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Introduction

- Cannabinoid-based therapies (CBT) are gaining acceptance for the management of treatment-resistant epilepsy (TRE) and other conditions, but health providers are not fully on board.
- 46% of family physicians in Colorado¹ did not support physicians recommending medical marijuana, and only 19% thought that physicians should recommend it. Few thought that marijuana had significant health benefits; 92% agreed that they need further education.
- Only 38% of physicians in Kansas² felt well informed about medical marijuana and only 18% have ever recommended it to a patient.
- One study³ identified key CBT education needs (e.g., risks, safety, dosing) among Canadian physicians.
- However, data regarding knowledge of and attitudes toward CBT, especially cannabidiol (CBD) use for TRE, among diverse healthcare providers are limited.

Study Aim

- To examine and compare knowledge of and attitudes toward CBT, especially CBD, among different provider types in the United States.

Methods

- Targeted, national, and quota-based online survey of US neurologists (n=151), pharmacists (n=150), and nurses (n=150; 60 NPs) was conducted in August-September 2018, after FDA approval of CBD in oral solution (Epidiolex®).
- 29 structured items tapped CBD attitudes, knowledge of endocannabinoid system, pharmacology, products, effects, clinical application, and regulation.
- Respondents demographics and professional/work characteristics were assessed.
- Analysis: cross-tabs/Chi-square tests (p<0.05).

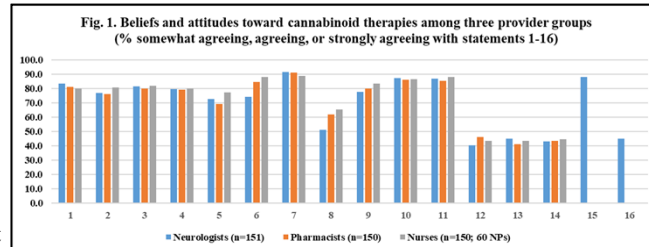
Results

- Respondents were 53% female, 83% white, 4% Hispanic/Latino; 40% worked in private practice and 24% in academic hospitals (Table 1).
- The majority believed that CBD is effective for epilepsy, favored use of CBD for TRE, and thought they needed further education (Fig. 1-2).
- Differences in responses based on provider type were largely nonsignificant (p≥0.188; Fig. 1-2; Table 2).

Table 1. Demographic characteristics of the full healthcare provider sample and nurse practitioner (NP) subsample

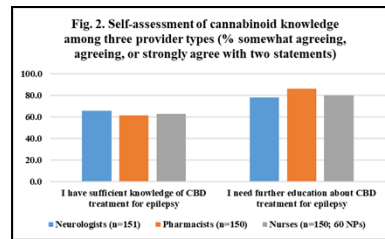
	Full Sample		NPs	
	n	%	n	%
Total	451	100.0	60	100.0
Gender				
Female	237	52.5	48	80.0
Male	207	45.9	12	20.0
Prefer not respond	7	1.6	0	0.0
Age group				
24-44 years	212	47.0	26	43.3
45-55 years	132	29.3	23	38.3
56-75 years	115	23.3	11	18.3
Prefer not respond	2	0.2	0	0.0
Race				
White	374	82.9	53	88.3
Black/Afr-Amer	16	3.5	4	6.7
Asian	49	10.9	2	3.3
AI/AN	2	0.4	1	1.7
Native Hawaiian	1	0.2	0	0.0
Pacific Islander	3	0.7	0	0.0
Other	10	2.2	1	1.7
Hispanic or Latino/a				
Yes	17	3.8	1	1.7
No	434	96.2	59	98.3
Clinical Profession				
Nurse	150	33.3	60	100.0
Pharmacist	150	33.3		
Neurologist	151	33.5		
Work Setting				
Community Hospital	112	24.8	16	26.7
Academic Hospital	109	24.2	11	18.3
Private Practice	176	39.0	29	48.3
Other	90	20.0	6	10.0

AA/AN=American Indian/Alaska Native



Note. Item distributions not different by provider type except items 6 (p=0.005) and 8 (p=0.030). Items 15 and 16 only asked of neurologists.

1 I believe CBD is effective for epilepsy	9 The use of any cannabis products for medical purposes if it is prescribed by a medical provider should be legal
2 I favor the use of CBD as a method of treating epilepsy	10 I favor the federal government allowing the use of cannabis for medical purposes
3 I believe that CBD is effective in reducing seizure frequency	11 I favor my state allowing the use of cannabis for medical purposes if it is prescribed by a medical provider
4 I believe that CBD is effective in reducing seizure severity	12 The use of cannabis for recreational purposes should be made legal
5 I believe that CBD is effective in reducing seizure duration	13 I favor my state allowing the use of cannabis for recreational purposes
6 There is a stigma associated with recommending CBD for treating epilepsy	14 I favor the federal government allowing the use of cannabis for recreational purposes
7 I support the legalization of the FDA approved and regulated versions of CBD prescribed by health care professionals for treatment of epilepsy	15 If legalized, I would be comfortable prescribing the FDA approved and regulated versions of CBD for treatment of epilepsy
8 I support the full legalization of all CBD products including non-FDA approved (artisanal) products available through dispensaries	16 If legalized, I would be comfortable prescribing any cannabis-derived products, including non-FDA approved (artisanal) products, for treatment of epilepsy



Note. Item distributions not different by provider type (p≥0.188).

Table 2. Cannabinoid knowledge: percentage of providers answering questions correctly, by provider type

Item	Correct answer	Neurologists n=151	Pharmacists n=150	Nurses ^a n=150	p ^b
How many different phytocannabinoids are present in the cannabis plant?	>50	30.5	34.0	30.0	0.717
Do you believe effects of cannabis-based products differ depending on the cannabinoid content (CBD, THC, CBDV, THCV, etc.)?	Yes	82.8	88.0	81.3	0.253
For patients with epilepsy who are taking a cannabis-derived product in addition to antiepileptic drugs (AEDs), which levels of their other AEDs should be tested (serum)?	Some levels (vs all, none, or don't know)	15.9	6.7	4.7	0.001 ^c
Hemp is legal	True	37.7	59.3	46.0	0.001 ^c
Cannabis is legal	False	74.8	80.7	66.7	0.021 ^d
Isolated plant-derived cannabinoids are legal	False	39.7	42.0	31.3	0.133

^a60 NPs, 90 other nurse type.

^bChi-square test.

^cSignificant after Bonferroni correction (α = 0.05/24 = 0.002).

^dNon-significant after Bonferroni correction (α = 0.05/24 = 0.002).

Study Limitations

- Instruments are preliminary and need refinement and validation in other samples.
- Sample is limited.

Conclusions

- US providers appear to believe in beneficial effects and support legalization of CBD for treatment of TRE.
- Notable knowledge gaps were present in questions related to legality and potential interactions with AEDs.
- The majority think that they have sufficient knowledge of cannabis/cannabis-based therapies, but overwhelmingly indicate a need for further education.

References

1. Kondrad, E, Reid, A. Colorado family physicians' attitudes toward medical marijuana. J Am Board Fam Med 2013; 26:52-60.
2. Kansas City Medical Society. Survey results: physician attitudes on medical marijuana. 2016; <https://kcmedicine.org/survey-results-physician-attitudes-medical-marijuana/>
3. Ziemanski D, Capler R, Tekanoff R et al. Cannabis in medicine: a national educational needs assessment among Canadian physicians. BMC Medical Education. 2015;15:52.

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Factors Associated with Providers' Attitudes and Knowledge Regarding Cannabis-Based Therapies

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Introduction

- Cannabis for therapeutic purposes (CTP) is gaining acceptance for management of treatment-resistant epilepsy (TRE) and other conditions, but providers are not fully on board.
- A third of family physicians in Colorado¹ recommended medical cannabis to patients, but many felt uncertain about health benefits and worried about risks.
- Patients report mixed responses and knowledge among providers; both patients and physicians navigate a not-fully legitimate field of CTP.²
- Factors associated with attitudes and knowledge of CTP among diverse providers (e.g., professional tenure, work policies, or state laws) are not well understood.

Study Aim

- To examine relationships of professional status, context, and demographic factors to knowledge and attitudes regarding CTP among different provider groups in the US.

Methods

- Targeted, quota-based online survey of US neurologists (n=151), pharmacists (n=150), and nurses (n=150; 60 NPs) was conducted in August-September 2018, after FDA approval of Epidiolex[®] (cannabidiol, 100mg/mL oral solution).
- 29 structured items tapped CTP attitudes, knowledge of endocannabinoid system, pharmacology, products, effects, clinical application, and regulation.
- 2 scales (attitudes, perceived knowledge) and a knowledge test score were constructed.
- Respondents' demographics, professional/work status and location were assessed.
- Analysis included Pearson correlations and multiple regression (alpha=0.05).

Results

- Respondents were 53% female, 83% white, 4% Hispanic/Latino; 40% worked in private practice, 24% in academic hospitals; 58% practiced in states with comprehensive medical marijuana law (Table 1).

	n	%	median
Gender/sex			
Female	237	52.5	
Male	207	45.9	
Prefer not to respond	7	1.6	
Age group			
24-44 years	212	47.0	
45-55 years	132	29.3	
56-75 years	105	23.3	
Prefer not to respond	2	0.4	
Race			
White	374	82.9	
Black/African-American	16	3.5	
Asian	49	10.9	
Other	16	3.5	
Hispanic or Latino/a	17	3.8	
Work setting			
Community Hospital	112	24.8	
Academic Hospital	109	24.2	
Private Practice	176	39.0	
Other	90	20.0	
State law			
No marijuana access laws	15	3.3	
CBD/low THC product law	101	22.4	
Comprehensive medical marijuana	261	57.9	
Adult and medicinal use regulated	74	16.4	
Work CTP policy			
"Don't ask, don't tell"	30	6.7	
Nursing/med techs must administer	23	5.1	
Pharmacy must administer	44	9.8	
Patient must administer own supply	83	18.4	
Not allowed	206	45.7	
Other	20	4.4	
Don't know	45	10.0	
Professional tenure (number of years)			14.0
% Pediatric patients in practice			15.0
% Epilepsy patients in practice			20.0
% TRE patients in practice			10.0

- Neurologists had less positive attitudes than nurses (p=0.02), but knowledge was similar across provider groups (p≥0.114).
- Attitudes/knowledge were associated with more epilepsy/TRE in practice (p≤0.02).

- Weak positive associations were observed among perceived knowledge, knowledge test, and attitudes (p<0.001; Table 2).
- Attitudes/knowledge did not vary by state law (p≥0.247).

	Attitudes	Perceived Knowledge	Knowledge Test Score	State Law ^a	% Epilepsy in Practice
COMBINED SAMPLE (n = 451)					
Attitudes	1.000				
Perceived Knowledge	0.446***	1.000			
Knowledge Test Score	0.183***	0.265***	1.000		
State Law	-0.026	0.055	0.051	1.000	
% Epilepsy in Practice ^b	0.127**	0.281***	0.113*	0.018	1.000
NEUROLOGISTS (n = 151)					
Attitudes	1.000				
Perceived Knowledge	0.474***	1.000			
Knowledge Test Score	0.167*	0.140	1.000		
State Law	-0.019	0.018	0.033	1.000	
% Epilepsy in Practice ^c	0.195*	0.285***	0.267**	0.055	1.000
PHARMACISTS (n = 150)					
Attitudes	1.000				
Perceived Knowledge	0.462***	1.000			
Knowledge Test Score	0.106	0.291***	1.000		
State Law	0.060	0.122	0.092	1.000	
% Epilepsy in Practice ^d	0.112	0.282**	-0.029	0.163	1.000
NURSES (n = 150)					
Attitudes	1.000				
Perceived Knowledge	0.433***	1.000			
Knowledge Test Score	0.320***	0.392***	1.000		
State Law	-0.062	0.026	0.014	1.000	
% Epilepsy in Practice ^e	0.131	0.252**	0.064	-0.187*	1.000
NPs (n = 60)					
Attitudes	1.000				
Perceived Knowledge	0.556***	1.000			
Knowledge Test Score	0.288*	0.416**	1.000		
State Law	-0.204	-0.021	0.038	1.000	
% Epilepsy in Practice ^f	0.305*	0.338*	0.018	-0.126	1.000

***p < 0.001, **p < 0.01, *p < 0.05; otherwise not statistically significant.
^aState law is assessed as CBD/cannabis access at 4 levels: no access laws (0), CBD/low THC law (1), medical marijuana law (2), and recreational adult/medical marijuana access law (3). n = 424. n = 150. n = 137. n = 57.

- Neurologists: Perceived and actual knowledge were not related (p=0.087); academic position and more pediatric/TRE patients were associated with a higher test score (p≤0.005).
- Higher perceived knowledge and nurse or pharmacist type were the strongest predictors of positive attitudes (p≤0.006; Table 3).

	B	Std. Error	Beta	t	Sig.
(Constant)	34.589	1.357		25.498	0.000
Perceived knowledge	0.187	0.019	0.430	9.892	0.000
Test score	1.047	0.583	0.078	1.795	0.073
Nurse	3.554	1.002	0.171	3.548	0.000
Pharmacist	2.773	1.002	0.133	2.767	0.006

R-square = 0.228; adj. R-square = 0.221; df = 4.
 Note: Dependent variable is attitudes. Neurologist is excluded from the model as a reference group. Addition of other variables did not improve the model fit.

Study Limitations

- Instruments are preliminary and need refinement and validation in other samples.
- Sample is limited and not generalizable.

Conclusions

- Support for CTP, especially pharmaceutical-grade CBD, is high among US neurologists, nurses, and pharmacists.
- Serving epilepsy/pediatric populations is associated with more positive attitudes and higher knowledge.
- State laws are not much of a factor, but, for some providers, organizational restrictions are associated with less knowledge.
- More representative data and professional cannabinoid education are needed.

References

1. Kondrad, E, Reid, A. Colorado family physicians' attitudes toward medical marijuana. J Am Board Fam Med 2013; 26:52-60.
2. Newhart, M, Dolphin, W. The Medicalization of Marijuana: Legitimacy, Stigma, and the Patient Experience. Routledge: 2019.

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