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# Cannabis use for menopause in women aged 35 and over: a cross-sectional survey on usage patterns and perceptions in Alberta, Canada

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## ABSTRACT

**Objective** Use of cannabis for medical reasons has increased in Canada since legalisation of recreational cannabis in 2018. The objective of this study was to examine the pattern of use and perceptions about cannabis for menopause in women aged 35 and over in Alberta, Canada.

**Design** Cross-sectional, web-based survey.

**Setting** Online (location of participant residence in Alberta, Canada).

**Participants** Self-selected sample of women recruited through social media (Facebook, Instagram, Twitter) between October and December 2020. Inclusion criteria included: identified as woman, ages 35 and over, living in Alberta, Canada.

**Primary and secondary outcomes measures** Self-reported data were collected on demographics, menopause status and symptoms, cannabis usage and how participants perceived cannabis. Descriptive statistics, comparative analysis and logistic regression explored relations in cannabis use and participant characteristics.

**Results** Of 1761 responses collected, 1485 were included for analysis. Median age was 49 years; 35% were postmenopausal and 33% perimenopausal. Among analysed responses, 499 (34%) women reported currently using cannabis and 978 (66%) indicated ever using cannabis. Of the 499 current cannabis users, over 75% were using cannabis for medical purposes. Most common reasons for current use were sleep (65%), anxiety (45%) and muscle/joint achiness (33%). In current users, 74% indicated that cannabis was helpful for symptoms. Current cannabis users were more likely to report experiencing menopause symptoms compared with non-users. History of smoking and general health status were associated with current cannabis use.

**Conclusions** Some women are using cannabis for symptoms related to menopause. Further research is required to assess safety and efficacy of cannabis for managing menopause and develop clinical resources for women on cannabis and menopause.

## STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Large survey sample captured to identify current cannabis usage patterns and perceptions in women aged 35 and over.
⇒ Current cannabis usage was characterised in women, including reason for use, frequency, duration, type of cannabis product, product access and for which menopause symptoms cannabis was used for.
⇒ Study conducted in a geographical area where cannabis is fully legalised for recreational and medical use with a wide range of cannabis products legally available.
⇒ Online survey data collection may impact complete representativity of the findings to the general population.
⇒ Conducting self-reported surveys carry risks of information biases, such as prevarication and notoriety biases, or responses influenced by social desirability.

## INTRODUCTION

Women can experience physical or psychological symptoms during the menopause transition, including vasomotor symptoms (VMS), genitourinary effects, mood changes, muscle and joint pain, sleep disturbances and decreased libido.[1] Up to 80% of women will experience one or more menopause-related symptoms, which may impact quality of life.[1 2] Symptoms can appear prior to the final menstrual period and last into postmenopause, with the median duration of VMS reported to be 7.4 years.[3] Management of menopause symptoms includes lifestyle changes, menopausal hormone therapy (MHT), non-hormonal prescription medications or complementary therapies. Current guidelines recommend MHT as first-line treatment for bothersome VMS.[4 5] MHT is considered a safe option for women without MHT contraindications, and who are less than 60 years of age or less than 10 years since their final menstrual period.[4 5] However, some women may be fearful of using MHT to control their menopausal symptoms and

may opt for alternative options they perceive to be safer.[6] Unfortunately, after the initial findings of the Women's Health Initiative (WHI) that oestrogen plus progestin therapy (specifically with the combination of conjugated equine oestrogen and medroxyprogesterone) increased the risk of cardiovascular disease and breast cancer, the use of MHT declined worldwide as many women were afraid to use MHT due to safety concerns.[7 8] Even though subsequent WHI publications have shown more favourable outcomes and current guidelines support the safety of MHT in symptomatic women without contraindications, this fear may still influence women to turn to other options which they perceive as less risk.[4 5] For example, cannabis is being publicly marketed as a panacea for many health issues, including symptoms overlapping with menopause, potentially influencing decisions made regarding its use.[9] A recent systematic review identified a lack of research on the effect of cannabis on menopausal symptoms.[10] The increasing anecdotal use of cannabis for menopause symptoms demands more attention.

In Canada, medical cannabis has been legal since 2001 and recreational cannabis was legalised in 2018. Cannabis, alternatively known as marijuana, is available for purchase in Canada and includes different strains of components such as tetrahydrocannabinol (THC) and cannabidiol (CBD) content in many forms, such as for smoking, vaping, edibles or oils.[11] Health Canada reports likely half of Canadians have used cannabis at some point in their lives.[12] Since legalisation, cannabis use has increased especially in the midlife population.[13] Additionally, a report showed over 800 000 Canadians are now using non-medical cannabis for the management of their health, without medical advice.[14] It is still unclear how many midlife women are currently using cannabis or are interested in the use of cannabis to self-manage their symptoms. We need to engage with women to understand if and how cannabis is being used for menopause symptoms and what forms women are preferring to use. This study is an essential preliminary step to inform future research studies assessing use of cannabis for menopause symptoms. The objective of the current study was to characterise the use patterns and perceptions of cannabis specifically for menopause in a population of women aged 35 and over.

## METHODS

### Study design

This was a cross-sectional, web-based survey of adult women residing in Alberta, Canada conducted over 2 months from October to December 2020. The survey was developed for the first phase of a mixed-methods study to explore the experiences and perspectives of women with cannabis use during menopause. The survey was hosted on the Qualtrics platform. Results are reported using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist for web-based surveys.[15]

### Participants and recruitment

The inclusion criteria were women, ages 35 years and over, living in Alberta and able to complete an online survey in English. Women were recruited through research-specific social media pages on Facebook, Instagram and Twitter. Targeted advertisement campaigns or user-shared public social media posts were used to advertise the survey link and offer women the opportunity to participate. Participants interested in study participation clicked the advertisement or post and were directed to the open access survey in two ways. This included a direct URL link into Qualtrics from a social media post on study recruitment, or through a targeted advertisement for a general call for women study participation directing individuals to a study-specific webpage providing URL link access (this was done to comply with policies on health-related advertisement from the specific social media platforms used in this study). Participants then completed three screening questions based on inclusion criteria (ie, identified as woman, ages 35 and over, residing in Alberta), and those eligible reviewed the study information letter which described the objectives of examining cannabis use for menopause and provided informed consent electronically prior to the start of the survey. If a participant did not meet all three criteria for inclusion during screening, they were excluded. There was no maximum age for inclusion. Participation was voluntary and survey participants were offered the chance to enter a raffle draw for one of four $C50 gift cards.

### Survey instrument design

The 50-item survey instrument was investigator driven and informed by published literature,[16 17] as well as Canadian national cannabis surveys.[18 19] The survey was designed to take 15 min to complete, consisting of questions that were closed-ended and one open-ended question (survey instrument can be found in online supplemental material 1). The survey was assessed for content validity by clinical experts (n=4) and pilot tested in a sample of women (n=10) using cognitive interviews.[20 21]

Data collected included demographics, medical history, self-reported changes to menstrual cycle and menopause symptoms, cannabis use and all respondents were asked about their perspectives related to cannabis, including use for menopause. Menopause stage was categorised through response to predefined descriptions of changes in menstrual cycle with or without presence of menopause symptoms, adapted from Marlatt *et al*.[16] Women were categorised as: 'premenopause' if periods were regular with no menopausal symptoms present; 'perimenopause' if periods were irregular or regular with presence of menopausal symptoms; 'postmenopause' if it had been more than 12 months since last menstrual period, regardless of menopause symptoms being present.[16] If menopause stage could not be determined, then women were categorised into 'other'. Health literacy was captured through use of three screening questions validated by Chew *et al*[17] and were coded and categorised into two groupings of

'moderate to adequate' or 'inadequate' health literacy. The term 'cannabis' was used as an all-encompassing term including any form of cannabis or marijuana and any components (including THC or CBD) derived from the cannabis plant. Cannabis use questions included: current (within past 30 days) and past cannabis use, frequency and duration of use, reasons for use (including menopause symptoms), cannabis form, type (CBD and/or THC) and product access. The survey used adaptive questioning and survey branching logic. Respondents not reporting current cannabis use were asked about past cannabis use, while never-users bypassed cannabis use questions and were directed to questions about perceptions and resources on cannabis use.

### Sample size

As this was an unrestricted, self-selected sample of participants, no specific sample size was calculated apriori for the survey. However, based on survey standards to set the CI at 95% and margin of error at 5%, and a proportional variable of interest with an infinite population we would need a minimum of n=385 participants in our sample.[22]

### Statistical analysis

All survey respondents who met the study inclusion criteria and provided informed consent were included in the survey analysis. Summary statistics were used to describe the survey cohort. Descriptive analysis of categorical variables was reported as frequencies (percentages) representing participant demographics, medical and menopause characteristics, and cannabis use patterns and perceptions. Comparative analysis, using $\chi^2$ test or Fisher's exact test for categorical variables and Kruskal-Wallis test for continuous variables as appropriate, were applied to assess between-group differences in (1) current cannabis versus non-users and (2) menopause stages for current cannabis use characteristics.

Logistic regression modelling on current cannabis users was completed to explore variables independently associated with cannabis use. Variables were included in univariable regression if they indicated statistical significance in group comparisons between current cannabis users vs current non-users ($p<0.05$) or were identified by the research team as potential for clinical significance. A multivariable logistic regression model was constructed using backward selection of independent variables included in univariable analysis, based on statistical significance ($p<0.05$) in group comparisons or clinical significance. Multivariable regression analysis was, therefore, adjusted for age, menopause stage, education, health status and smoking status, while excluding menopause symptoms grouped post hoc due to complexity of grouped variables. These associations were reported as multivariable/adjusted OR (95% CI). All statistical analyses were conducted using SAS V.9.4 (SAS Institute) and p value for reporting of statistical significance was <0.05.

### Patient and public involvement

Patient and public were not involved in design, conduct, reporting or dissemination of the research.

## RESULTS

Of the 1761 women who completed the screening questions, 10 respondents did not meet the inclusion criteria and 266 did not provide informed consent. A total of 1485 respondents were included in the final analysis (figure 1). Characteristics of respondents are shown in table 1. The median age was 49 years (range 35–72 years). Majority of respondents identified as white (92.9%), had postsecondary education or higher (88.0%),and had at least a moderate level of health literacy (95.4%). Overall, 35.2% of women were in postmenopause and 32.7% in perimenopause. Most frequently reported symptoms were difficulty with sleep (65.3%), concentration (49.2%) and anxiety (48.8%).

### Characteristics of cannabis use

Current cannabis use was reported by 499 respondents (33.6%) and an additional 479 (32.3%) reported past cannabis use only (figure 1). Current cannabis users reported lower education, history of cigarette smoking and poorer health compared with non-users (all $p<0.0001$; table 1). Current users reported experiencing more menopause symptoms compared with non-users, including difficulty with sleep, difficulty with concentration, anxiety, irritability, mood swings, depression, muscle/joint achiness (all $p<0.0001$) and painful intercourse ($p=0.014$). Current users were also more likely to use natural health products or participate in cognitive behavioural therapy or meditation/mindfulness.

Table 2 shows the characteristics of women currently using cannabis broken down by menopause stage (additional demographic characteristics can be found in online supplemental material 2). Of the current cannabis users (n=499), 33.9% reported using cannabis for medical use only and 41.1% both medical and recreational use. Only 22.6% used cannabis medically prescribed by a healthcare professional. Most women were using cannabis once daily or more (42.7%) and for a duration of more than 5 years (35.3%). Menopause symptoms for cannabis use including sleep difficulties (65.1%), anxiety (45.3%) and muscle/joint achiness (33.3%). Majority of respondents reported cannabis helpful with menopause symptoms (73.5%). Common forms of cannabis used were edibles (51.7%), oils (47.3%) and smoking (41.1%), with nearly two-thirds purchased cannabis products from in-person cannabis dispensaries (63.9%).

Women in perimenopause and postmenopause were more likely to use cannabis for medical purposes ($p<0.0001$) and have a medical prescription for cannabis ($p=0.034$), compared with premenopause (table 2). Women in postmenopause were more likely to use cannabis every day ($p=0.0002$) and report use

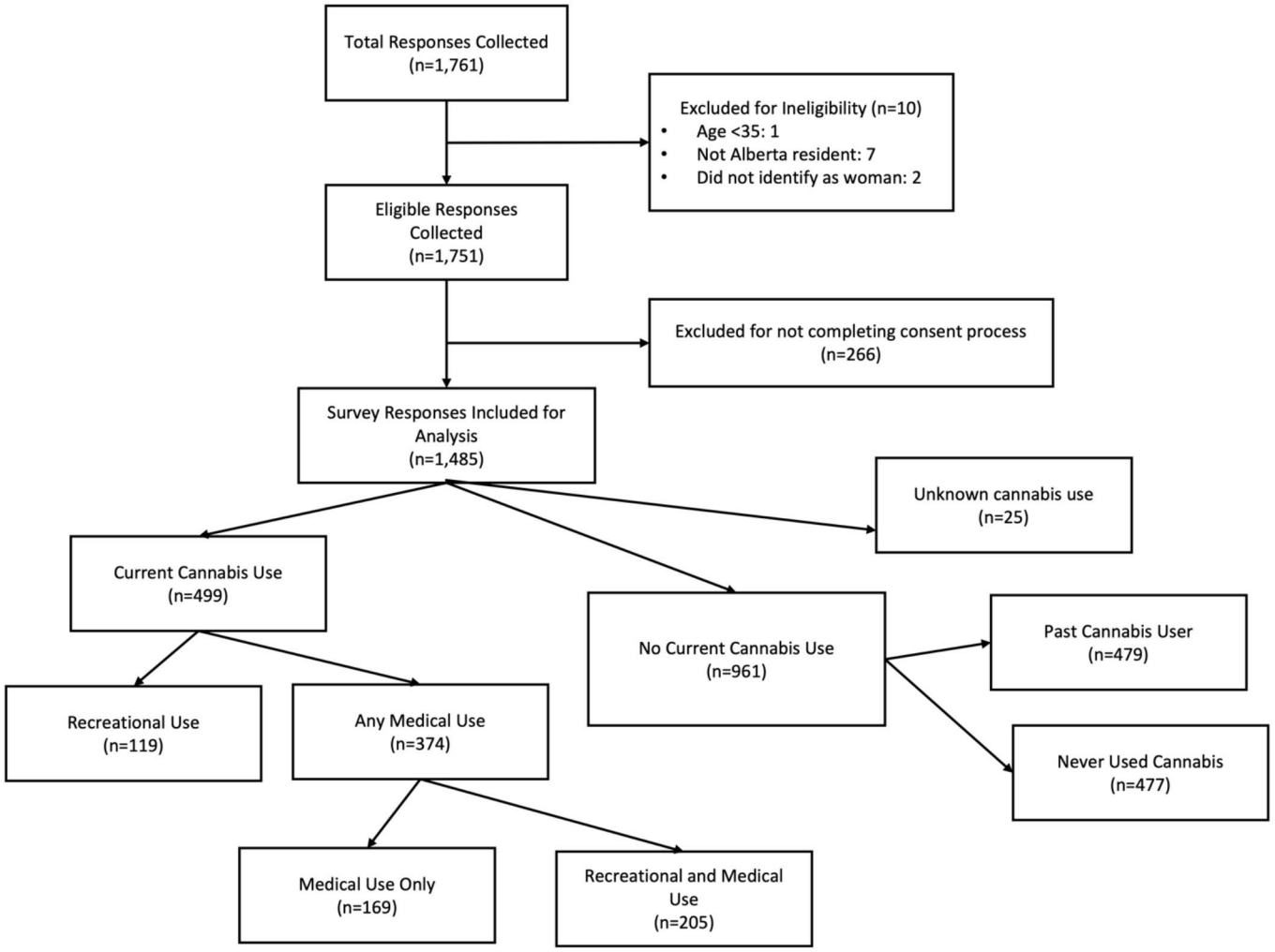


**Figure 1** Flow chart of survey participants categorised on history of cannabis use.

for menopause symptoms, as compared with women in premenopause and perimenopause.

For women who only reported past cannabis use (n=479), majority used cannabis for recreational purposes only (69.9%). Reasons for stopping cannabis use were not wanting to use it anymore (35.5%), side effects (18.2%) or because it was illegal at the time (16.3%).

### Perceptions on cannabis for medical purposes

Over one-third of women surveyed (37.6%) indicated they would use cannabis now that it is legalised, with 38.7% expressing interest in using cannabis for menopause symptoms (table 3). Internet searches (46.3%), family or friends (34.1%) or cannabis dispensaries (22.8%) were the most common sources of information. Women indicated preference to receive cannabis information from physicians (50.2%), medical cannabis clinics (48.6%) and pharmacists (40.2%).

### Factors associated with cannabis use

In the multivariable model, smoking status and health status were the only significant variables independently associated with current cannabis use (table 4). Women who reported a history of cigarette smoking were 2.5 times more likely to report use compared with non-smokers (OR 2.5, 95% CI 1.9 to 3.2, p<0.0001). Women who self-reported neutral or poor health were more likely to use compared with those who reported good health (OR 1.5, 95% CI 1.1 to 2.0 and OR 1.8, 95% CI 1.1 to 3.0, respectively, with p=0.0025).

## DISCUSSION

One-third of women aged 35 and over in our survey reported current cannabis use and more than 65% used cannabis at some point in their life. Frequency of cannabis use ranged, however, most women who were current users used at least once daily. Our survey showed that two-thirds of women currently using cannabis used for medical purposes, yet most did not have cannabis medically prescribed. Current cannabis users indicated taking cannabis to manage menopause symptoms and found it helpful for their symptoms. To our knowledge, this is the largest study to directly investigate cannabis use and perceptions in a general population of women aged 35 and over.

**Table 1** Demographic and clinical characteristics of participants by cannabis use

| Characteristic | No (%) of total participants (n=1485) | Cannabis use (n=1460)* | | |
|---|---|---|---|---|
| | | Current users† (n=499) | Current non-users (n=961) | P value |
| Age, median (IQR) | 49.0 (43.0–55.0) | 49.0 (42.0–55.0) | 49.0 (43.0–55.0) | 0.2661** |
| Ethnicity,‡ n (%) | | | | |
| White | 1379 (92.9) | 461 (92.4) | 894 (93.0) | 0.6518†† |
| Indigenous | 54 (3.6) | 26 (5.2) | 28 (2.9) | 0.0274†† |
| Asian | 27 (1.8) | 5 (1.0) | 22 (2.3) | 0.0833†† |
| South Asian | 12 (0.8) | 1 (0.2) | 11 (1.1) | 0.0687‡‡ |
| Black | 8 (0.5) | 4 (0.8) | 4 (0.4) | 0.4566‡‡ |
| Education level, n (%) | | | | <0.0001‡‡ |
| Less than high school | 14 (0.9) | 11 (2.2) | 3 (0.3) | |
| High school degree, equivalent | 136 (9.2) | 52 (10.4) | 80 (8.3) | |
| Postsecondary education | 1003 (67.5) | 349 (69.9) | 637 (66.3) | |
| Graduate education | 304 (20.5) | 75 (15.0) | 226 (23.5) | |
| Medical conditions,‡ n (%) | | | | |
| Migraines | 384 (25.9) | 144 (28.9) | 240 (25.0) | 0.1124†† |
| High blood pressure | 250 (16.8) | 88 (17.6) | 162 (16.9) | 0.7147†† |
| Respiratory disorders | 209 (14.1) | 73 (14.6) | 136 (14.2) | 0.8109†† |
| Diabetes | 84 (5.7) | 29 (5.8) | 55 (5.7) | 0.9489†† |
| Osteoporosis | 42 (2.8) | 19 (3.8) | 23 (2.4) | 0.1260†† |
| Breast cancer | 41 (2.8) | 15 (3.0) | 26 (2.7) | 0.7441†† |
| Smoking status, n (%) current | 119 (8.0) | 74 (14.8) | 45 (4.7) | <0.0001‡‡ |
| History of hysterectomy, n (%) | 187 (12.6) | 72 (14.4) | 115 (12.0) | 0.1818†† |
| History bilateral oophorectomy, n (%) | 64 (4.3) | 28 (5.6) | 36 (3.8) | 0.0996†† |
| Menopause stage,§ n (%) | | | | 0.6827†† |
| Premenopause | 272 (18.3) | 96 (19.3) | 175 (18.2) | |
| Perimenopause | 486 (32.7) | 160 (32.2) | 326 (33.9) | |
| Postmenopause | 522 (35.2) | 184 (37.0) | 338 (35.2) | |
| Other | 173 (11.6) | 55 (11.0) | 118 (12.3) | |
| Menopause symptoms‡ (in past 30 days), n (%) | | | | |
| Difficulty with sleeping | 970 (65.3) | 367 (73.5) | 603 (62.8) | <0.0001†† |
| Difficulty concentrating/brain fog | 730 (49.2) | 288 (57.7) | 442 (46.0) | <0.0001†† |
| Anxiety | 724 (48.8) | 294 (58.9) | 430 (44.8) | <0.0001†† |
| Low sex drive or libido | 691 (46.5) | 252 (50.5) | 438 (45.6) | 0.0768†† |
| Irritability | 686 (46.2) | 272 (54.5) | 413 (43.0) | <0.0001†† |
| Muscle and joint achiness | 638 (43.0) | 263 (52.7) | 375 (39.1) | <0.0001†† |
| Night sweats | 610 (41.1) | 221 (44.3) | 389 (40.5) | 0.16632†† |
| Hot flashes | 567 (38.2) | 200 (40.1) | 367 (38.2) | 0.49142†† |
| Mood swings | 532 (35.8) | 223 (44.7) | 309 (32.2) | <0.0001†† |
| Depression | 480 (32.3) | 211 (42.3) | 269 (28.0) | <0.0001†† |
| Vaginal dryness or itching | 455 (30.6) | 172 (34.5) | 283 (29.5) | 0.0510†† |
| Painful intercourse | 174 (11.7) | 74 (14.8) | 100 (10.4) | 0.0136†† |
| No symptoms | 130 (8.8) | 29 (5.8) | 101 (10.5) | 0.0027†† |
| Prescription Medications for Menopause,‡ n (%) | | | | |
| Menopausal hormone therapy | 142 (9.6) | 47 (9.4) | 95 (9.9) | 0.7888†† |

Continued

Table 1 Continued

| Characteristic | No (%) of total participants (n=1485) | Cannabis use (n=1460)* | | |
|---|---|---|---|---|
| | | Current users† (n=499) | Current non-users (n=961) | P value |
| Combined hormonal contraceptives | 105 (7.1) | 36 (7.2) | 69 (7.2) | 0.9688†† |
| Antidepressants | 300 (20.2) | 123 (24.6) | 177 (18.4) | 0.0047†† |
| Gabapentin or pregabalin | 26 (1.8) | 12 (2.4) | 14 (1.5) | 0.1912†† |
| Clonidine | 11 (0.7) | 7 (1.4) | 4 (0.4) | 0.0531‡‡ |
| Complementary methods,‡ n (%) | | | | |
| Exercise and yoga | 611 (41.1) | 204 (40.9) | 407 (42.4) | 0.5444†† |
| Mindfulness or meditation | 360 (24.2) | 149 (29.9) | 211 (22.0) | 0.0010†† |
| Cooling or avoiding triggers | 293 (19.7) | 99 (19.8) | 194 (20.2) | 0.8446†† |
| Natural health products | 185 (12.5) | 84 (16.8) | 101 (10.5) | 0.0006†† |
| Cognitive behavioural therapy | 87 (5.9) | 43 (8.6) | 44 (4.6) | 0.0021†† |
| Overall health status,¶ n (%) - good | 964 (64.9) | 294 (58.9) | 670 (69.7) | <0.0001‡‡ |
| Health literacy, n (%) moderate-adequate | 1417 (95.4) | 486 (97.4) | 931 (96.9) | 0.3434†† |

*Only included values for respondents that answered survey questions on cannabis usage. Missing data may be present for those who did not, resulting in differences between cannabis usage and total participant counts.
†Current cannabis user defined as cannabis use within the last 30 days; non-users defined as having not used cannabis in the last 30 days.
‡More than one response possible.
§Menopause Stage definitions adapted from Marlatt *et al*:[16] Premenopause: regular period, no menopause symptoms; perimenopause: irregular or regular period with menopause symptoms; postmenopause: no period in 12 months or more, with or without menopause symptoms; other: unable to determine menopause stage through changes to menstrual cycle due to report of hysterectomy, endometrial/uterine ablation, hormonal contraception/intrauterine device, unclear description of menopause symptoms or menstrual cycle changes (group comparisons for cannabis use only included 'premenopause', 'perimenopause' and 'postmenopause' variables).
¶No response in 25 of total respondents.
**Kruskal-Wallis p value.
††$X^2$ p value.
‡‡Fisher's exact p value.

Cannabis is largely viewed as an illicit drug internationally, but there is expanding legalisation along with changes to usage, prohibition, and research occurring globally.[23 24] However, cannabis is still more commonly used in North America and parts of Europe and Oceania.[2] As of 2020, it was estimated one in five Canadian women report recent use of cannabis, an increase since the 2018 Canadian legalisation of recreational cannabis.[13] Despite our survey showing a higher prevalence in cannabis use in relation to the general population, our results collectively provide a snapshot into use patterns in women aged 35 and over. Many Canadians are using cannabis medically without healthcare professional authorisation or guidance.[25 26] This is also reflected in the latest decline in medical cannabis clients registered with licensed producers authorised by Health Canada.[27 28] Legalisation may be the reason for these trends by easing access to cannabis products.[29] In our survey, women commonly accessed cannabis through in-person cannabis stores followed by online sales, both of which are legal means of product access in Alberta. Though many of these women used cannabis for medical reasons, most did not access healthcare providers as an information source. As well, women reported using a variety of cannabis products. Educating on cannabis product selection is an area healthcare providers can focus efforts on as it is already known that different routes of administration can yield different cannabis onset, effects and risk profiles.[30]

Appropriate menopause care may be complicated by the fact women may not attribute symptoms to menopause simply due to a lack of awareness about menopause.[31 32] There is a well-recognised gap in menopause care,[33] which is further influenced by societal stigma around menopause and ageing, as well as lack of healthcare provider training in this area.[32] Women may be turning to cannabis because they are unaware of their options or may not be getting the care they need during menopause.[32]

Our results show women are using cannabis for menopause related symptoms. Self-medicating with cannabis is already present in literature for a wide range of conditions and symptoms.[34] In general, many women in our survey reported cannabis was helpful for their symptoms. This was a global subjective assessment of cannabis effect on their menopause symptoms, and we caution on the validity of this finding as our survey was not set up to assess the effect of cannabis on individual symptoms. Current cannabis guidelines from the Society of Obstetrician and Gynaecologists of Canada do not support the use of cannabis for menopause due to the lack of available evidence.[35] Yet, women are using cannabis for this

**Table 2** Characteristics of women currently using cannabis (within past 30 days) with group comparisons between menopause stage

| Characteristic | Current cannabis users* | | | | P value |
|---|---|---|---|---|---|
| | Total (n=499) | Premenopause (n=96) | Perimenopause (n=160) | Postmenopause (n=184) | |
| Reason for cannabis use, n (%) | | | | | <0.0001¶ |
| Recreational | 119 (23.8) | 41 (42.7) | 38 (23.8) | 29 (15.8) | |
| Medical | 169 (33.9) | 21 (21.9) | 52 (32.5) | 73 (39.7) | |
| Both | 205 (41.1) | 32 (33.3) | 70 (43.8) | 80 (43.5) | |
| Medical prescription, n (%) | 113 (22.6) | 13 (13.5) | 44 (27.5) | 40 (21.7) | 0.03441¶ |
| Duration of current cannabis use, n (%) | | | | | 0.25431¶ |
| Less than 1 year | 132 (26.5) | 33 (34.4) | 35 (21.9) | 49 (26.6) | |
| 1–2 years | 105 (21.0) | 20 (20.8) | 39 (24.4) | 31 (16.8) | |
| 2–5 years | 82 (16.4) | 13 (13.5) | 27 (16.9) | 32 (17.4) | |
| Over 5 years | 176 (35.3) | 29 (30.2) | 59 (36.9) | 71 (38.6) | |
| Frequency of use, n (%) | | | | | 0.00021¶ |
| Only as needed | 165 (33.1) | 25 (26.0) | 16 (10.0) | 10 (5.4) | |
| Once daily | 98 (19.6) | 13 (13.5) | 30 (18.8) | 45 (24.5) | |
| 2–3 times daily | 80 (16.0) | 14 (14.6) | 28 (17.5) | 32 (17.4) | |
| 4+times daily | 35 (7.0) | 5 (5.2) | 8 (5.0) | 17 (9.2) | |
| Recreational use only | 60 (12.0) | 25 (26.0) | 16 (10.0) | 10 (5.4) | |
| Use for management of menopause symptoms,† n (%) | | | | | |
| Sleep | 325 (65.1) | 46 (47.9) | 102 (63.8) | 138 (75.0) | <0.0001¶ |
| Anxiety | 226 (45.3) | 37 (38.5) | 80 (50.0) | 87 (47.3) | 0.19091¶ |
| Muscle/joint pain | 166 (33.3) | 13 (13.5) | 54 (33.8) | 82 (44.6) | <0.0001¶ |
| Irritability | 142 (28.5) | 23 (24.0) | 53 (33.1) | 55 (29.9) | 0.29891¶ |
| Depression | 124 (24.8) | 15 (15.6) | 38 (23.8) | 59 (32.1) | 0.00841¶ |
| Mood swings | 97 (19.4) | 12 (12.5) | 37 (23.1) | 38 (20.7) | 0.10861¶ |
| Low libido | 52 (10.4) | 6 (6.3) | 23 (14.4) | 17 (9.2) | 0.09561¶ |
| Brain fog | 46 (9.2) | 5 (5.2) | 10 (6.3) | 28 (15.2) | 0.00441¶ |
| Night sweats | 25 (5.0) | 2 (2.1) | 4 (2.5) | 17 (9.2) | 0.00802** |
| Hot flashes | 24 (4.8) | 1 (1.0) | 3 (1.9) | 18 (9.8) | 0.00062** |
| Vaginal dryness | 7 (1.4) | 0 (0) | 3 (1.9) | 4 (2.2) | 0.48842** |
| Painful intercourse | 5 (1.0) | 2 (2.1) | 1 (0.6) | 2 (1.1) | 0.63442** |
| Other | 45 (9.0) | 7 (7.3) | 14 (8.8) | 18 (9.8) | 0.77521¶ |
| Helpful for menopause symptoms listed above, n (%) | | | | | |
| Yes | 367 (73.5) | 54 (56.3) | 123 (76.9) | 149 (81.0) | 0.05672** |
| No | 10 (2.0) | 2 (2.1) | 2 (1.3) | 5 (2.7) | |
| Do not know | 82 (16.4) | 22 (22.9) | 26 (16.3) | 24 (13.0) | |
| Cannabis product,‡ n (%) | | | | | |
| Edibles | 258 (51.7) | 44 (45.8) | 82 (51.3) | 95 (51.6) | 0.60231¶ |
| Oils | 236 (47.3) | 39 (40.6) | 82 (51.3) | 88 (47.8) | 0.25351¶ |
| Smoke | 205 (41.1) | 37 (38.5) | 77 (48.1) | 73 (39.7) | 0.20261¶ |
| Vape | 129 (25.9) | 25 (26.0) | 52 (32.5) | 40 (21.7) | 0.08341¶ |
| Capsules | 81 (16.2) | 20 (20.8) | 27 (16.9) | 24 (13.0) | 0.23951¶ |
| Other | 25 (5.0) | 6 (6.3) | 8 (5.0) | 10 (5.4) | 0.91331¶ |
| Cannabis type,† n (%) | | | | | |

Continued

Table 2 Continued

| Characteristic | Current cannabis users* Total (n=499) | Premenopause (n=96) | Perimenopause (n=160) | Postmenopause (n=184) | P value |
|---|---|---|---|---|---|
| CBD/THC blends | 289 (57.9) | 59 (61.5) | 100 (62.5) | 97 (52.7) | 0.07761¶ |
| High THC (THC only or with low CBD) | 180 (36.1) | 26 (27.1) | 63 (39.4) | 65 (35.3) | 0.14691¶ |
| High CBD (CBD only or with low THC) | 173 (34.7) | 30 (31.3) | 61 (38.1) | 60 (32.6) | 0.41851¶ |
| I do not know | 30 (6.0) | 7 (7.3) | 9 (5.6) | 11 (6.0) | 0.83951¶ |
| Cannabis product access,† n (%) | | | | | |
| In-person store | 319 (63.9) | 66 (68.8) | 100 (62.5) | 119 (64.7) | 0.59731¶ |
| Online store | 195 (39.1) | 42 (43.8) | 74 (46.3) | 56 (30.4) | 0.00731¶ |
| From someone they know (ie, friend) | 124 (24.8) | 16 (16.7) | 37 (23.1) | 54 (29.3) | 0.05381¶ |
| Other‡ | 27 (5.4) | 5 (5.2) | 6 (3.8) | 12 (6.5) | 0.50781¶ |
| Changes to use during COVID-19 pandemic,§ n (%) | | | | | |
| No change | 290 (58.1) | 46 (47.9) | 100 (62.5) | 120 (65.2) | 0.01871¶ |
| Increased use | 189 (37.9) | 42 (43.8) | 57 (35.6) | 57 (31.0) | |
| Decreased use | 16 (3.2) | 7 (7.3) | 3 (1.9) | 5 (2.7) | |

*Only included values for respondents that answered survey questions on current cannabis usage and were categorised into 'premenopause', 'perimenopause' or 'postmenopause' for group comparisons ('other' category was not included). Missing data may be present for those who were not categorised into these stages, resulting in differences between menopause stage and total counts.
†More than one response possible.
‡Other including grow own (16), local pharmacy/pharmacy chain (3), specific distributor/suppliers (4), online (2), black market (1) and unknown (1).
§Note: no specific timeframe for COVID-19 pandemic defined to survey respondents.
¶$X^2$ p value.
**Fisher's exact p value.
CBD, cannabidiol; THC, delta-9-tetrahydrocannabinol.

indication as demonstrated in a survey of midlife women veterans in the USA, which reported over a quarter of women had used cannabis for menopause symptom management (published as abstract only).[36] Furthermore, Dahlgren *et al* recently published a study from the USA assessing patterns of medical cannabis use in perimenopausal and postmenopausal women.[37] Their survey administration overlapped with the time frame as our mixed methods study. They found that 86.1% of women in their sample of 258 survey respondents were using cannabis for menopausal symptoms and that 78.7% endorsed it for menopause symptoms.[37] Similar to our findings the most commonly reported symptoms for cannabis use were sleep difficulties and mood/anxiety.[37]

Still few studies have looked at the effect of cannabis on improving menopausal symptoms, as identified in a recently published systematic review.[10] Despite MHT being effective in women for VMS, some women continue to desire alternative methods of managing menopause beyond prescribed therapies.[6 38] Use of complementary and alternative medicine (CAM) and compounded bioidentical hormone therapy (cBHT) is prevalent despite mixed evidence and lack of recommendations by clinical guidelines.[4 5 39] Cannabis appears to follow the same trend as CAM and cBHT use by women for menopausal symptoms, warranting further exploration of how women perceive cannabis as a medicine. One study investigated the impact of smoked cannabis on mood in postmenopausal women.[40] Another examined associations of drug use and menopause in women with HIV, and found hot flashes to be associated with cannabis use.[41] An American survey of menopausal women endorsing lifetime cannabis use reported expectations for cannabis to relieve menopause symptoms, including musculoskeletal discomfort, sleep issues, mood changes and hot flashes.[42] Our survey did not measure expectancies for symptom relief; however, women were asked to indicate cannabis use for specific symptoms. Women who reported current cannabis use were more likely to report experiencing menopause symptoms compared with non-users, specifically sleep difficulties, mood symptoms, muscle/joint achiness and urogenital symptoms. Our data add to the evidence indicating midlife women's use of cannabis medically, as well as emphasise the high level of interest on cannabis through the large number of responses in our survey.

Women in our survey used the internet as a main source of information on cannabis, suggesting cannabis use is driven by sharing of anecdotal information. The internet is a source for easily shared information, resulting in misleading health claims including menopause.[43] Women may be reluctant to discuss cannabis with healthcare

**Table 3** Perceptions around cannabis for medical purposes

| Responses | No (%) of participants (n=1485) |
|---|---|
| Likelihood to use after legalisation, n (%) | |
| Yes | 559 (37.6) |
| No | 445 (30.0) |
| Maybe | 302 (20.3) |
| I do not know | 127 (8.5) |
| No response | 52 (3.5) |
| Interest in using cannabis for menopause symptoms, n (%) | |
| Yes | 575 (38.7) |
| No | 254 (17.1) |
| Maybe | 424 (28.6) |
| I do not know | 181 (12.2) |
| No response | 51 (3.4) |
| Interest in learning about cannabis for managing menopause symptoms, n (%) | |
| Yes | 763 (51.4) |
| No | 236 (15.9) |
| Maybe | 355 (23.9) |
| I do not know | 81 (5.5) |
| No response | 50 (3.4) |
| Type of cannabis information desired,* n (%) | |
| Indications | 966 (65.1) |
| Type of cannabis (CBD vs THC, different strains) | 698 (47.0) |
| Drug interactions | 621 (41.8) |
| Dosing | 609 (41.0) |
| Side effects | 554 (37.3) |
| Cannabis product forms | 413 (27.8) |
| Other | 41 (2.8) |
| Information sources accessed for cannabis use and products,* n (%) | |
| Internet searches | 687 (46.3) |
| Family or friends | 506 (34.1) |
| In-person cannabis store | 338 (22.8) |
| Physician | 236 (15.9) |
| Medical cannabis clinic | 232 (15.6) |
| Online cannabis store | 159 (10.7) |
| Social media | 98 (6.6) |
| Pharmacist | 89 (6.0) |
| Other | 68 (4.6) |
| Desired sources of information for cannabis,* n (%) | |
| Physician | 745 (50.2) |
| Medical cannabis clinic | 722 (48.6) |
| Pharmacist | 597 (40.2) |
| Internet searches | 497 (33.5) |
| In-person cannabis store | 301 (20.3) |
| Online cannabis store | 228 (15.4) |
| Family or friends | 183 (12.3) |
| Social media | 114 (7.7) |
| Other | 33 (2.2) |

*More than one response possible.
CBD, cannabidiol; THC, tetrahydrocannabinol.

providers and resort to self-medicating because of fear of stigmatisation.[44] Health professionals are hesitant to provide guidance on use of cannabis therapeutically due to lack of evidence, lack of product standardisation and dosing, and unfamiliarity.[45 46] Yet, our data show that women prefer to receive cannabis information from their healthcare providers, highlighting the importance of developing women's cannabis-specific evidence-based resources for patients and providers.

## Limitations

This study has several limitations to be considered when interpreting findings. First, our recruitment strategy included women who had access to the internet and were able to complete the survey in English, which may limit the generalisability to all women aged 35 or over. It is difficult to estimate our population for the survey given that this was an unrestricted and self-selected survey with women who had access to social media platforms. This was an exploratory study designed to inform further research, including the next qualitative phase of this mixed-methods study. These findings are not representative of the full population of women aged 35 and over, other than the women who completed the survey. Online data collection may impact complete representativeness of the population, however, the large number of responses collected in the short time frame suggests our survey method was effective to engage women in study participation. As well, our sample of self-selected women addressed the lack of evidence available on cannabis for self-management of symptoms in this population to justify future clinical investigations. Second, our survey cohort was highly educated and there was an underrepresentation of ethnic or racial minorities. To compare, 88% of women in our survey had some level of postsecondary education vs 65% of women in Alberta per census data.[47] Third, this study relied on self-reported data to categorise menopause stages and symptoms. All women were asked to report presence of menopause symptoms, which may have inadvertently introduced confounders and self-reporting bias. Other limitations, common to survey design include information bias, prevarication bias, notoriety bias, and social desirability which may have influenced how women may have responded to questions around cannabis or menopause. Fourth, it was beyond

Table 4 Logistic regression analysis for predictors of current cannabis use with participant characteristics (n=499)

| | Unadjusted | | Adjusted* | |
|---|---|---|---|---|
| Variable | Univariable OR (95% CI) | P value | Multivariable OR (95% CI) | P value |
| Age | | | | |
| Per year increase | 1.0 (1.0 to 1.01) | 0.2759 | 1.0 (1.0 to 1.1) | 0.167 |
| Menopause stage | | | | |
| Premenopause | Reference | | Reference | |
| Perimenopause | 0.9 (0.7 to 1.2) | 0.6828 | 0.9 (0.6 to 1.2) | 0.6016 |
| Postmenopause | 1.0 (0.7 to 1.4) | | 0.9 (0.6 to 1.5) | |
| Smoking status | | | | |
| Never | Reference | | Reference | |
| Current/past | 2.6 (2.1 to 3.2) | <0.0001 | 2.5 (1.9 to 3.2) | <0.0001 |
| Health status | | | | |
| Good | Reference | | Reference | |
| Neutral | 1.5 (1.2 to 1.9) | 0.0001 | 1.5 (1.1 to 2.0) | 0.0025 |
| Poor | 2.0 (1.3 to 3.1) | | 1.8 (1.1 to 3.0) | |
| Education | | | | |
| High school or less | Reference | | Reference | |
| Postsecondary or more | 0.7 (0.5 to 0.9) | 0.0142 | 0.7 (0.5 to 1.1) | 0.1083 |
| Menopause symptoms† | | | | |
| Symptoms not present | Reference | | | |
| Vasomotor symptoms | 1.1 (0.9 to 1.4) | 0.467 | N/A | |
| Genitourinary syndrome of menopause | 1.3 (1.0 to 1.6) | 0.031 | N/A | |
| Difficulty with sleep | 2.0 (1.5 to 2.6) | <0.0001 | N/A | |
| Mood symptoms | 2.0 (1.5 to 2.6) | <0.0001 | N/A | |
| Muscle and joint achiness | 1.7 (1.4 to 2.2) | <0.0001 | N/A | |

*Model adjusted for: age, menopause stage, health status, smoking status and education level.
†For regression analysis, menopause symptoms from table 1 were categorised into overlapping clinical effects as follows: vasomotor symptoms=hot flashes, night sweats; genitourinary syndrome of menopause=vaginal dryness/itching, painful intercourse, low libido; mood symptoms=depression, mood swings, irritability, anxiety, difficulty concentrating; difficulty with sleep; muscle and joint achiness.
N/A, not available.

the scope of the study to objectively measure the positive or negative effects of cannabis use on individual symptom control, nor can this data establish causality. While we asked past users if side effects were the reason for stopping cannabis use, we did not explore perceived cannabis related adverse effects in current users. Fifth, the term cannabis in our study was defined according to Canadian regulations.[11] We recognise that cannabis definitions may differ depending on country-specific regulations. Finally, as medical cannabis is not currently covered by most Canadian healthcare plans, the population who use cannabis will be women who can afford it. Affordability of cannabis, including out of pocket expenses, to establish associations with demographic characteristics was beyond the scope of this survey. Rather, we developed a cross-sectional survey to identify cannabis usage patterns and provide insight on associations for further hypothesis generating and clinical investigations.

## Conclusion

Some women are using cannabis for symptoms related to menopause. Our survey established that women are using cannabis for symptoms during the menopause transition. Information about cannabis was more frequently accessed through online searches and personal contacts, with limited involvement of healthcare providers. Further research is required to investigate the efficacy and safety of cannabis on menopause symptoms and foster the development of clinical resources for women to use in making informed decisions around cannabis for medical purposes.

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