



## Correspondence

## Cannabis use in people with multiple sclerosis and spasticity: A cross-sectional analysis



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## ABSTRACT

**Background:** Growing evidence supports that cannabinoids relieve MS-related spasticity but little is known about cannabis use among people with MS (PwMS) and spasticity.

**Objective:** To characterize cannabis use among PwMS and spasticity.

**Methods:** As part of baseline data collection for a spasticity intervention trial in Oregon, PwMS and self-reported spasticity answered questions about cannabis use.

**Results:** 54% reported ever using cannabis and 36% currently use. 79% use multiple routes of administration, 58% use at least daily. 79% find cannabis helpful for spasticity and 26% use cannabis and prescribed oral antispasticity medications.

**Conclusions:** Many PwMS and spasticity use cannabis and report it helps their spasticity.

## 1. Introduction

Over 80% of people with MS have spasticity, causing pain, gait difficulties, and increased disability (Rizzo et al., 2004). MS-associated spasticity is generally treated with oral anti-spasticity medications, with botulinum toxin or intrathecal baclofen used second-line. However, these may not be completely effective and are associated with dose-limiting side effects (Otero-Romero et al., 2016). A survey of people with MS-related spasticity found under 50% were satisfied with their current treatment (Bethoux and Marrie, 2016), supporting the need for better therapies for MS-associated spasticity.

Recent American Academy of Neurology systematic reviews concluded that the only use of cannabinoids in neurological disorders supported by high-quality evidence is for reducing patient-reported spasticity in MS (Koppel et al., 2014), and the only complementary medicine intervention with high level evidence for efficacy in MS is pharmaceutical cannabinoids for spasticity (Yadav et al., 2014). Although no pharmaceutical cannabinoid preparation for treating MS-associated spasticity is available in the United States, and cannabis is federally illegal (Schedule 1), cannabis has been legalized for medical use in 30 states as of September 2019. However, there is still limited information about patterns of cannabis use and perceived benefits among people with MS (PwMS), and no published studies have specifically assessed patterns of cannabis use in adults with MS-related spasticity.

We completed a cross-sectional analysis of self-reported patterns of cannabis use and perceived benefits for MS symptoms in PwMS enrolling in a randomized controlled rehabilitation trial for MS-related spasticity in Oregon, a state where cannabis is medically (1998) and

recreationally (2014) legal.

## 2. Methods

Ambulatory people aged 18 and over with MS and self-reported lower extremity spasticity that interfered with daily activity were enrolled in a randomized controlled trial, being carried out in Portland, Oregon, evaluating the impact of education and stretching on spasticity. The Portland VA and OHSU Institutional Review Boards approved the study and participants provided written informed consent.

As part of baseline data collection, in addition to demographics and other outcomes, subjects completed a questionnaire about past and current cannabis use. Current users also reported route(s) of administration, frequency of use, and perceived benefit for MS symptoms, including pain, spasticity, sleep, depression, anxiety, stress, rated on a 1–5 scale from very unhelpful to very helpful. Participants were asked which, if any, prescribed oral anti-spasticity agents they currently used. The data from subjects enrolled over the first 10 months of the study were summarized with descriptive statistics and logistic regression models evaluated associations between cannabis use and demographic characteristics.

## 3. Results

Ninety-one PwMS enrolled and there were no missing data. Most were middle-aged, white, and female, representative of the wider population of PwMS (Table 1). Forty-nine participants (54%) reported using cannabis in the past and 33 (36%) reported current cannabis use (Fig. 1A). Among current users, most (26, 79%) used multiple routes,

**Table 1**  
Demographics and clinical characteristics. \*Not all participants used oral spasticity medications and some used more than one medication.

		Number of participants	% of total	
Age	30–39	12	13.2	
	40–49	21	23.1	
	50–59	25	27.5	
	60–69	22	24.2	
	70–79	11	12.0	
Gender	Male	9	9.9	
	Female	82	90.1	
Race	Caucasian	78	85.7	
	African-American	5	5.5	
	Mixed/other	8	8.8	
Ethnicity	Hispanic	4	4.4	
	Non-Hispanic	87	95.6	
Education level	High school diploma/ GED	9	9.9	
	Some college	25	27.5	
	Community College Degree	10	11.0	
	College graduate	26	28.6	
	Master's degree or higher	21	23.0	
	Currently employed	Yes, full time	14	15.4
		Yes, part time	11	12.1
	Total household income	No	66	72.5
		Less than \$15,000	13	14.3
		\$15,000–\$30,000	13	14.3
\$30,000–\$50,000		17	18.7	
\$50,000–\$100,000		23	25.3	
More than \$100,000		19	20.9	
MS Subtype	I prefer not to answer	6	6.5	
	Relapsing remitting MS	51	56.0	
	Secondary progressive MS	23	25.3	
	Primary progressive MS	17	18.7	
Patient-determined disease steps	0 = Normal	3	3.3	
	1 = Mild disability	8	8.8	
	2 = Moderate disability	10	11.0	
	3 = Gait disability	13	14.3	
	4 = Early cane	23	25.3	
	5 = Late cane	14	15.4	
	6 = Bilateral support	19	20.8	
Oral spasticity medication*	Baclofen	49	53.8	
	Clonazepam	8	8.8	
	Gabapentin	8	8.8	
	Tizanidine	7	7.7	
	Diazepam	2	2.2	
	Cyclobenzaprine	1	1.1	

with topical being the most popular (18, 55%). Seventeen (52%) used edible cannabis, 16 (48%) used cannabis tinctures, 14 (42%) smoked cannabis, and 10 (30%) vaped (Fig. 1B). Among current users, 19 (58%) used cannabis at least once a day, 12 (36%) used once a week to once a month, and two (6%) used less than once a month (Fig. 1C).

All current users reported cannabis was very or somewhat helpful for at least one of the following: pain, spasticity, sleep, depression, anxiety, and/or stress. Twenty-eight (85%) found cannabis somewhat to very helpful for pain, and 26 (79%) found it somewhat to very

helpful for spasticity.

Regarding treatments used for spasticity, of the 91 total participants, 39 (43%) used only prescribed oral medications, 24 (26%) used prescribed oral medications and cannabis, 9 (10%) only used cannabis, and 19 (21%) used neither prescribed oral medications nor cannabis (Fig. 1D).

There were no differences in patterns of cannabis use based on age, gender, income, education, MS subtype, or patient-reported disability.

#### 4. Discussion

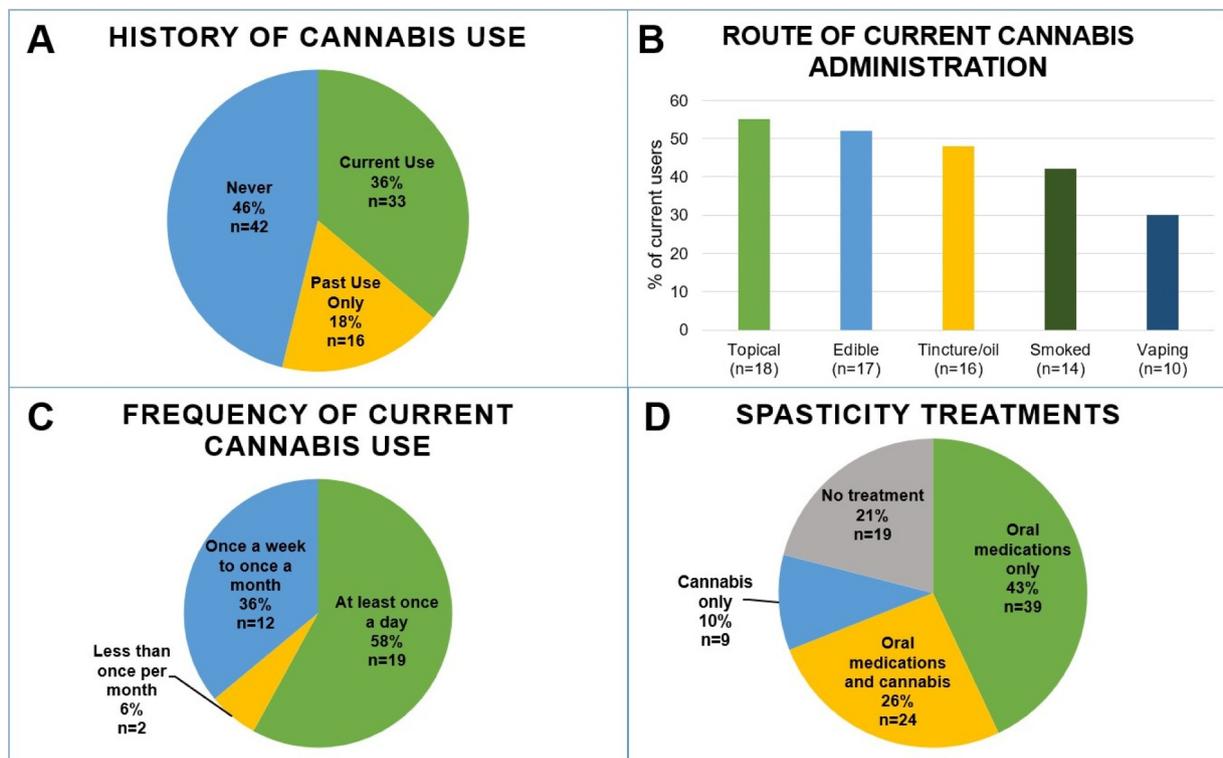
To our knowledge, this is the first study of cannabis use patterns in PwMS and spasticity. In this sample, approximately 1/3 currently use cannabis. Although this is higher than the 16% previously reported in a 2017 survey of North American PwMS (Cofield et al., 2017), this is consistent with reported cannabis use in PwMS in states where cannabis is medically and recreationally legal (Weinkle et al., 2019).

Most subjects used multiple routes of cannabis administration. Interestingly, topical cannabis was most common whereas, in other studies, smoking or vaping were most common (Weinkle et al., 2019; Ware et al., 2005). Spasticity is a localized musculoskeletal symptom, which may explain the popularity of topical cannabis in this population. Most cannabis users (58%) used cannabis at least daily. This is higher than in a recent study from Colorado, where cannabis is also recreationally and medically legal, where 35% of users used daily (Weinkle et al., 2019). Our subjects may use daily to address daily spasticity. All subjects found cannabis helpful for at least one symptom, consistent with motivation for use, and most found it helpful for pain or spasticity, consistent with previous controlled trials (Chong et al., 2006; Park and Prevalence, 2017). Additional studies would be needed to explore causal relationships between populations and patterns of cannabis use.

To our knowledge, the use of cannabinoids and prescribed spasticity medication use have not been previously studied. Although 43% of our participants used oral prescription medications to treat their spasticity, 26% used cannabis with these medications, and 10% exclusively used cannabis. These data support previous findings (Bethoux and Marrie, 2016) that prescribed oral medications do not completely relieve MS-associated spasticity. Further research is needed to determine how cannabinoids may complement or affect the use of oral prescription medications.

This study had several limitations. The small and homogeneous sample limits generalizability. The cross-sectional design limits attribution of causation. Subjects were not asked about cannabis side effects, amount of cannabis used, cannabinoid content, or perceptions or attitudes about cannabis use for MS symptoms.

In summary, as cannabis legalization spreads, clinicians are likely to encounter more interest in using cannabis for MS symptoms. While evidence supports the benefit of certain cannabinoid formulations for improving self-reported MS-associated spasticity, these specific formulations are not available in the US, and the products in states where cannabis is legal are heterogeneous in their purity and cannabinoid content. This makes it difficult to provide evidence-based recommendations to patients. There is a critical need for further research into the safety and efficacy of various cannabinoid formulations for the treatment of MS symptoms, including spasticity.



**Fig. 1.** Patterns of cannabis use among 91 people with MS and spasticity. A) History of cannabis use in study participants ( $n = 91$ ). B) Route of cannabis administration for current users ( $n = 33$ ). C) Frequency of cannabis use among current users ( $n = 33$ ). D) Treatments for spasticity used by all participants ( $n = 91$ ).

#### Declaration of Competing Interest

Dr. Rice has done consulting for Greenwich Biosciences. Ms. Hugos declares that there is no conflict of interest. Ms. Hildebrand declares that there is no conflict of interest. Dr. Cameron has done consulting for Adamas Pharmaceuticals Inc. and for Greenwich Biosciences.

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