Survey article

Non-prescription cannabis use for symptom management amongst women with gynecologic malignancies

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A B S T R A C T

Objectives: To evaluate interest in and patterns of use of non-prescription cannabis products for symptom management amongst gynecologic cancer patients living in states with legal access to medical and recreational marijuana.

Methods: Cross-sectional study using a novel 35-question survey distributed to women diagnosed with gynecologic cancer within two academic centers in California and Colorado. The survey queries demographic and disease traits, and both objective and subjective issues surrounding use of cannabis products for symptom management. Surveys were distributed to patients actively receiving treatment or under surveillance.

Results: Enrollment began July 16, 2018 and was completed December 1, 2018. Survey return rate was 52.7%. A total of 225 participants met inclusion criteria.

Sixty-two percent reported that they have used or would be interested in using cannabis products for symptom management; 60 (26.7%) are using non-prescription cannabis for treatment of cancer related symptoms, and 80 (35.6%) are interested in using cannabis derivatives under direction of their oncologist. Reasons cited for use of cannabis included: pain control (n = 41, 68.3), insomnia (n = 33, 55.0%), anxiety (n = 29, 48.3%), nausea (n = 26, 43.3%), and appetite stimulation (n = 21, 35.0%). Of the women using cannabis products, almost half report decreased prescription narcotic use after initiation of cannabis products (n = 27, 45.0%).

Conclusions: Women with gynecologic cancer report a strong interest in the use of non-prescription cannabis products for management of cancer-related symptoms. Practitioners in the field of gynecologic oncology should be aware of the frequency of use of non-prescription cannabis amongst their patients as well as the growing desire for guidance about the use of cannabis derivatives. A substantial number of patients report decreased reliance on opioids when using cannabis derivatives for pain control.

1. Introduction

Cannabis has been used for medicinal purposes for centuries (Pergam et al., 2017). However, in 1970 cannabis was classified as a Schedule I drug in the US, alongside LSD and heroin. This designation severely restricted cannabis research, leaving providers and patients with little evidence-based guidance regarding positive and negative effects, dosing considerations, side-effect management, or drug interactions(Bar-Sela et al., 2013).

The need to understand implications of cannabis use as a conjunct to standard medical care has grown in the last few decades as multiple states have approved use of medicinal and recreational cannabis. At the time of preparation of this manuscript, 33 states had legalized medical marijuana and 10 states allowed access to recreational marijuana. Recent surveys show that increasing numbers of cancer patients have considered or have used cannabis products alongside prescription medications while healthcare providers remained inadequately prepared to give appropriate recommendations(Bowles et al., 2012; Ware

et al., 2015).

Studies of cancer patients have identified multiple pharmacologic properties of cannabis that could prove useful in the palliation of symptoms related to cancer and its therapies(Pergam et al., 2017; Ware et al., 2015; Hill, 2015; Bar-Sela et al., 2014).Furthermore, cannabis has the potential to be a less addictive option for pain control than some commonly used medications, primarily opioids(Abrams and Guzman, 2015; Gilliam, 1980). Consequently, a potential role for cannabis is now being explored in multiple oncology specialties(Pergam et al., 2017; National Academies of Sciences EaM, 2017)

There is to date no literature describing use of cannabis or its derivatives in the care of gynecologic oncology patients. The primary aim of this study is to describe the current interest in and patterns of use cannabis products by patients diagnosed with a gynecologic malignancy.

2. Materials and methods

This was a multi-institutional cross-sectional study intended to assess and describe the current patterns of use and subjective benefits of cannabis use in patients diagnosed with gynecologic malignancies and receiving treatment in states with legal access to both medical and recreational marijuana products. The study took place within both public and private clinics affiliated with two major academic centers, the University of Southern California and the University of Colorado. The protocol received Institutional Review Board approval from both institutions.

A novel 35-question survey instrument was developed specifically to query patterns of cannabis use in relation to cancer care amongst gynecologic oncology patients. The study was designed in consultation with the current literature and in discussion with various health care providers, research professionals, and patients . The survey queried demographic variables, disease type and status, and both objective and subjective issues surrounding cannabis use as a supplement to traditional methods of cancer care. The survey was self-administered by use of questionnaires available in English and Spanish. The questionnaire was translated from English to Spanish by a member of the research team who a native speaker of Spanish familiar with vernacular of the local patient population. Following translation, an interpretation of the Fry Graph was used to evaluate appropriate readability for our patient population(Braun et al., 2018).

Inclusion criteria were being a female patient, aged 18–89 years at the time of the survey, with a history of gynecologic malignancy (cervical, endometrial/uterine, ovarian, vaginal, vulvar) undergoing non-operative follow-up care by a gynecologic oncologist. Surveys were self-administered at the time of non-operative follow-up visits that included visits for administration of chemotherapy, surveillance visits, or various forms of palliative treatment. Patients on their initial visit to the gynecologic oncologist, and patients without a confirmed gynecologic malignancy were excluded.

The survey was distributed in hard copy or sent electronically to all eligible patients when checking into return clinic visits. In order to maintain anonymity hard copies were returned in unlabeled envelopes to a sealed collection box, and electronic copies were accessed using a public survey link and returned without identifying information via RedCap electronic data capture(Harris et al., 2009). We collected age and ethnicity from potential participants who chose not to complete the survey. No identifying information was collected from potential participants, and among those who completed the survey all information regarding histology, treatment, and cannabis use patterns was provided by the study participant. Study data were stored and managed using REDCap electronic data capture tools hosted at the University of Southern California(Harris et al., 2009).

Analysis of study data was primarily descriptive in nature. Responses were categorical and summarized as frequencies and percentages. Age was estimated from reported year of birth and year of

administration of the survey. Differences between mean values of age by participation status were assessed with a two sample t-test. Person's chi-squared test was used to evaluate differences by use of cannabis or interest status. All tests were assessed at a significance level of $p < 0.05$ unless otherwise specified.

Multinomial logistic regression models were developed to estimate the prevalence odds ratio associations of factors of interest with each of two outcomes: a woman's reporting interest in using cannabis under the guidance of a physician or actual use after diagnosis, each group compared to those reporting no interest or use following diagnosis. We included both tumor stage and age at diagnosis in the model, based on prior information, and considered as candidate predictor variables each factor that had been found to be associated with outcome in univariate analyses. In the final analytic model, we retained in addition to tumor stage and age each predictor found to be associated with the outcome at a nominal significance level of $p < 0.10$ after mutual adjustment. Analyses were performed using Stata version 14.2 (StataCorp LLC, College Station, TX).

3. Results

In total, 550 surveys were distributed and 290 were returned resulting in a 52.7% return rate (Supplementary Material Fig. S1). Of those who returned the survey, 225 met inclusion criteria. The majority of surveys were completed in California (n = 147, 65.3%, Table 1). Enrollment began July 16th, 2018 and was completed December 1st, 2018.

Participants represented a diverse sampling of ages, ethnicities, educational levels, and socioeconomic strata. Age of participants ranged from 21-89 years (mean 57.3 years, standard deviation (SD) 12.8 years, data not shown); this did not differ significantly from women who opted out of participation (mean 63 years, SD 10.4 years, data not shown). Hispanic and white women constituted the majority of participants (n = 102, 45.3% and n = 94, 41.8%, respectively). Approximately one half of participants reported an educational level of high school or less. Income distributions were wide, with about one fifth of women falling into each income category ranging from less than $10,000 to greater than $100,000 annual gross household income. The majority of participants (64.9%) were not actively employed at the time of the survey. Most participants reported a religious affiliation; the most frequently cited religion was Catholicism (n = 96, 42.7%). Nearly half of participating women were married, while about 30% identified as single (n = 102, 45.3% and n = 62, 27.6% respectively). The majority of participants spoke English at home (n = 142, 63.1%), while the remaining primarily spoke Spanish.

There was also diversity noted in participants' cancer characteristics (Table 1). The most frequently reported cancer site was an ovary (n = 101, 44.9%) followed by endometrium (n = 71, 31.6%) and the uterine cervix (n = 40, 17.8%). Approximately thirty percent of patients were diagnosed with early stage disease, while forty-five percent were diagnosed with Stage III to IV disease. One quarter of participants did not know their stage at diagnosis. Approximately fifty percent of patients were in remission at time of survey completion; of these, just over one-third had been in remission one year or less (n = 42, 39.2%), and sixteen percent had been in remission for over five years. Thirty-five percent of women reported active disease at the time of survey completion (n = 79), while sixteen percent reported they were unsure if they had active disease or were in remission (n = 36).

Almost thirty percent of respondents reported using cannabis products following their cancer diagnosis (n = 60, 26.7%, Table 2). More than a third of participants were not using cannabis products but were interested in doing so if this could be under the guidance of a physician (n = 80, 35.6%). The remaining third reported no interest in cannabis derivatives for their cancer care (n = 71, 31.6%). The proportions of respondents reporting current use of interest in use, taken together, were consistent across sites in Colorado and California, 60.3% and

Table 1
Demographic and malignancy characteristics of survey participants (N = 225).

N (%)	Total[a]	California	Colorado	p-value
	225 (100)	147 (65.3)	78 (34.7)	
Age				
Under 30 years	4 (1.8)	4 (2.7)	0 (0)	< 0.001
30–39 years	21 (9.3)	19 (12.9)	2 (2.6)	
40–49 years	28 (12.4)	21 (14.3)	7 (9.0)	
50–59 years	68 (30.2)	44 (29.9)	24 (30.8)	
60–69 years	65 (28.9)	44 (29.9)	21 (26.9)	
70 years or more	37 (16.4)	14 (9.5)	23 (29.5)	
Missing	2 (0.9)	1 (0.7)	1 (1.3)	
Race/Ethnicity				
African American/Black	6 (2.7)	4 (2.7)	2 (2.6)	< 0.001
American Indian	2 (0.9)	1 (0.7)	1 (1.3)	
Asian/Pacific Islander	14 (6.2)	13 (8.8)	1 (1.3)	
Hispanic/Latino	102 (45.3)	98 (66.7)	4 (5.1)	
White/Caucasian	94 (41.8)	25 (17.0)	69 (88.5)	
Other	7 (3.1)	6 (4.1)	1 (1.3)	
Highest level of education				
Elementary/primary school	28 (12.4)	28 (19.0)	0 (0)	< 0.001
Some high school	15 (6.7)	15 (10.2)	0 (0)	
High school or GED	75 (33.3)	59 (40.1)	16 (20.5)	
College degree	69 (30.7)	33 (22.4)	36 (46.2)	
Masters/professional degree	35 (15.6)	10 (6.8)	25 (32.1)	
Missing	3 (1.3)	2 (1.4)	1 (1.3)	
Annual household income				
Less than $10,000	48 (21.3)	48 (32.7)	0 (0)	< 0.001
$10,000- < 50,000	48 (21.3)	33 (22.4)	15 (19.2)	
$50,000–100,000	44 (19.6)	13 (8.8)	31 (39.7)	
More than $100,000	37 (16.4)	12 (8.2)	25 (32.1)	
Unsure	44 (19.6)	38 (25.9)	6 (7.7)	
Missing	4 (1.8)	3 (2.0)	1 (1.3)	
Employment status[b]				
Not currently working including retired	146 (64.9)	103 (70.1)	43 (55.1)	0.03
Part-time	26 (11.6)	16 (10.9)	10 (12.8)	0.67
Full-time	36 (16.0)	15 (10.2)	21 (26.9)	0.001
Student	4 (1.8)	3 (2.0)	1 (1.3)	0.68
Other	13 (5.8)	10 (6.8)	3 (3.8)	0.37
Missing	3 (1.3)	3 (2.0)	0 (0)	0.20
Relationship status				
Single	62 (27.6)	54 (36.7)	8 (10.3)	< 0.001
In a relationship	23 (10.2)	19 (12.9)	4 (5.1)	
Married	102 (45.3)	54 (36.7)	48 (61.5)	
Widowed	14 (6.2)	8 (5.4)	6 (7.7)	
Divorced	19 (8.4)	8 (5.4)	11 (14.1)	
Other	2 (0.9)	2 (1.4)	0 (0)	
Missing	3 (1.3)	2 (1.4)	1 (1.3)	
Religious affiliation				
Catholic	96 (42.7)	84 (57.1)	12 (15.4)	< 0.001
Other Christian	76 (33.8)	40 (27.2)	36 (46.2)	
Buddhist	4 (1.8)	2 (1.4)	2 (2.6)	
Jewish	5 (2.2)	1 (0.7)	4 (5.1)	
Other	8 (3.6)	6 (4.1)	2 (2.6)	
No religious affiliation	31 (13.8)	10 (6.8)	21 (26.9)	
Would prefer not to respond	4 (1.8)	3 (2.0)	1 (1.3)	
Missing	1 (0.4)	1 (0.7)	0 (0)	
Language spoken at home				
English	142 (63.1)	67 (45.6)	75 (96.2)	< 0.001
Spanish	73 (32.4)	72 (49.0)	1 (1.3)	
Other	7 (3.1)	7 (4.8)	0 (0)	
Missing	3 (1.3)	1 (0.7)	2 (2.6)	
Cancer type				
Ovarian	101 (44.9)	58 (39.5)	43 (55.1)	0.004
Endometrial/uterine	71 (31.6)	42 (28.6)	29 (37.2)	
Cervical	40 (17.8)	35 (23.8)	5 (6.4)	
Vaginal	4 (1.8)	4 (2.7)	0 (0)	
Vulvar	3 (1.3)	3 (2.0)	0 (0)	
Other/Unsure	6 (2.7)	5 (3.4)	1 (1.3)	
Cancer stage at diagnosis				

Table 1 (*continued*)

N (%)	Total[a]	California	Colorado	p-value
	225 (100)	147 (65.3)	78 (34.7)	
1	49 (21.8)	26 (17.7)	23 (29.5)	0.006
2	19 (8.4)	12 (8.2)	7 (9.0)	
3	61 (27.1)	35 (23.8)	26 (33.3)	
4	41 (18.2)	27 (18.4)	14 (17.9)	
Unsure	54 (24.0)	46 (31.3)	8 (10.3)	
Missing	1 (0.4)	1 (0.7)	0 (0)	
Cancer status at last visit				
Active	79 (35.1)	50 (34.0)	29 (37.2)	< 0.001
Remission	107 (47.6)	60 (40.8)	47 (60.3)	
Unsure	36 (16.0)	34 (23.1)	2 (2.6)	
Missing	3 (1.3)	3 (2.0)	0 (0)	
Time in remission[c]				
Less than 6 months	24 (22.4)	13 (21.7)	11 (23.4)	< 0.001
6– < 12 months	18 (16.8)	8 (13.3)	10 (21.3)	
1–2 years	23 (21.5)	12 (20.0)	11 (23.4)	
2–3 years	11 (10.3)	3 (5.0)	8 (17.0)	
3–5 years	8 (7.5)	4 (6.7)	4 (8.5)	
Greater than 5 years	17 (15.9)	14 (23.3)	3 (6.4)	
Missing	6 (5.6)	6 (10.0)	0 (0)	

[a] All data presented as counts (percentage).
[b] Multiple responses allowed therefore total column percentages may exceed 100%.
[c] Among participants in remission (N = 107).

63.3%, respectively. Among women who reported current use, interest in use, and no interest in use we did not observe significant differences based on age, race, educational level, income, employment status, religious affiliation, or cancer stage. However, statistically significant differences were observed in relation to disease status; women with active disease were more likely to be interested in or to have already used cannabis products (p = 0.001). Women who had used cannabis products in the past, prior to their cancer diagnosis, were also more likely to consider use during their cancer care (p < 0.001). A higher likelihood to use cannabis was noted amongst women with ovarian cancer (p = 0.049) and those who speak English at home as a primary language (p = 0.02)

Of the approximately thirty percent of women using non-prescription cannabis products for cancer related symptoms, the majority reported using it for pain control (n = 41, 68.3%, Fig. 1). Participants also reported using cannabis for insomnia (n = 33, 55.0%), anxiety (n = 29, 48.3%), nausea (n = 26, 43.3%), and appetite stimulation (n = 21, 35.0%). Women not currently using non-prescription cannabis products but documenting that they would be interested in exploring this option noted similar reasons for potentially using cannabis: pain control (n = 55, 68.8%), insomnia (n = 48, 60.0%), anxiety (n = 44, 55.0%), nausea (n = 35, 43.8%) and appetite stimulation (n = 24, 30.0%) (Fig. 1). Several (n = 3) women documented potential anti-cancer properties or "cure" as other reasons that they were using or interested in using cannabis products.

Of those using cannabis products, thirty-five percent reported daily use (n = 21, Table 3). Route of administration varied widely, with most women using more than one type of product. Some women specified use of cannibidiol (CBD) orally (n = 31,51.7%) or topically (n = 23, 38.3%). More traditional routes of consumption including inhaled (n = 23, 38.3%) and edible (n = 28, 46.7%) marijuana were also used frequently. The majority of respondents obtained cannabis products at dispensaries, either medical (n = 29, 48.3%) or recreational (n = 23, 38.3%). The majority of women used cannabis products alone (n = 40, 66.7%), although they also sometimes did so with family (n = 30, 50.0%) or friends (n = 9,15.0%). The majority of respondents did not use cannabis for their cancer symptoms until it was legalized in their state (n = 39, 65.0%).

Of the women currently using cannabis products most had discussed

Table 2
Use of cannabis and interest in use reported by participants (N = 225)

N (%)	No post diagnosis marijuana use or interest in cannabis products	Interested in cannabis use under MD guidance	Post diagnosis marijuana users	Missing response	p-value[a]
	71 (31.6)	80 (35.6)	60 (26.7)	14 (6.2)	
State					0.28
California	42 (59.2)	53 (66.3)	40 (66.7)	12 (85.7)	
Colorado	29 (40.8)	27 (33.8)	20 (33.3)	2 (14.3)	
Age					0.45
Under 30 years	1 (1.4)	1 (1.3)	1 (1.7)	1 (7.1)	
30-39 years	3 (4.2)	9 (11.3)	8 (13.3)	1 (7.1)	
40–49 years	12 (16.9)	7 (8.8)	7 (11.7)	2 (14.3)	
50–59 years	18 (25.4)	26 (32.5)	21 (35.0)	3 (21.4)	
60–69 years	21 (29.6)	21 (26.3)	18 (30.0)	5 (35.7)	
70 years or more	15 (21.1)	16 (20.0)	4 (6.7)	2 (14.3)	
Missing	1 (1.4)	0 (0)	1 (1.7)	0 (0)	
Race/Ethnicity					0.92
African American/Black	1 (1.4)	2 (2.5)	2 (3.3)	1 (7.1)	
American Indian	0 (0)	1 (1.3)	1 (1.7)	0 (0)	
Asian/Pacific Islander	3 (4.2)	6 (7.5)	5 (8.3)	0 (0)	
Hispanic/Latino	35 (49.3)	32 (40.0)	26 (43.3)	9 (64.3)	
White/Caucasian	30 (42.3)	36 (45.0)	24 (40.0)	4 (28.6)	
Other	2 (2.8)	3 (3.8)	2 (3.3)	0 (0)	
Highest level of education					0.18
Elementary/primary school	14 (19.7)	6 (7.5)	4 (6.7)	4 (28.6)	
Some high school	3 (4.2)	5 (6.3)	6 (10.0)	1 (7.1)	
High school or GED	18 (25.4)	29 (36.3)	22 (36.7)	6 (42.9)	
College degree	24 (33.8)	26 (32.5)	18 (30.0)	1 (7.1)	
Masters/professional degree	9 (12.7)	14 (17.5)	10 (16.7)	2 (14.3)	
Missing	3 (4.2)	0 (0)	0 (0)	0 (0)	
Annual household income					0.24
Less than $10,000	12 (16.9)	21 (26.3)	13 (21.7)	2 (14.3)	
$10,000– < 50,000	11 (15.5)	19 (23.8)	16 (26.7)	2 (14.3)	
$50,000–100,000	16 (22.5)	12 (15.0)	13 (21.7)	3 (21.4)	
More than $100,000	10 (14.1)	17 (21.3)	9 (15.0)	1 (7.1)	
Unsure	20 (28.2)	11 (13.8)	8 (13.3)	5 (35.7)	
Missing	2 (2.8)	0 (0)	1 (1.7)	1 (7.1)	
Employment status[b]					
Not currently working including retired	43 (60.6)	51 (63.7)	44 (73.3)	8 (57.1)	0.41
Part-time	8 (11.3)	9 (11.3)	6 (10.0)	3 (21.4)	0.68
Full-time	12 (16.9)	16 (20.0)	7 (11.7)	1 (7.1)	0.45
Student	1 (1.4)	2 (2.5)	1 (1.7)	0 (0)	0.91
Other	7 (9.9)	3 (3.8)	3 (5.0)	0 (0)	0.30
Missing	1 (1.4)	0 (0)	0 (0)	2 (14.3)	
Relationship status					0.046
Single	16 (22.5)	26 (32.5)	15 (25.0)	5 (35.7)	
In a relationship	8 (11.3)	9 (11.3)	5 (8.3)	1 (7.1)	
Married	35 (49.3)	30 (37.5)	32 (53.3)	5 (35.7)	
Widowed	8 (11.3)	4 (5.0)	0 (0)	2 (14.3)	
Divorced	3 (4.2)	10 (12.5)	6 (10.0)	0 (0)	
Other	0 (0)	0 (0)	1 (1.7)	1 (7.1)	
Missing	1 (1.4)	1 (1.3)	1 (1.7)	0 (0)	
Religious affiliation					0.13
Yes	65 (91.5)	65 (81.3)	49 (81.7)	10 (71.4)	
No	4 (5.6)	14 (17.5)	11 (18.3)	2 (14.3)	
Decline to state	2 (2.8)	1 (1.3)	0 (0)	1 (7.1)	
Missing	0 (0)	0 (0)	0 (0)	1 (7.1)	
Language spoken at home					0.02
English	39 (54.9)	53 (66.3)	45 (75.0)	5 (35.7)	
Spanish	30 (42.3)	21 (26.3)	14 (23.3)	8 (57.1)	
Other	2 (2.8)	4 (5.0)	0 (0)	1 (7.1)	
Missing	0 (0)	2 (2.5)	1 (1.7)	0 (0)	
Cancer type					0.049
Ovarian	29 (40.8)	39 (48.8)	30 (50.0)	3 (21.4)	
Endometrial/uterine	28 (39.4)	26 (32.5)	13 (21.7)	4 (28.6)	
Cervical	9 (12.7)	12 (15.0)	12 (20.0)	7 (50.0)	
Vaginal	2 (2.8)	2 (2.5)	0 (0)	0 (0)	
Vulvar	2 (2.8)	0 (0)	1 (1.7)	0 (0)	
Other/Unsure	1 (1.4)	1 (1.3)	4 (6.7)	0 (0)	
Cancer stage at diagnosis					0.47
1	19 (26.8)	20 (25.0)	7 (11.7)	3 (21.4)	
2	7 (9.9)	3 (3.8)	7 (11.7)	2 (14.3)	
3	17 (23.9)	19 (23.8)	22 (36.7)	3 (21.4)	
4	11 (15.5)	16 (20.0)	12 (20.0)	2 (14.3)	
Unsure	17 (23.9)	21 (26.3)	12 (20.0)	4 (28.6)	
Missing	0 (0)	1 (1.3)	0 (0)	0 (0)	

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Table 2 (continued)

N (%)	No post diagnosis marijuana use or interest in cannabis products	Interested in cannabis use under MD guidance	Post diagnosis marijuana users	Missing response	p-value[a]
	71 (31.6)	80 (35.6)	60 (26.7)	14 (6.2)	
Cancer status at last visit					0.001
Active	16 (22.5)	31 (38.8)	28 (46.7)	4 (28.6)	
Remission	34 (47.9)	41 (51.2)	27 (45.0)	5 (35.7)	
Unsure	21 (29.6)	7 (8.8)	4 (6.7)	4 (28.6)	
Missing	0 (0)	1 (1.3)	1 (1.7)	1 (7.1)	
Time in remission[c]					0.12
Less than 6 months	8 (23.5)	7 (17.1)	9 (33.3)	0 (0)	
6– < 12 months	5 (14.7)	6 (14.6)	7 (25.9)	0 (0)	
1–2 years	6 (17.7)	12 (29.3)	3 (11.1)	2 (40.0)	
2–3 years	5 (14.7)	3 (7.3)	3 (11.1)	0 (0)	
3–5 years	1 (2.9)	4 (9.8)	3 (11.1)	0 (0)	
Greater than 5 years	5 (14.7)	8 (19.5)	1 (3.7)	3 (60.0)	
Missing	4 (11.8)	1 (2.4)	1 (3.7)	0 (0)	
Any use of marijuana products prior to cancer diagnosis					< 0.001
Yes	2 (2.8)	11 (13.8)	24 (40.0)	4 (28.6)	
No	69 (97.2)	69 (86.3)	36 (60.0)	10 (71.4)	

[a] All data presented as counts (percentage). Rows enumerating missing data do not contribute to estimated p-values.

[b] Multiple responses allowed therefore total column percentages may exceed 100%.

[c] Among participants in remission (N = 107).

this with their physician (n = 41, 68.3%, Table 3); the vast majority felt their physicians were supportive (n = 34, 82.9%, data not shown) but could not provide helpful information regarding the use of non-prescription cannabis products (n = 23, 56.1%, this and remaining data in this paragraph not shown in tables). Of the women who had not discussed cannabis use with their physicians (n = 18, 30.0%), reasons included worry about judgment (n = 4, 22.2%), lack of comfort (n = 3, 16.7%), or desire for the physician to initiate the conversation (n = 7, 38.9%). Several others thought their physician would not have any useful information to contribute (n = 4, 22.2%).

The majority of women participating in the survey were not using other non-prescribed products (n = 181, 80.4%, Supplementary Material Table S1). Of those using non-prescription products (n = 13,

5.8%), two reported tobacco use and 9 reported the use of herbal medicine or teas. No women reported using recreational drugs including heroin, methamphetamines, or cocaine products. The majority of participants reported they never used prescribed opioid products (n = 131, 58.2%). However, of those using cannabis products for cancer related symptom control, almost fifty percent report decreased prescription narcotic use after initiation of cannabis products (n = 27, 45.0%).

Three predictors met criteria for inclusion in the multivariable analytic model: state of residence, language spoken at home, and use of cannabis prior to cancer diagnosis, and each was significantly associated with both outcomes. Interest in using cannabis and actual use following diagnosis were inversely associated with living in Colorado
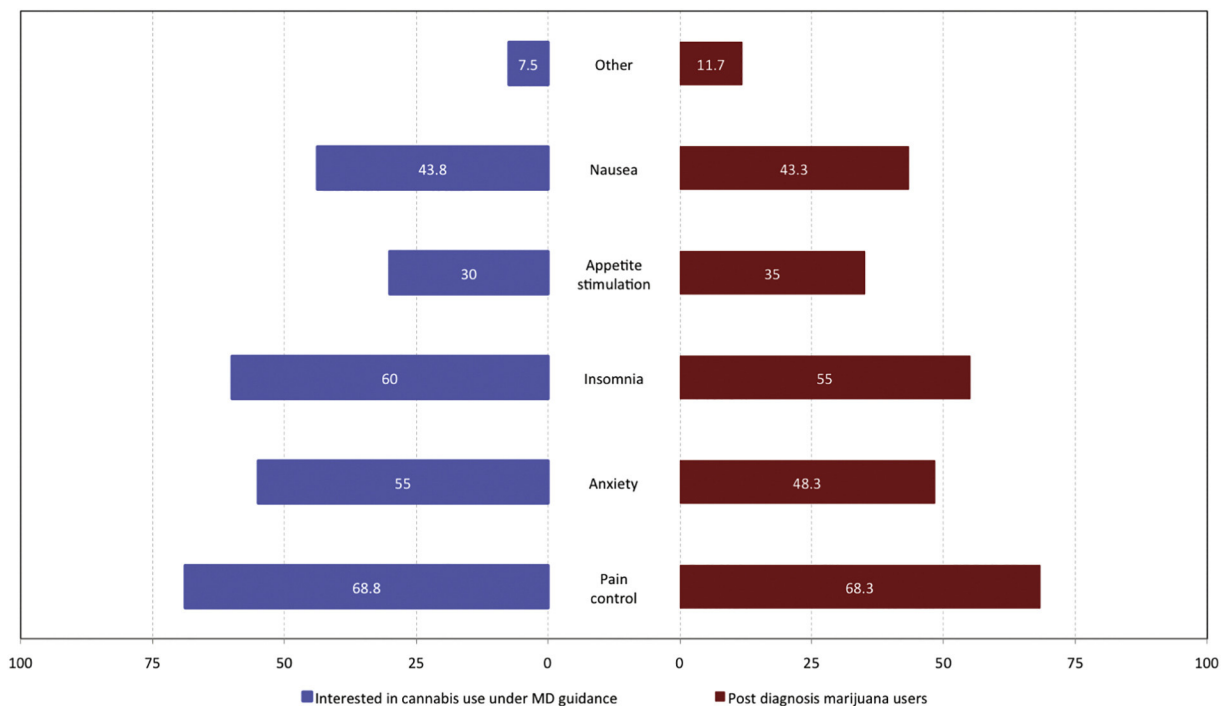

Fig. 1. Reasons for cannabis use among women with gynecologic cancer.

Table 3
Patterns of use in women using cannabis products for symptom management (N = 60).

N (%)	Total	California	Colorado	p-value[a]
	60 (100)	40 (66.7)	20 (33.3)	
Frequency of use				
Less than once a year	17 (28.0)	11 (28.0)	6 (30.0)	0.81
About once a month	14 (23.0)	9 (23.0)	5 (25.0)	
About once a week	6 (10.0)	3 (8.0)	3 (15.0)	
Daily use	21 (35.0)	15 (38.0)	6 (30.0)	
Missing	2 (3.0)	2 (5.0)	0 (0)	
Type of products[b]				
Inhaled	23 (38.3)	15 (37.5)	8 (40.0)	0.85
Edible	28 (46.7)	17 (42.5)	11 (55.0)	0.36
CBD orally	31 (51.7)	20 (50.0)	11 (55.0)	0.71
CBD topically	23 (38.3)	12 (30.0)	11 (55.0)	0.06
Other	2 (3.3)	1 (2.5)	1 (5.0)	0.61
Source of products[b]				
Medical dispensary	29 (48.3)	20 (50.0)	9 (45.0)	0.71
Recreational dispensary	23 (38.3)	11 (27.5)	12 (60.0)	0.02
Individual seller	11 (18.3)	9 (22.5)	2 (10.0)	0.24
Mail order	3 (5.0)	3 (7.5)	0 (0.0)	0.21
Other	2 (3.3)	2 (5.0)	0 (0.0)	0.31
Use with other people[b]				
Alone/no	40 (66.7)	24 (60.0)	16 (80.0)	0.12
With spouse/sig other	19 (31.7)	12 (30.0)	7 (35.0)	0.69
With other family	11 (18.3)	7 (17.5)	4 (20.0)	0.81
With friends	9 (15.0)	5 (12.5)	4 (20.0)	0.44
With other cancer patients	6 (10.0)	3 (7.5)	3 (15.0)	0.36
Cannabis product use among others in household				
No	44 (73.3)	30 (75.0)	14 (70.0)	0.91
Yes	15 (25.0)	10 (25.0)	5 (25.0)	
Missing	1 (1.7)	0 (0.0)	1 (5.0)	
Talked to cancer MD about cannabis use				
No	18 (30.0)	15 (37.5)	3 (15.0)	0.06
Yes	41 (68.3)	24 (60.0)	17 (85.0)	
Missing	1 (1.7)	1 (2.5)	0 (0.0)	

[a] All data presented as counts (percentage).
[b] Multiple responses allowed therefore total column percentages may exceed 100%.

rather than California ($p = 0.03$) and speaking Spanish at home ($p = 0.03$), and positively associated with cannabis use prior to cancer diagnosis ($p < 0.001$) (Supplementary Material Table S2). Compared to participants in California, those in Colorado were about one third as likely (OR: 0.31 95% CI: 0.12–0.82) to report interest, and a quarter as likely (OR: 0.25, 95% CI: 0.09–0.74) to report actual use. Spanish speakers were a quarter as likely to report interest (OR: 0.25 95% CI: 0.09–0.67) or use (OR: 0.25, 95% CI 0.08-0.74). Finally, women who reported any use of cannabis prior to diagnosis were nearly six times more likely to report interest in using (OR: 5.83, 95% CI: 1.15–29.58) and 25 times more likely to report actual use (OR: 24.69, 95% CI: 4.89–124.51) following diagnosis. Of the two variables forced into the analytic model, there was a tendency for those with younger age at diagnosis to report both more interest and more use, and for those with higher stage at diagnosis to report more use, although overall associations did not achieve statistical significance

4. Discussion

To date, this is the only study to evaluate the use of cannabis products specifically amongst women with gynecologic malignancies. Participants in this anonymous study demonstrated a strong interest in the use of non-prescription cannabis products for management of cancer-related symptoms. This interest was evident among women of different ages, ethnicities, religions, and educational and income profiles. Many women using cannabis products for as part of their pain management regimen reported decreased opioid use.

This study was undertaken in two states with legal and recreational access to cannabis products. Medical cannabis has been legal in California since 2004; however, recreational access has only been available since 2018. In Colorado, recreational cannabis products have been available since 2012. Despite these different timelines, living in Colorado was inversely associated with both interest in and actual use of cannabis products. The vast majority of women using cannabis products for cancer related symptoms reported that they did not do so until use was legalized in their state, consistent with other studies examining use practices in cancer patients(Pergam et al., 2017). As more states move to legalize access to cannabis derivatives, we can anticipate increased uptake within our population as evidenced by current national trends(Pergam et al., 2017; Bar-Sela et al., 2013; National Academies of Sciences EaM, 2017; Ward et al., 2014).

Among patients in our study, few demographic characteristics were predictive of use of or interest in cannabis. Neither age, ethnicity, income, educational level, religious affiliation nor relationship status were highly associated with cannabinoid product use. This may indicate that cannabis products are becoming more mainstream, and as such, accepted by increasingly diverse members of the population. Spanish language was associated with less interest in and use of cannabis products; this could be due to a variety of social and cultural factors that are not fully elucidated in the scope of this study. The strongest predictor of cannabis use was previous use of cannabis. Although marijuana has been suggested in the popular press as a gateway drug leading to experimentation with other illicit substances, no participants in our study reported use of any other recreational drugs, regardless of history of using cannabis.

The most common symptom cited by women in our study for interest in or use of cannabis was pain. Additionally, a substantial number of patients in our study report decreased reliance on opioids when using cannabis derivatives for pain control. This observation is consistent with other studies demonstrating fewer prescriptions written for conventional pain medication in states with access to medical marijuana. A National Academies of Science comprehensive report on cannabis reaches the conclusion that, "There is substantial evidence that cannabis is an effective treatment for chronic pain in adults."(Bradford and Bradford, 2016). In the setting of the current expanding opioid crisis, exploring analgesic options that have proven effective and safe will behoove the medical community.

Most women who used cannabis products reported sharing this information with their oncologists. Many more women in our study reported a desire to use cannabis products for symptom management if their oncologist could provide guidance to them on the subject. However, the majority of women whom had discussed cannabis with their physicians felt that the information available from their oncologist regarding cannabis for symptom palliation was not helpful for them. A recent survey of medical oncologists demonstrated that only 30% felt well informed on the topic; however, 80% had conducted conversations with their patients regarding medical marijuana(National Academies of Sciences EaM, 2017). The large number of women using cannabis products with reported benefit for palliation of the often debilitating consequences of cancer and its therapies indicates that more research into this topic is warranted, as there is now increasing evidence that both patients and physicians are affected by the paucity of clinical data available regarding cannabis product use in the setting of malignancy.

Strengths of this study include inclusion of a demographically and culturally diverse population in terms of age, ethnicity, educational level, religious affiliation, and socioeconomic strata. The survey was provided in both Spanish and English in an effort to include Hispanic patients representative of those treated at both centers. The instrument was designed for a population of women with gynecologic malignancies, thus enabling us to gather data specific to our population. The study was de-identified in order to encourage honest responses about potentially controversial or embarrassing topics. Having greater than fifty percent of our surveys returned is extremely successful for this type

of study, and this could imply a strong degree of interest in the subject within our population.

Limitations of this study include but are not limited to the survey design, which is descriptive by nature and therefore somewhat limits the extent of investigation that can be undertaken. Although our sample size and proportion of participation was high in the context of similar studies, there is likely to be a component of selection bias(Pergam et al., 2017; Johns, 2019). However, such a large percentage of participants expressed current or potential use of cannabis that we feel the findings are clinically significant. The de-identified nature of the survey did not allow us to verify the patient's reported demographic and clinical characteristics. We maintained a strict review process to exclude patients without clear evidence of a gynecologic malignancy. Therefore, in our effort to preserve internal validity it is possible that we excluded some patients that would have been included had we been able to verify clinical information.

Legal access to medical and recreational cannabis is increasing rapidly throughout the United States. This study adds to the growing body of evidence about the use of cannabis products for symptom control in the setting of malignancy, but more research into the therapeutic effectiveness of this pharmacologic agent is needed. Practitioners in the field of gynecologic oncology should be aware that many patients desire guidance in the use of cannabis derivatives, and that significant numbers of their patient may already be using non-prescription cannabis products.

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Declaration of Competing Interest

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