] compared with cannabis, where death is a rare outcome usually related to accidents while engaging in other risky behaviors while using cannabis. From this perspective, as an opioid substitute, cannabis is markedly safer.[10]

However, the actual benefits of medical marijuana remain relatively unclear. There are only 3 Food and Drug Administration-approved cannabis-related drug products and only one cannabis-derived product, and the indications for these products currently relate to child-seizure disorders and appetite stimulation in certain chronic diseases.[24] Despite promising research related to chronic pain, medical marijuana has yet to be considered first-line therapy for any pain-related condition.[25] Thus, our results also suggest that women are willing to use cannabis for medical conditions in the absence of evidence of efficacy and safety. Marijuana producers and retailers make significant health claims for their products, especially for mental health conditions such as anxiety and depression,[26] which were conditions highly cited by our sample. This is in contrast to the observed association of both regular marijuana use and marijuana withdrawal with *increased* anxiety, depression, and psychiatric illness.[25] Given the uncertainty regarding the benefits of cannabis, but

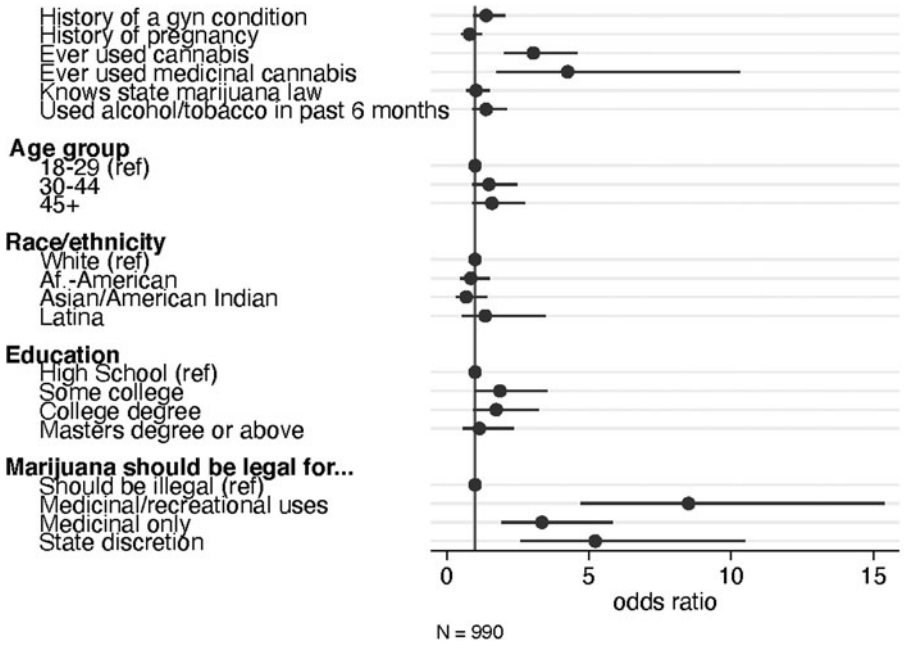

FIG. 3. Multivariate analysis of participant characteristics and their association with willingness to use cannabis for any gynecological conditions. Characteristics associated with higher odds of willingness to use cannabis included ever use of cannabis (OR 3.0, CI 2.0–4.6), history of cannabis use for medical purposes (OR 4.2, CI 1.8–10.3), or belief that cannabis should be legal, (medical only; OR 3.3, CI 1.9–5.8, medical and recreational; OR 8.5, CI 4.7–15.3, states discretion; OR 5.2, CI 2.6–10.5). See Supplementary Table S1 for full ORs. CI, confidence interval; OR, odds ratio.

also the known dangers of opioid pain medications, we need additional studies that demonstrate circumstances when substitution of an opioid medication with a cannabis product is most useful.

We asked participants if they ''would consider using'' cannabis to treat or manage various medical conditions. However, we did not ask for further elaboration of what this meant to participants. We do not know the circumstances (*e.g.*, symptom severity, disease stage, primary vs. adjunct therapy) they felt cannabis use was appropriate, the symptoms and disease processes they believed cannabis could treat (pain vs. disease process itself), or the method they would undertake for treatment (frequency, with or without clinical supervision). We also did not explore if women willing to use cannabis differentiated between the potential therapeutic effects of various cannabis derivatives (*e.g.*, THC vs. CBD) and formulations (*e.g.*, inhaled vs. topical). Additional studies are needed to understand patient perspectives on how cannabis is used or could be used to treat specific conditions, and how patients understand the expected therapeutic effects of cannabis.

Our results must be interpreted in light of several limitations. Our primary limitation is the representativeness of our MTurk sample. MTurk ''workers'' represent a diverse sample of the U.S. population,[27,28] but MTurk workers are more likely to be female, white, younger, and less likely to report excellent health status than the general population.[29] We tried to limit selection bias by giving the study a generic title (Women's Health and Pain) that did not indicate this was a study of cannabis. Despite this, cannabis ever use was higher in the study population compared with that reported in other samples of the general population (64% vs. 49%, respectively).[30] Like other survey studies, our findings are limited by the reliability of self-reported responses, but previous studies using MTurk data have shown high reliability and validity, even about substance use.[13,26] There is also potential for nonresponder bias because it is not possible to determine the response rate through MTurk. However, once the survey was started, our completion rate was very high (>90%). Strengths of this study include a large sample size, geographic diversity, and race and education diversity comparable to the U.S. population. To our knowledge, this is the first survey specifically exploring the prevalence and attitudes of cannabis use in gynecological conditions.

Conclusion

This preliminary data inform clinicians and researchers about the public perceptions of cannabis usage in gynecology and suggests there is need for both further research and clinical guidelines. These data also align with current national trends of expanding cannabis legality and increased consumption by the general public. Clinicians should take note that patients may already be using cannabis to treat gynecological conditions or may want more information about cannabis as a treatment for their condition. We need further research investigating the clinical benefit of using cannabis in gynecology, particularly with respect to pain.

Author Disclosure Statement

No competing financial interests exist.

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Supplementary Material

Supplementary Appendix 1
Supplementary Table S1

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